

# FRIDAY, APRIL 19, 1PM PROGRAM

Presenters, Sessions and Abstracts

The Student Showcase program is also posted at **coloradomesa.edu/showcase**.





# ABOUT THE STUDENT SHOWCASE

The Student Showcase highlights student works involving creativity, discovery, research, innovation and/ or entrepreneurship through sessions by undergraduate and graduate students at Colorado Mesa University and Western Colorado Community College. The Student Showcase builds on classroom experience and is a venue where students can share their work with faculty, student peers and community members. Students participating in this campus-wide forum have distinguished themselves as scholars.









# CHECK-IN

**Students • 10am-2pm**First Floor of the University Center

Judges • 12-1:45pm
Outside of Love Recital Hall, MPAC

# KICK-OFF EVENT 1:15pm

Love Recital Hall, MPAC

Sponsor: Alpha Chi Honor Society Speaker: Kati Garner, Coordinator of Mental Health and Crisis Coordinator for School Districit 51

### Stop, Collaborate and Listen

Join us in kicking off the Student Showcase with a dynamic TED-style talk on a very important topic that affects our community: mental health. While mental health issues are common, resources, support and conversations around mental health have not always been available. And, historically, both as a nation and a community, we have been reactive when it comes to meeting mental health needs. The good news is that, over the past several years, Mesa County has brought mental health to the forefront in order to be proactive rather than reactive. The ability to Stop, Collaborate and Listen to address mental health issues in the Grand Valley has helped us move forward in meeting these important needs for our community.

# Bronze Pour Demonstration

3:15 pm

Fine Arts Building Foundry

The bronze pour is the culmination of the artists' work in creating an artwork using the lost wax process. In this process the artist creates an artwork; creates a mold from the artwork; slushes the mold with wax and then uses this to create a ceramic shell to be used during the pour. Today, during the bronze pour you will see the molten metal being poured into these ceramic shells. After the pour, these forms will cool and then the artist breaks off the ceramic shell; cuts off areas that are not artwork, cleans the sculpture, puts a patina on the artwork and exhibits the artwork.

## AWARDS CEREMONY

Friday, April 19, 2018, 4:30 pm Meyer Ballroom, University Center

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Session Facilitators
Faculty Mentors
Campus Mapback cover



PRESENTER	TRACK		SE # ABSTRACT	PRESENTER	TRACK	PAC TRACK	GE # ABSTI
Elias Acevedo	11B	32	115	Harrison Benoit	5A	20	78
Suzann Acovio	3F	16	63	Colton Berg	10D	30	103
Angelo Adams	4B	18	69	Noelle Berg	12A	34	121
Jesus Aguirre	5E	22	71	Savannah Bernal	11E	33	116
Ashli Alderman	13A	36	132	Austin Beswick	3G	17	57
Broderick Alexand	er 3A	13	50	Isabella Bettinger	2A	12	43
Bader Alkhamees	4A	18	67	Kaitlyn Bilsing	3A	13	62
Oxana Allen	4C	19	69	Tristin Bina	3D, 5D	15, 22	51, 7
Ahmad Alojairi	3A	13	62	Lucas Bingham	4A	18	67
Serena Alvarado	7A	24	87	Sasha Bizer	12A	34	119
Dakota Amos	5E	23	73	Sasha Bizer	12D	35	120
Dylan Amos	5B	20	79	Zachary Blumenth	al 10D	30	103
Madeline Ancell	11A	31	119	Julie Boano	12B	34	123
Braxton Anderson	5B	20	72	Sean Bohling	5C	21	79
Carter Anderson	5D	22	70	Mitchell Bohn	4A	18	67
Keren Angeles	4B	18	68	Jacob Bollinger	10C	29	101
Caden Aragon	5B	20	79	Morgan Bond	12B, 14B	34, 39	124
Ethan Archer	10D	30 9	8, 101	Joseph-lan Bonga	r 4A	18	69
Ashlee Arline	13B	36	127	Elias Born	8D	26	94
Megan Atkin	7B	24	85	Jonathon Botello	13C	37	129
Fatima Attoumani	11E	33	116	William Bovard	5E	23	80
Jody Bailey	5E	22	71	Brianna Bower	12B	34	120
Garrett Ball	7A	24	84	Jacob Boyce	4B	18	68
Andris Balodis	5E	22	75	Jesse Boyce	5F	23	78
Caleb Barnes	5C	21	77	Marc Brandt	5E	22	75
Olia Barskey	7A	23	86	Marco Bravo	14A	38	134
Adam Bartels	5A	20	78	Kori Brenner	3C	15	58
TaylorBartholomev	v			Dylan Brewer	3H	17	54
	1A, 1B	11, 12	40, 41	Mikayla Brewer	3C	15	55
Tristan Bates	10A	28	110	Riley Brodie	3A, 3H	13, 17	48, 5
Kate Beagle	11E	33	116	Alec Brown	9B	27	96
Jorgan Bean	8B, 8C	25, 26	90, 92	Camden Brown	5A	20	82
Noah Beaver	5D	22	70	Hope Brown	13D	37	127
Colby Beckett	5B	21	76	William Brown	5D	22	83
Matthew Behnke	4B	18	66	Erik Brygger	5C	21	82
Hannah Belich	3C	15	50	Elliot Buchanan	5E	23	73
Janet Benedict	2A, 6	12, 23	44	Joshua Burget	5C	21	76
Andrew Bennett	14A	38	134	Paige Burnham	12B	33	119
				Cadle Burrell	5A	20	75

PRESENTER	TRACK		GE # ABSTRACT	PRESENTER	TRACK		GE # ABSTRACT
Brogan Butler	5E	22	77	Jennifer Dennison	-Jones		
Morgan Camp	11F	33	113		5E	22	81
Neifi Campas	4A	18	69	Jacob Dexter	5C	21	82
Alex Campbell	5B	21	76	Allie Dilldine	12D	35	120
Ina Elise Campbell	7A	24	87	Mitchell Dilley	5E	23	74
Amado Capetillo	5B	20	72	Rachel Dillmann	4C	19	64
Nicholas Cardinale	7A	24	84	William Doherty	5B	20	78
Zoe Carnes-Dougla	as 2B	13	43	Madison Donnafie	ld 3H	17	54
Lindsay Carpenter	12B	34	123	Jacob Doose	5D	22	83
Ryan Carr	7A	24	87	Jack Dorrance	5C	21	77
Alan Carrasco	5F	23	78	Sarah Douglas	11B	32	115
Nicole Castle	13E	37	129	Alexandrea Doyle	2A	12	44
Tori Catlett	10C	29	105	Cody Dozoretz	5E	22	81
Sarah Cerrone	8B	25	90	Stephen Drozda	3C, 5E	15, 23	59, 70
Joshua Chaffee	14A	38	134	Jacob Druce	3G	17	52
Amanda Charles	12A	34	124	Edward Dry	14A	38	134
Uchechukwu Chied	lu 5C	21	80	Stephen Dunn	3G	17	50
Samuel Cioara	3A	13	62	Robert Dunski	4A	18	67
Sara Clark	10C	29	99	Grant Duta	5A	20	71
Brian Claymon	4A	18	69	Anna Dworkin	13C	37	130
Meghan Cline	11D	32	112	Jeremy Ehlers	7A	24	86
Tristan Cloyd	3C	15	64	Mar Y El Torres	5B	21	77
Allen Cochran	14A	38	134	Mahmoud Elgayar	5B	21	80
Seth Coisman	3D	15	51	John Elliott	3A	13	62
Chris Cole	12D	35	120	Gerald Ellis	11C	32	111
Alejandro Conde	10E	31	110	Justin-Shay Ellswo	rth		
Rikki Cook	3B	14	48	-	5D	22	70
Katelyn Craig	13C	37	131	Kasey Emrich	3E	16	55
Olivia Crochet	13F	38	128	Justin Endicott	10B	29	105
Courtney Cross	11C	32	114	Aaron Enright	5C	21	83
Savana Cummings	10D	30	103	Angel Enrique	5A	18	75
Parker Cushing	3A, 3B	13, 14	52, 54	Brigittah Erickson	11D	32	113
Adam Davenport	3D	15	48	Erika Esquinca	4C	19	65
Daniel Davidek	13F	38	128	Lauren Essman	3C	15	55
Reno Davidson	10A	28	99	Seifeldin Ezzat	4B	18	68
Ethan Davis	5D	22	71	Madeline Farmer	7B	24	84, 85
Jeffrey Davis	5B	20	79	Jackson Ferguson	5B	20	78
James Dawe	10C	29	99	Gemini Fernandez			
Alain De la Bastide	3C	15	59		12A, 14B	34, 39	121
Peyton Deal	8A, 8F	25, 27	94	Joel Fiedler	5A	20	72
Payton Dearboarn	12D	35	120	Devon Fierberg	3A	13	48
Sarah Dedecker	10A	28	109	Marc Fiot	5A	20	75

PRESENTER	TRACK		GE # ABSTRACT		PRESENTER	PRESENTER TRACK	PRESENTER TRACK P
Cori Fix	12B	34	120		David Hale	David Hale 5D	David Hale 5D 22
DanielleFleig	3B	34 14	48		Jamie Hall		
DanielleFleig Angeline Fletcher		18	40 68		Jamie Hall		
Angeline Fletcher Emerson Flom					Vail Hall		
	4B	18	66				
Shawn Fox	10E	31	102		Dylan Hallett	•	•
Aaron Frick	9A, 9B	27	95, 97		Cera Hammond		
Scott Funston	5B	21	76		Aric Harper	•	•
Colton Futter	5A	20	75		yton Harrison	•	•
Andrew Gaines	4B	18	69	Halle Har	rison	rison 12C	rison 12C 35
lathan Garcia	3B	14	48	Donovan Harv	vell	vell 3A	vell 3A 13
ara Garcia	11D	32	117	Matthew Haskel	I	I 5A	I 5A 20
Hayden Gardner	5A	20	76	Benjamin Haver		1A	1A 11,
Caleb Gartner	4A	18	66	Olivia Hebrank		8D	8D 26
Natalie Gaul	3H	17	54	Alex Heckman		5B	5B 21
Rachel Geertgens	11B	32	118	Jessica Hedlun	1/	4	A 11
Anthony Gerken	3A, 3H	13, 17	54, 60	Cody Hedrick	5D		22
Austin Germann	5B	21	76	Chad Heiden	3C		15
Cara Giancaterino	12C	35	122	Tyler Heinsma	3E		16
Teresa Giandonat	o 2A	12	47	July Hendriksen	3C		15
Vincent Giandona	to 3B	14	63	Mahli Hernandez	10C		29
Parker Giles	5C	21	82	Carla Hernandez C	hacon		
Amber Gillard	7B	24	86		8A, 8E		25, 2
Gabrielle Gines	2A	12	47	Amanda Herron	3G		17
Sara Gladding	5D	22	79	Dominick Heskett	5E		22
Sara Gladding	5E	23	74	Marlon Heskett	5B		21
Timothy Gloor	5B	21	77	Jackson Hill	4B		18
Lindsay Gnesios	5E	23	74	Morgan Hoffmeiste	er		
Austin Gonsalves	3A	13	59	•	2C, 12I	5	D 35
Alyssa Gose	13C	37	126	Ana Holguin	3D		14
Brittany Goshia	4C	19	64	Eliajia Holliday	8C		26
Aaron Gossage	4B	18	68	Jack Holt	11A		31
Daniel Grace	3F	16	49	Blake Hood	13A		36
Jordan Gray	13A	36	125	Collin Hood	13A		36
Grayson Greeley	3C	15	49	Jill Hook	12D		35
Laura Green	10A	28	101	Nicholas Howland	14B		39
Cody Grinstead	4B	18	69	Ashley Hulet	3A		13
Adam Grotjohn	11F	33	114	Justin Humenik	10A		28
Antonio Gueretta		23	73	David Hunt	5E		23
Taylor Guerra	5A	20	70	Wyatt Hurst	4A		18
Andy Guerrero	8E	26	93	Jonathon Hutson	10A		28
Richard Hakes	4B	18	65	301141101111413011	10/1		
Janine Hald			91	Chevenne-Asia Hur	tto		
Janine Hald	8D	26	91	Cheyenne-Asia Hut	ττο		

PRESENTER	TRACK		SE #	PRESENTER	TRACK		GE#
		IRACK	ABSTRACT			IRACK	ABSTRACT
	7A	23	86	Jacob Lambdin	4B	18	65
Laura Huwa	13F	38	127	Carter Lambert	5C	21	72
Jamie Hyatt	6, 12C	23, 35	121	Collbren Lang	13D	37	128
Benjamin liames	7B	24	86	Anne Lapeira	3C	15	49
Annie Imes	13C	37	131	Kellie Larsen	4A, 4B	18	68
Noah Jackson	5E	23	73	Evan Lavin	5B	20	78
ThomasJacobs	13A	36	133	Megan Lawson	3A	13	48
Marisa Jahnke	11B	32	112	Teal Leavitt	8A	25	93
Alejandro Jaquez-	Caro			Spencer Lee	3A	13	59
	10A	28	103	Cierra LeVan	9A	27	97
Dejan Jestrovich	1B	12	41	Joshua Levy	3D, 3H	15, 17	54, 58
Joseph Jimenez	4A	18	69	Haley Lewis	3H	17	54
Trey Jiron	10B	29	108	Megan Liborio	3A, 3H	13, 17	48, 54
Bree Johnson	5C	21	76	Gabriel Liebelt	5B	21	77
Emmett Johnson	10D	30	98	Dana Liesegang	13D	37	132
Layna Johnson	1A, 1B	11, 12	41, 42	Calvin Lindberg	9B	27	97
Samantha Johnson	n 12C	35	123	Joshua Lindsey	10E	31	100
Westlyn Johnston	5E	23	74	Jacqueline Linn	5C	21	82
Jessica Jolley	11B	32	112	Logan Litle	4C	19	66
Nicholas Jones	8C	26	91	Chandler Livingsto	n 5A	20	76
Kekoa Kayser	7A	24	87	Bryn Loftness	4C	19	65
Keaton Kemper	5E	22	81	Gabrielle Lopez	11F	33	117
Brian Kennedy	5B	20	78	Mikaela Lopez	11C	32	111
Anna Kenney	8B	25	89	Jose Lopez Ramire		21	77
Geoffrey Kice	3B	14	56	Scott Lowe	4A	18	67
Brian Kimbrell	3A, 3B	13, 14	48. 62	Ashley Lozinski	3A	13	48
J D. King	10E	31	107	Paige Luke	12C	35	122
Mackenzie King	12C	35	122	Connor Lumley	5E	22	81
Peter Kisiel	13A		26, 132	Cinthya Luna Ram		21	83
Olin Klovdahl	3C	15	49	Sydney Lyons	10D	30	97
Zane Knapp	5A	20	75	David Madrid	5E	22	75
• •	12C, 12D	35	120	Briana Maestas	10C	29	108
Alana Koch	13B	36	132	Ryland Mahre	13A	36	125
Angela Koch Ortiz		35	120	Estevan Maldonad		21	76
Jaden Koos	5E	23	70	Brieanna Mangette		27	96
Sandra Kostjushko		17	54	Nicolas Maraschin	5E	22	81
Rachel Kotris	6, 12C	23, 35	121	Justin Marker	5F	23	78
Gretchen Kowalcz		_0,00		Dominique Marqu		16	57
5.55/1	14A	38	134	Edward Martin	10A	28	108
Kyle Krauland	5C	21	83	HannahMartin	1A	11	40
Tia Leray Kroschel		19	64	Lucas Martin	3C	15	50
Erin Krueger	3A	13	53	Gabriel Martinez	5C	21	80
Lilli Kidegei	57	13	55	Gubrici iviai tiilez	30	۷.	00

PRESENTER	TRACK		SE # ABSTRACT
Madyson Martinez	8D	26	89
athew Matamale	s 5B	20	79
loshua Mathews	4A	18	66
ames Mathson	4A	18	67
_eighanne Matson	12D	35	120
Derek Mayo-Alvare		25	92
Quiana McElroy	13B	36	130
abitha McFarland		12	46
Joshua McGarity	5E	23	74
Micah McLaren	5E	22	81
BrianMcMahon	3C	15	59
Breanna Meininger		13	37
oreanna Menniger		12	42
Christian Mendez	1B 5C	21	82
Hannah Menees	3A	13	53
Nicholas Merelli	5C	21	79
Dillon Merenich	10B	29	109
Chad Merrick	5E	22	75
Cullen Meurer	10A	28	105
Seth Mewhinney	3C	15	49
Sage Meyer	1B	12	41
Grant Miller	5E	23	73
Kimberly Miller	3C	15	58
Matthew Miller	7A	24	87
Addison Mingilton	1A	11	40
Lucas Mitchell	5F	23	78
Manuel Monroy Ra	mirez		
	5B	20	72
Diana Montes	5D	22	71
Michelle Moore	12A, 14B	34, 38	125
Susan Moore	3C	15	59
Hannah More	3C	15	49
Samuel Moreno	11E	33	116
McKenna Morgan	12D	35	120
John Mosnes	5A	20	75
Ryan Mumby	10A	28	107
Kathleen Nelson	3E	16	49
Philip Nelson	5E	22	81
Gage Nettleblad	5B	20	72
Carly Nugent	13F	38	125
Rylee Shayne O'Ne		30	123
Trylee Shayne O Ne		21	79
O Oli:	5C		
Oscar Olivas	3A	13	62

PRESENTER	TRACK		GE # ABSTRACT	PRESENTER	TRACK		GE # ABSTRACT
Delaney Robison	10D	30	97	Julia Simmons	12A	34	121
Christopher Roch	e 14A	38	134	Macharnie Skalecki	8F	27	93
Caleb Rodriguez	5B	20	72	Michael Skinner	5C	21	76
Bailey Rogers	12A	34	121	Heather Skufca	3C	15	59
Jennifer Romo	12A, 14B	34. 39	125	Madilyn Slocomb	9B	27	96
Christian Romrell	5C	21	80	Kelly Smallwood	3B	14	59
Brio Rookey	5C	21	83	Ryan Smallwood	3H	17	54
Wade Rose	5A	20	76	Alexander Smith	11D	32	117
Dillon Rosenberg	10D	30	105	Amanda Smith	4A	18	67
Max Roumph	10D	30	97	Austin Smith	3A	13	54
Alexander Rowe	3C	15	64	Cole Smith	3D	15	52
Callie Rubalcaba	6, 12C	23, 35	121	Kristen Smith	11E	33	116
Cassie Rubalcaba	•	23, 35	121	Parker Smith	5B	21	76
Shandon Rushton	•	36	126	Dirk Smuin	5E	22	77
Tanner Rust	10D	30	98	Sean Snediker	5E	23	74
Alicia Ruybal-Enri		00	, 0	Heidi Snider	13C	37	130
7 meia Raybai Emi	3A	13	48		2A, 14B		121
Dominic Sailors	5B	20	72	Christopher Sorens		34, 37	121
Amber Sanborn	12B, 12D			Christopher Sorens	12D	35	120
Abram Sanchez	5A	20	72	Samuel Speir	1A	11	
Alexys Sanchez	12A, 14B		121	Anne Sponheim	5A	20	43 71
PaytonSanders	5A	20	78	Sarah Staats	10D	30	97
Christopher Sarak		15	51	Cody Staggs	3H	17	54
Christopher Scha		12	46	J B. Stahl	3H	17	54
Bradly Schiesser	14A	38	134	Ryan Stahl	3H	17	60
Steven Schopen	3F	16	51	Hanna Starling	8C	26	95
Brendan Schott	5C	21	76	Noah Steinbach	5C	21	73 72
Chapin Schott	5B	21	76 76	Justin Stenman	5A	20	71
Logan Schroeder	5C	21	70 77	Matthew Stokes	5F	23	78
•	11D	32	118	Melissa Stokes	3г 7А	24	85
Tyler Schwartz Katelynn Schwerd		32	110	Warren Story	4A	18	68
Katelynin Schwerd	5A	20	72	Joshua Stricker		20	72
Netherial Caulty				Conner Swatloski	5B		72 74
Nathaniel Scully	10D		98, 101		5E	22	
Abraham Selenke		29	100	Erik Tabiolo	3H	17	54
Amanda Seuell	10D		01, 103	Domonic Tafoya	4B	18	68
Joshua Shapiro	3G	17	54 47	Caleb Talkington	9B	27	95 54
Riad Shash	4A	18 25	67	Jared Taylor	3A	13	54
Kellen Shaw	12D	35	120	Fernando Tena	5A	20	76
Jordan Sheehan	11E	33	116	Christie Thammavo	J		404
Kanako Sherrill	3F	16	60	- T	13E	37	131
Garrett Shudinis	3D	15	51	Espen Thune-Larse		17	60
Jay Shuman	5C	21	82	Cruz Tijerina	3C	15	64

PRESENTER	TRACK		GE # ABSTRACT	PRESENTER	TRACK		GE # ABSTRACT
Auraia Taura	20				124		
Anais Torres	3G	17	53 70	Heather Wilczek	12A	34	124
Vicente Trevino	5A	20	70 104	Billie Williams	2B	13	45
Brianna Trump	10A	28	106	Casey Williams	10D	30	103
Riley Tucker	3E	16	63	Kaylie Williams	12B, 14B	•	
Carly U-Ren	12B	34	120	Wesleigh Williams		35	120
Chris Urbanski	14A	38	134	Clark Willis	5B	21	80
Troy Utley	1A	11	43	PaytonWills	2A	12	45
Lawrence Vaalburg	5C	21	72	Brandon Wilson	14A	38	134
Lauren Valdez	13C	37	129	Josiah Wilson	3C	15	49
Jamie Van Dyke	9A	27	95	Matthew Wilson	10C	29	103
Kelli Van Tassel	7A	24	83	Shannel Wilson	11C	32	114
Anthony Vanden-Pl	as			Thayne Wilson	4A	18	66
	10D	30	106	AlexandraWiuff	1A	11	41, 43
Brandon VanDenBo	sch			Conor Woltman	5A	20	82
	3C	15	49	Henry Wondollecl	< 10D	30	103
Christopher Vander	meer			Anna Woodfield	12A	34	123
	10E	31	102	Joel Woodward	14A	38	134
Stavan Vanscoy	3A	13	62	Joshua Worth	10D	30	98
Dylan Varra	3H	17	54	Nicholas Wright	10E	31	108
Miguel Vasquez	5A	20	78	Benson Wu	5C	21	72
Dillon Vavak	5E	23	70	Carolina Yamada	5E	23	80
Rylie Vavra	3F	16	56	Charles Young	3H	17	54
Jesus Velasquez	4A	18	67	Kyra Young	13A, 13C	36, 37	
Joshua Vincent	10C	29	99				126, 127
Travis Vineyard	3E	16	56	Wade Young	14A	38	133, 134
Joy Von Guerard	10D	30	98	Dakota Yourkowsl	ki 5D	22	70
Rick Voss	3C	15	61	Linnaea Zaenger	13F	38	127
William Vrooman	5B	21	80	Garrett Zanon	5A	20	75
Logan Wagner	1B	12	42	Isaac Zepeda	5D	22	83
Bryan Waite	11A	31	110	Ryan Zinke	5E, 5F	23	78, 80
Gregory Waldorf	3D	15	51	,			
Peter Ward	5E	22	71				
Makoto Watanabe	3A	13	48				
Timothy Watrous	5E	22	77				
Alexander Weaver		15. 23	51, 73				
Nicolas Weckerly	3H	17	54				
	8A, 8E		91, 92				
Garrett Westerhoff		20	70				
Kyle Wharton	5C	21	82				
Alan Wheeler	5E	22	81				
Charles White	5A	20	70				
Justin Whittenburg	13A	36	133				

# \* AWARDS CEREMONY

Meyer Ballroom, University Center, 4:30pm

# \* Kick-Off Event

Facilitators: Liz Cottingham, Delaney Santoro, Shannon Canitz
Faculty Sponsors: Robin Calland, Morgan Bridge, Tiffany Kinney and Aparna Palmer

LOCATION TIME TYPE STUDENT(S)

STOP, COLLABORATE AND LISTEN

Love Recital Hall, MPAC 1:15 oral Guest speaker, Kati Garner, Coordinator of Mental Health and Crisis Coordinator

DH: Dominguez Hall
EH: Escalante Hall
FA: Fine Arts Building
H: Houston Hall
Plaza (Tent)

MC: Maverick Center

MPAC: Moss Performing Arts Center WS: Wubben Hall & Science Center

**☀** Sessions

• Sessions listed alphabetically by department

TIME

See back cover for a Campus Map with locations

Art and Design

Track 1A

Facilitator: Lily Cain

LOCATION

ART THROUGH CRAFT
FA 111 2:00-2:15 oral Hannah Martin

STUDENT(S)

ACCEPTING MY IDENTITY THROUGH MY ARTWORK
FA 214 2:15-2:30 oral Addison Mingilton

THE FROGMAN'S DEMONSTRATION: MONOTYPE, INTAGLIO, AND LITHOGRAPHY

TYPE

FA 201 2:30-2:45 oral Alexandra Wiuff, Jessica Hedlun, Samuel Speir, Troy Utley

A BRIEF HISTORY OF PHOTOGRAPHY

FA 214 2:45-3:00 oral Taylor Bartholomew

**BALANCE** 

FA 201 3:00-3:15 oral Layna Johnson





# ART AND DESIGN

Facilitator: Eli Hall			
LOCATION	TIME	TYPE	STUDENT(S)
SWEET SUCCESS			
FA 308	2:00-2:15	oral	Breanna Meininger
SPACE SERIES FA 308	2:15-2:30	oral	Benjamin Haver
CREATIVE REPRESENT FA 308	ATION 2:30-2:45	oral	Sage Meyer
MESA COUNTY LIBRA	RIES INTERNSH	IIP PORTFOL	IO
FA 308	2:45-3:00	oral	Logan Wagner
IN-HOUSE DESIGN FA 308	3:00-3:15	oral	Dejan Jestrovich
BIOLOGICAL SC			Track 2A
Facilitator: Paul Ham	•		
LOCATION	TIME	TYPE	STUDENT(S)
MOLECULAR CHARAC WS 1st Fl. N Hallway	TERIZATION O 2:00-3:45	F THE ARUN poster	DO SCALE INSECT Payton Wills
SEASONAL VARIATION	N IN PIKA GLUC	COCORTICO	D METABOLITES IN AN ISOLATED
POPULATION IN COLO WS 1st Fl. N Hallway		poster	Tabitha McFarland
DO ENVIRONMENTAL (THAMNOPHIS ELEGA		S DRIVE LO	CAL ADAPTATIONS IN GARTER SNAKES
WS 1st Fl. N Hallway	2:00-3:45	poster	Isabella Bettinger
ACTIVATED PROTEIN I GAMMA (PPAR?)	KINASE (AMPK)	AND PERO	CTIVATION AND FUNCTION OF AMP- KISOME PROLIFERATOR ACTIVATED RECEPTOR
WS 1st Fl. N Hallway	2:00-3:45	poster	Alexandrea Doyle
USING RESTRICTION F SPECIES IDENTIFICATI			IORPHISM ANALYSIS AS A NEW METHOD FOR
WS 1st Fl. N Hallway	2:00-3:45	poster	Christopher Schaaf
VALIDATION OF MOLE	CULAR PROTO	COL FOR SE	X IDENTIFICATION IN DEMOGRAPHIC
STUDIES OF THE AME WS 1st Fl. N Hallway	2:00-3:45	poster	Gabrielle Gines
VARIABILITY IN COND	ITION FOR SAN	ND LANCE (A	MMODYTES SPP.) ON STELLAWAGEN BANK
WS 1st Fl. N Hallway	2:00-3:45	poster	Teresa Giandonato
EXPLORING DRIVERS	OF ANTIBIOTIC	OVER-PRES	CRIBING

WS 1st Fl. N Hallway 2:00-3:45 poster Janet Benedict

**Facilitator: Matt Stansbury** 

LOCATION TIME TYPE STUDENT(S) CHANGES IN NUTRITIONAL QUALITY IN PIKA DIET OVER THREE DECADES AT NIWOT RIDGE, COLORADO WS161 2:00-2:15 oral Zoe Carnes-Douglas INFLUENCE OF OFF- HIGHWAY VEHICLES (OHV) USE ON GREAT BASIN SPADEFOOTS (SPEA INTERMONTANA) 2:15-2:30 Billie Williams oral TRACK 3A BUSINESS Facilitator: Johnny Snyder LOCATION TYPE TIME STUDENT(S) **HOW MAVERICKS INVEST \$100,000** DH 304 2:00-2:15 oral Parker Cushing, Anthony Gerken, Ashley Hulet, Austin Smith, Jared Taylor A COMPREHENSIVE STRATEGY PROPOSAL TO ENHANCE RECRUITMENT, RETENTION AND MAINTENANCE OF COMMUNICATION IN COLORADO MESA UNIVERSITY'S DEPARTMENT OF BUSINESS DH 304 2:15-2:30 oral Riley Brodie, Donovan Harwell, Megan Lawson, Megan Liborio, Bryce Roberts, Alicia Ruybal-Enriquez VISTAS AND VINEYARDS DH 304 2:30-2:45 oral Ahmad Alojairi, Samuel Cioara, John Elliott, Brian Kimbrell, Oscar Olivas, Patrick Reilly, Stavan Vanscoy FACTORS INFLUENCING COLLEGE STUDENTS SATISFACTION WITH INDEPENDENT-OWNED CAFES IN GRAND JUNCTION DH 304 2:45-3:00 oral Erin Krueger, Hannah Menees ADVANCED INFORMATION SYSTEMS CAPSTONE

DH 304 3:00-3:15 oral Devon Fierberg, Ashley Lozinski,

Steven Pack, Erik Platou, Patrick Rewers,

Makoto Watanabe

#### THE VALUE OF A MILESTONE CLASS: ENTREPRENEURSHIP

DH 304 3:15-3:30 oral Kaitlyn Bilsing

SOFA BRAND

DH 304 3:30-3:45 oral Austin Gonsalves, Spencer Lee

#### BETTER MARKETING FOR ENERGY DEVLOPEMENT COMPANIES

DH 304 3:45-4:00 oral Broderick Alexander

## **Facilitator: Tim Hatten**

LOCATION	TIME	TYPE	STUDENT(S)
ANIMAL SHELTER STATIS	STICS		
DH 314	2:00-2:15	oral	Rikki Cook, Danielle Fleig, Nathan Garcia, Brian Kimbrell
COLORADO AND HEMP	•		
DH 314	2:15-2:30	oral	Bryce Roberts
OIL SHALE - WESTERN O	COLORADO PO	TENTIAL	
DH 314	2:30-2:45	oral	Geoffrey Kice
WHAT GOES AROUND O	COMES AROUN	D: CORRUPT	ION IN VENEZUELA
DH 314	2:45-3:00	oral	Vincent Giandonato
ENVIRONMENTAL VALU	ES OF COLLEG	E STUDENTS	
DH 314	3:00-3:15	oral	Parker Cushing
THE DEAD ZONE & NAT	URAL GAS DER	IVED FERTILI	ZER
DH 314	3:15-3:30	oral	Clayton Harrison
SURFACE DISTURBANCE	E AND OUTPUT	BY SOURCE	
DH 314	3:30-3:45	oral	Kelly Smallwood









**Facilitator: Britt Mathwich** 

LOCATION	TIME	TYPE	STUDENT(S)
BADA PIZZERIA SPO	ORTS BAR		
DH 217	2:00-2:15	oral	Hannah Belich, Chad Heiden, Lucas Martin
THE POINT: A GRO	WING BUSINESS		
DH 217	2:15-2:30	oral	Rick Voss
RIVER CITY LOUNG	E DEVELOPMENT	PLAN	
DH 217	2:30-2:45	oral	Kori Brenner, Kimberly Miller, Justin Pascual
AUTOMATIC DOOR	EOB CHICKEN CO	 ⊃∩P	
DH 217	2:45-3:00	oral	Grayson Greeley, Olin Klovdahl, Anne Lapeira, Seth Mewhinney, Hannah More, Brandon VanDenBosch, Josiah Wilson
YOLKS ON YOU FO DH 217	3:00-3:15	oral	Alexander Rowe, Tristan Cloyd, Cruz Tijerina
SNAP-ON LONGBO	APDING SHOE SO	) E	
DH 217	3:15-3:30	oral	Alain De la Bastide, Stephen Drozda, Brian McMahon, Zachary Reeder, Heather Skufca
LET'S GET JUICY!			
DH 217	3:30-3:45	oral	Mikayla Brewer, Lauren Essman, July Hendriksen
STARTING A PERSO	NIAL PHOTOGRAF		······
DH 217	3:45-4:00	oral	Susan Moore
Business			Track 3D
Facilitator: Shiang	-Lih Chen-McCain	1	
LOCATION	TIME	TYPE	STUDENT(S)
CUSTOMER PROBL	EM, TEAM SOLUT	ION	
DH 2nd Fl. Hallway		poster	Tristin Bina, Seth Coisman, Christopher Sarabia, Garrett Shudinis, Gregory Waldorf, Alexander Weaver

LOCATION	TIME	TYPE	STUDENT(S)						
CUSTOMER PROBLEM, TEAM SOLUTION									
DH 2nd Fl. Hallway	2:00-3:45	poster	Tristin Bina, Seth Coisman, Christopher Sarabia, Garrett Shudinis, Gregory Waldorf, Alexander Weaver						
SHIN-BAR DH 2nd Fl. Hallway	2:00-3:45	poster	Joshua Levy						
SHOULD UNIVERSITIES DH 2nd Fl. Hallway			ALUATIONS? Ana Holguin						
ANALYZING USER ACCOUNT HEALTH, A PREVENTATIVE FRAMEWORK DH 2nd Fl. Hallway 2:00-3:45 poster Adam Davenport									
ENERGY: WHAT'S IT WO	ORTH? 2:00-3:45	poster	Cole Smith						

TRACK 3E BUSINESS

Facilitator: Deb Parman

LOCATION TIME TYPE STUDENT(S)

AUDITORS: THE UNSUNG HERO OF THE BUSINESS WORLD

DH 2nd Fl. Hallway 2:00-3:45 poster Kathleen Nelson

LNG IMPORTS IN THE CARIBBEAN

DH 2nd Fl. Hallway 2:00-3:45 poster Tyler Heinsma

OIL AND GAS PRODUCTION IN PERU

DH 2nd Fl. Hallway 2:00-3:45 poster Kasey Emrich

WILDLIFE AND DRILLING IN HARMONY

DH 2nd Fl. Hallway 2:00-3:45 poster Riley Tucker

PUBLIC PERCEPTION ON OFFSHORE DRILLING

DH 2nd Fl. Hallway 2:00-3:45 poster Travis Vineyard

TRACK 3F BUSINESS - MBA

Facilitator: Kyle Stone

DH 214

LOCATION TIME TYPE STUDENT(S)

RESEARCH PRACTICUM - RIVER FRONT DEVELOPMENT AT LAS COLONIAS PARK 2:00-2:15 oral Dominique Marquez

SUSTAINABILITY AND A SMALL SENIOR LUNCH PROGRAM 2:15-2:30 oral Kanako Sherrill

WHAT DRIVES CONSUMERS TO PURCHASE IN BEST BUY RATHER THAN ONLINE?

2:30-2:45 oral Suzann Acovio

APPLYING TOC PRINCIPLES TO IMPROVE PRODUCTION KPI'S AT JABIL LEWIS ENGINEERING

2:45-3:00 oral Daniel Grace

OPERATIONAL PROCESS ANAYLSIS AT MJ THOMAS PHOTOGRAPHY

3:00-3:15 oral Rylie Vavra

COMPARATIVE ANALYSIS FOR IT VENDORS AT LOCAL ACCOUNTING FIRM

3:15-3:30 oral Steven Schopen

THE DISPARITY OF FEMALE COACHES IN DIVISION II ATHLETICS

3:30-3:45 oral Hannah Pollart









Business - MBA

Track 3G

Facilitator: Jacob Ongaki

LOCATION TIME TYPE

CAPACITY PLANNING AT POWDERHORN MOUNTAIN RESORT

DH 313 2:00-2:15 oral Stephen Dunn

EMPLOYEE TURNOVER IN THE PERMIAN BASIN

DH 313 2:30-2:45 oral Jacob Druce

GETTING THE BIG FOUR ACCOUNTING FIRMS TO CMU

DH 313 2:45-3:00 oral Anais Torres

QUALITY OF EDUCATION RECEIVED BY STUDENT ATHLETES

DH 313 3:00-3:15 oral Austin Beswick

WHAT CMU CHARACTERISTICS ARE ATTRACTIVE TO VETERANS

DH 313 3:15-3:30 oral Amanda Herron

GRAND JUNCTION REGIONAL AIRPORT - PRICE ELASTICITY OF DEMAND ANALYSIS

DH 313 3:30-3:45 oral Joshua Shapiro

**BUSINESS - EXHIBIT** 

TRACK 3H

Facilitator: Carlos Baldo

LOCATION TIME TYPE STUDENT(S)

INTERNATIONAL BUSINESS EXPERIENTIAL LEARNING - DESTINATION:

COSTA RICA SPRING 2019

DH 2nd Fl. Hallway 2:00-4:00 exhibit Dylan Brewer, Riley Brodie,

Madison Donnafield, Natalie Gaul, Sandra Kostjushko, Joshua Levy, Haley Lewis, Megan Liborio, Richard Penny III, Ryan Smallwood, Cody Staggs,

JB Stahl, Erik Tabiolo, Dylan Varra, Nicolas

Weckerly, Charles Young,

Bryce Roberts

STUDENT(S)

THE \$100,000 INVESTMENT PROJECT

DH 2nd Fl. Hallway 2:00-4:00 exhibit Anthony Gerken, Ryan Stahl,

Espen Thune-Larsen

# COMPUTER SCIENCE, MATHEMATICS AND STATISTICS

TRACK 4A

Facilitator: Warren MacEvoy

LOCATION	TIME	TYPE	STUDENT(S)		
FIREMAP WS 120	2:00-2:15	oral	Caleb Gartner, Joshua Mathews, Thayne Wilson		
SNAGHUB WS 120	2:15-2:30	oral	Joseph-lan Bongar, Neifi Campas, Brian Claymon, Joseph Jimenez		
MILOG: MILEAGE TRAC	CKING MADE S	IMPLE			
WS 120	2:30-2:45	oral	Robert Dunski, Scott Lowe, James Mathson, Riad Shash, Jesus Velasquez		
GROVE HAVOC VR			······································		
WS 120	2:45-3:00	oral	Lucas Bingham		
QUICKCONNECT			······································		
WS 120	3:00-3:15	oral	Angeline Fletcher, Wyatt Hurst, Kellie Larsen, Warren Story		
CLACIED ICE ADENIAC	NIENALNALEDELTE	• • • • • • • • • • • • • • • • • • • •	······································		
WS 120	3:15-3:30	oral			
software demonstration					
JUPYTERBIN WS 120	3:30-3:45	oral	Bader Alkhamees, Daniel Powell, Amanda Smith		

# COMPUTER SCIENCE, MATHEMATICS AND STATISTICS TRACK 4B

Facilitator: Lori Pavne

Facilitator: Lori	Payne		
LOCATION	TIME	TYPE	STUDENT(S)
CLUB CALENDA	R PROJECT (CCP)		
WS 118	2:00-2:15	oral	Matthew Behnke, Emerson Flom, Janina Pohorecki
OUICK TO THE I	IET DENITAL CYCTEM	• • • • • • • • • • • • • • • • • • • •	······································
	IFT RENTAL SYSTEM		
WS 118	2:15-2:30	oral	Keren Angeles, Jackson Hill, Kellie Larsen, Merle Reynolds
• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •
SIMPLE INVENTO	ORY MATRIX		
WS 118	2:30-2:45	oral	Angelo Adams, Andrew Gaines, Cody Grinstead
• • • • • • • • • • • • • • • • • • • •			· · · · · · · · · · · · · · · · · · ·
MONEY MANAG	IEMENT APPLICATION	J .	
WS 118	2:45-3:00	oral	Jacob Boyce, Seifeldin Ezzat,
			Aaron Gossage, Domonic Tafoya
ATTORNEY/C AC	CICTANIT: I AVA/ FIDAA C	LIENT MAN	IACEMENT COETIA/ADE
			IAGEMENT SOFTWARE
WS 118	3:00-3:15	oral	Richard Hakes, Jacob Lambdin, Munna Rai

#### Facilitator: Cathy Bonan-Hamada

LOCATION TIME TYPE STUDENT(S)

A LOGISTIC REGRESSION MODEL FOR NCAA BASKETBALL TOURNAMENT PREDICTIONS

WS 1st Fl. S Hallway 2:00-3:45 poster Brittany Goshia

ANALYZING LIBRARY HEAD COUNT DATA TO PREDICT FUTURE LIBRARY USAGE

WS 1st Fl. S Hallway 2:00-3:45 poster Rachel Dillmann

CIRCULATORY SYSTEM MODELS

WS 1st Fl. S Hallway 2:00-3:45 poster Erika Esquinca

A CHI-SQUARE TEST ON ST. MARY'S HOSPITAL DATA

WS 1st Fl. S Hallway 2:00-3:45 poster Tia Leray Kroschel

STATISTICAL ANALYSIS OF BIAS IN NEWS COVERAGE OF CONTROVERSY

WS 1st Fl. S Hallway 2:00-3:45 poster Karen Prather

RASCAL TRIANGLE

WS 1st Fl. S Hallway 2:00-3:45 poster Oxana Allen

CONFIDENCE INTERVAL PERFORMANCE ANALYSIS

WS 1st Fl. S Hallway 2:00-3:45 poster Logan Litle

BPMBOX

WS 1st Fl. S Hallway 2:00-3:45 poster Bryn Loftness







Facilitator: Sarah Lanci

LOCATION	TIME	TYPE	STUDENT(S)
<b>DESIGN AND DEVE</b> Plaza (Tent)	2:00-3:45	PEDAL-ACTIVAT exhibit	ED WIRE CUTTER FOR SEEK OUTSIDE Joel Fiedler, Caroline Qualls, Abram Sanchez, Katelynn Schwerdtfeger
DESIGNING THE TA	CTICAL AWAREN	ESS KIT "AMMO	D BOX"
Plaza (Tent)	2:00-3:45	exhibit	Marc Fiot, Colton Futter, Jacob Payer, Garrett Zanon
BARREL PUMP RED	FSIGN		
Plaza (Tent)	2:00-3:45	exhibit	Grant Duta, Anne Sponheim, Justin Stenman
SOLAR HEATER	•••••		
Plaza (Tent)	2:00-3:45	exhibit	Camden Brown, Matthew Haskell, Ramiree Quick, Conor Woltman
A MODEST APPRO	ACH TO CONSTRI	ICT A DMG (DEI	RMANENT MAGNET GENERATOR)
Plaza (Tent)	2:00-3:45	exhibit	Taylor Guerra, Vicente Trevino, Garrett Westerhoff, Charles White
			THE NET ATION TO SUCK ATOMS
STRUCTURE IN MAT		ALL-BEARING L	DEMONSTRATION TO SHOW ATOMIC
Plaza (Tent)	2:00-3:45	exhibit	Cadle Burrell, Angel Enrique, Zane Knapp John Mosnes
EUREKA! BUSY BOA			
Plaza (Tent)	2:00-3:45	exhibit	Hayden Gardner, Chandler Livingston, Wade Rose, Fernando Tena
Plaza (Tent)	2:00-3:45	exhibit	Adam Bartels, Harrison Benoit, Payton Sanders, Miguel Vasquez
•••••			
Engineering	G - FIRST-YEA	r Design	Track 51
Facilitator: Sarah I	_anci		
LOCATION	TIME	TYPE	STUDENT(S)
CLOUDS FOR THE	ICE OF DARTIC: -	DETECTION:	
CLOUDS FOR THE UPPLIED (Tent)	2:00-3:45		Amado Capetillo, Manuel Monroy Ramirez Gage Nettleblad, Joshua Stricker
CONTRACTIONAL	SANDBOX		
Plaza (Tent)	2:00-3:45	exhibit	Braxton Anderson, Trey Peltier, Caleb Rodriguez, Dominic Sailors
LOAD DISPERSION	IN VARVING THE		
LOAD DISPERSION	IN VARTING FILLS	I KADII	Malle 5 L L L

PARALLEL AND SERIES PUMPS

2:00-3:45 exhibit

2:00-3:45 exhibit

William Doherty, Jackson Ferguson, Brian Kennedy, Evan Lavin

Mathew Matamales

Dylan Amos, Caden Aragon, Jeffrey Davis,

Plaza (Tent)

Plaza (Tent)

•••••	••••••				
EUREKA! PIPE SLIDE ENGINEER					
Plaza (Tent)	2:00-3:45	exhibit	Colby Beckett, Alex Campbell,		
			Scott Funston, Austin Germann		
		• • • • • • • • • • • • • • • • • • • •	······································		
GEARBOX CUTAWAY					
Plaza (Tent)	2:00-3:45	exhibit	Alex Heckman, Estevan Maldonado,		
			Chapin Schott, Parker Smith		
DDO IFOT ANAMA CAN			······································		
PROJECT AMMO CAN	0.00.0.45	1.91.9	Add to the same of the same		
Plaza (Tent)	2:00-3:45	exhibit	Mahmoud Elgayar, Marlon Heskett,		
			William Vrooman, Clark Willis		
HOBO 8K SOLAR RADIATION SHIELD					
		1.91.91	T: -! C  C  :   ! ! ! !		
Plaza (Tent)	2:00-3:45	exhibit	Timothy Gloor, Gabriel Liebelt,		
			Mar Y El Torres		
			•••••••••••••••••••••••••••••••••••••••		

TRACK 5C

ENGINEERING - FIRST-YEAR DESIGN TRACK						
Facilitator: Sarah Lanci						
LOCATION	TIME	TYPE	STUDENT(S)			
TANGRAM EXHIBIT FO	TANGRAM EXHIBIT FOR EUREKA! MCCONNELL SCIENCE MUSEUM					
Plaza (Tent)	2:00-3:45	exhibit	Erik Brygger, Jacqueline Linn, Kyle Wharton			
OPTICAL CHOPPER						
Plaza (Tent)	2:00-3:45	exhibit	Sean Bohling, Nicholas Merelli, Rylee Shayne O'Neill			
IMPLIESE SOUND SOU	DCE EOD ACO	LICTIC MEACLID	EMENTS OF REVERBERATION TIME			
Plaza (Tent)	2:00-3:45		Caleb Barnes, Jack Dorrance, Jose Lopez Ramirez, Logan Schroeder			
DEMONSTRATION OF	FORCES IN HE	LICAL GEAR TR	AIN			
Plaza (Tent)	2:00-3:45	exhibit	Carter Lambert, Noah Steinbach, Lawrence Vaalburg, Benson Wu			
TRUSS TESTING APPA	RATUS					
Plaza (Tent)	2:00-3:45	exhibit	Aaron Enright, Kyle Krauland, Cinthya Luna Ramos, Brio Rookey			
PEARLITIC MICROSTRU	ICTUDE		······································			
Plaza (Tent)	2:00-3:45	exhibit	Uchechukwu Chiedu, Gabriel Martinez, Edgar Palacios, Christian Romrell			
FALLING CHIMNEY DEMONSTRATION						
Plaza (Tent)	2:00-3:45	exhibit	Joshua Burget, Bree Johnson, Brendan Schott, Michael Skinner			
STICK-SLIP DEVICE						
Plaza (Tent)	2:00-3:45	exhibit	Jacob Dexter, Parker Giles, Christian Mendez, Jay Shuman			
• • • • • • • • • • • • • • • • • • • •			•••••••••••••••••••••••••••••••••••••••			

Facilitator: Scott Bevill

LOCATION	TIME	TYPE	STUDENT(S)
THE DEVASTATOR	: AUTONOMOUS R	OVER	
Plaza (Tent)	2:00-3:45	poster	William Brown, Jacob Doose, Dylan Hallett, Isaac Zepeda
BAR BUDDY			
Plaza (Tent)	2:00-3:45	poster	Tristin Bina, Ethan Davis, David Hale, Cody Hedrick, Diana Montes
AUTOMATED DRIL	L PRESS		······································
Plaza (Tent)	2:00-3:45	poster	Carter Anderson, Noah Beaver, Justin-Shay Ellsworth, Dakota Yourkowski
MODELING THE A	NISOTROPIC MECH	IANICAI PRO	DPERTIES OF FUSED DEPOSITION MODELING
	RTIFICIAL NEURAL N		
Plaza (Tent)	2:00-3:45	poster	Sara Gladding, Aric Harper

**Facilitator: Chris Penick** 

Track 5E

LOCATION	TIME	TYPE	STUDENT(S)
REDESIGN AND OP Plaza (Tent)	TIMIZATION OF F 2:00-3:45	SAE RACE CA	
• • • • • • • • • • • • • • • • • • • •			Cesar Reyes
SELECTION OF ENG MOTORSPORTS' 20			AND WIRING DESIGN FOR MESA
Plaza (Tent)	2:00-3:45	poster	Keaton Kemper, Connor Lumley, Nicolas Maraschin, Philip Nelson
DESIGN, CONSTRUC OF NANO-PARTICLE		ING OF A CO	OLLISION-TYPE ATOMIZER FOR GENERATION
Plaza (Tent)	2:00-3:45	poster	Dominick Heskett, Conner Swatloski
AUTOMATION OF C	COORSTEK BIOCE	RAMIC CUTT	ING SYSTEM FOR GREEN CERAMIC BILLETS
Plaza (Tent)	2:00-3:45	poster	Jacob Pacheco, Peter Ward
RUNWAY RUBBER R			•
Plaza (Tent)	2:00-3:45	poster	Jennifer Dennison-Jones, Vail Hall, James Prescott, Alan Wheeler
DESIGN OF A MECH	HANICAI SAEE-AN	ID-APM DEV	ICE FOR USE IN AIRCRAFT
COUNTERMEASURE		ND-ARIVI DEV	ICE FOR USE IN AIRCRAFT
Plaza (Tent)	2:00-3:45	poster	Andris Balodis, Marc Brandt, David Madrid, Chad Merrick
IMPLEMENTATION ( CONTROL PROCESS		RM TO AUTO	MATE A MANUFACTURING QUALITY
Plaza (Tent)	2:00-3:45	poster	Brogan Butler, Dirk Smuin, Timothy Watrous

DESIGN AND DEVELOPMENT OF ROLL-OFF ANGLE TESTING APPARATUS Plaza (Tent) 2:00-3:45 Elliot Buchanan, Antonio Gueretta. poster Alexander Weaver REDESIGN AND MANUFACTURE OF A FORMULA SOCIETY OF AUTOMOTIVE ENGINEERS (FSAE) RACECAR SUBFRAME FOR REDUCED WEIGHT AND INCREASED STRENGTH-TO-WEIGHT RATIO Plaza (Tent) William Bovard, Carolina Yamada, 2:00-3:45 poster Ryan Zinke DESIGN AND FABRICATION OF A CARBON FIBER BICYCLE RIM SURFACE PREPARATION MACHINE FOR DT SWISS USA 2:00-3:45 Plaza (Tent) poster Dakota Amos, Noah Jackson, Grant Miller, Eric Pipkin AUTOMATED DISPENSING AND STACKING PROCESS FOR CERAMIC COMPONENTS Plaza (Tent) 2:00-3:45 poster Stephen Drozda, Jaden Koos, Dillon Vavak DESIGN AND MANUFACTURE OF A FATIGUE TESTER FOR ACRYLIC MATERIALS poster Plaza (Tent) 2:00-3:45 Mitchell Dilley, Westlyn Johnston, Joshua McGarity, Sean Snediker ...... DESIGN AND IMPLEMENTATION OF HUMAN CARDIOVASCULAR EXHIBITS FOR CHILDREN'S MUSEUM Plaza (Tent) 2:00-3:45 Sara Gladding, Lindsay Gnesios, poster Aric Harper, David Hunt ENGINEERING - EXHIBIT TRACK 5F Facilitator: Scott Kessler LOCATION TIME TYPE STUDENT(S) MAV-5 BY MESA MOTORSPORTS Plaza (Tent) 2:00-3:45 Jesse Boyce, Alan Carrasco, Jorden Hall, poster Justin Marker, Lucas Mitchell, Matthew Stokes, Ryan Zinke HEALTH SCIENCES TRACK 6 Facilitator: Erin Donovan LOCATION TIME TYPE STUDENT(S) EXPLORING DRIVERS OF ANTIBIOTIC OVER-PRESCRIBING WS 1st Fl N Hallway 2:00-3:45 poster Janet Benedict Find abstract in the Biological Sciences department section. HEALTH LITERACY AND DISCHARGE PLANNING DH 1st Fl. Hallway 2:00-3:45 Jamie Hyatt, Rachel Kotris, poster Callie Rubalcaba, Cassie Rubalcaba Find abstract in the Teacher Education department section.

Kinesiology Track 7A

Facilitator: Brent Alumbaugh

LOCATION TIME TYPE STUDENT(S)

THE DIFFERENCE OF MUSCLE ACTIVATION IN COLLEGIATE VOLLEYBALL PLAYERS ON SAND

VS INDOOR SURFACES

MC 115 2:00-3:45 poster Olia Barskey, Jeremy Ehlers,

Cheyenne-Asia Hutto

THE EFFECT OF REFLEXIVE NEUROMUSCULAR STABILIZATION ON HAMSTRING FLEXIBILITY AND HIP FLEXION RANGE OF MOTION

MC 115 2:00-3:45 poster Ina Elise Campbell, Matthew Miller

A COMPARISON OF VERTICAL JUMP HEIGHT BETWEEN STANDING TWO-FOOT JUMP,

ONE-FOOT APPROACH JUMP, AND TWO-FOOT APPROACH JUMP
MC 115 2:00-3:45 poster Kelli Van Tassel

THE PERCEIVED EFFECT OF CAFFEINE ON VERTICAL JUMP PERFORMANCE AND GROUND REACTION FORCE

MC 115 2:00-3:45 poster Serena Alvarado, Kekoa Kayser

.....

THE EFFECTS OF AN ACUTE BOUT OF EXERCISE ON EXECUTIVE FUNCTION MC 115 2:00-3:45 poster Ryan Carr

WC 113 2.00-3.43 poster Ryan Can

INJURY REPORTING IN DANCE, SWIMMING, AND GYMNASTICS ATHLETES
MC 115 2:00-3:45 poster Melissa Stokes

DOUBLE PEAK MUSCLE ACTIVATION PATTERN IN A BASEBALL SWING
MC 115 2:00-3:45 poster Garrett Ball, Nicholas Cardinale

EFFECTS OF UPPER SHOE DESIGN ON GOLF SWING BIOMECHANICS AND COMFORT

AMONGST EXPERIENCED GOLFERS
MC 115 2:00-3:45 poster Alexander Pollock

Note: MC 115 is the Monfort Family Human Performance Lab

Kinesiology - Exhibit

Facilitator: Brent Alumbaugh

LOCATION TIME TYPE STUDENT(S)

NATIONAL DISABLED VETERANS WINTER SPORTS CLINIC VOLUNTEER EXPERIENCE

MC 115 2:00-3:45 poster Megan Atkin, Madeline Farmer

PHYSICIAN ASSISTANT PROGRAM NUTRITIONAL EDUCATION INITIATIVE

MC 115 2:00-3:45 oral Amber Gillard, Benjamin liames,

Aaron Rayford

J ROBINSON INTENSIVE WRESTLING CAMPS ATHLETIC TRAINING INTERNSHIP EXPERIENCE

TRACK 7B

MC 115 2:00-3:45 poster Megan Atkin e-portfolio

e portione

**EVALUATION FOR RETURN-TO-PLAY FOLLOWING ACL RECONSTRUCTION** 

MC 115 2:00-3:45 poster Madeline Farmer

Note: MC 115 is the Monfort Family Human Performance Lab

## LANGUAGES. LITERATURE AND MASS COMMUNICATION TRACK 8A

Facilitator: Luis Silva-Villar

HOW SPANISH CHANGES ACROSS GEOGRAPHIC REGIONS
EH 128 2:00-2:15 oral Carla Hernandez Chacon

RACIAL EPITHETS: A UNIVERSAL PHENOMENON
EH 128 2:15-2:30 oral Sarena Wells

THE CULTURAL IMPACT OF EUPHEMISMS
EH 128 2:30-2:45 oral Teal Leavitt

TABOO: THE MISCONCEPTION AND ROOTS BEHIND THE MEANING OF IT IN LINGUISTICS
EH 128 2:45-3:00 oral Derek Mayo-Alvarez

AQUÍ NO NO, SPANISH WITH AN "-O"
EH 128 3:00-3:15 oral Maria Perez-Chavez

THE PRESENCE AND FUNCTION OF CODESWITCHING IN BILINGUAL COMMUNITIES EH 128 3:15-3:30 oral Peyton Deal

# Languages, Literature and Mass Communication Track 8B

Facilitator: Rhonda Claridge

LOCATION TIME TYPE STUDENT(S)

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**THE BRONTË SISTERS: REIMAGINING THE VICTORIAN NOVEL**EH 318 2:00-2:15 oral Jorgan Bean

.....

PICK YOUR SUITOR: HOW EARLY AMERICAN CONDUCT LITERATURE TRAINED WOMEN FOR THE INEVITABLE

EH 318 2:15-2:30 oral Sarah Cerrone

BREAKING THE HYMENIAL CHAIN: EXAMINING ELIZA WHARTON IN THE COQUETTE AS AN INDIVIDUALIST THROUGH THE LENS OF JEFFERSONIAN IDEOLOGIES IN THE NEW REPUBLIC

EH 318 2:30-2:45 oral Anna Kenney





# Languages, Literature and Mass Communication Track 8C

Facilitator: Rhonda Claridge

LOCATION	TIME	TYPE	STUDENT(S)		
FRIENDS, ROMANS, COUNTRYMEN					
EH 318	2:45-3:00	musical production	Eliajia Holliday		
SHOWING AND TELLING: STRATEGIES OF SELF-EXPRESSION					
EH 318	3:00-3:15	oral	Nicholas Jones		
THE WAY MY HEART LIGHTS					
EH 318	3:15-3:30	oral	Hanna Starling		
OCEANS APART					
EH 318	3:30-3:45	oral	Jorgan Bean		

# Languages, Literature and Mass Communication Track 8D

**Facilitator: Tiffany Kinney** 

RALLYING AGAINST RACISM: ANN PETRY'S FIGHT FOR EQUALITY IN "LIKE A WINDING SHEET"
EH 308 2:00-2:15 oral Janine Hald

"FREAKS"
EH 308 2:15-2:30 oral Olivia Hebrank

EXPLORING HOMOSOCIAL BONDS IN TARANTINO'S "PULP FICTION"
EH 308 2:30-2:45 oral Madyson Martinez

THE OPTIMIZATION OF SPEEDRUNNING IN SUPER MARIO BROS' MOST STORIED LEVEL
EH 308 2:45-3:00 oral Elias Born

# Languages, Literature and Mass Communication Track 8E

Facilitator: Tom Acker

LOCATION	IIIVIE	ITPE	STUDENT(S)			
THE ANGEL THAT WEEPS						
EH 243	2:00-2:15	oral	Sarena Wells			
THE MINING EXPLOITATION: SACRIFICE AND POVERTY						
EH 243	2:15-2:30	oral	Andy Guerrero			
"TÍAS" BREAKING THE PARADIGM OF THE TRADITIONAL HOME						
EH 243	2:30-2:45	oral	Carla Hernandez Chacon			

# LANGUAGES, LITERATURE AND MASS COMMUNICATION TRACK 8F

Facilitator: Tyler Anderson

LOCATION TIME TYPE STUDENT(S)

THE PRESENCE OF BILINGUAL EDUCATION PROGRAMS IN THE UNITED STATES AND SPAIN AND HOW VARYING SOCIAL ATTITUDES IMPACT THEIR EFFECTIVE IMPLEMENTATION

EH 243 2:45-3:00 oral Peyton Deal

THE IMPORTANCE OF CULTURAL COMPETENCE IN HEALTH CARE AND THE NEED FOR HIGHER STANDARDS

EH 243 3:00-3:15 oral Macharnie Skalecki

MUSIC TRACK 9A

Facilitator: Kristen Yeon-Ji Yun

LOCATION TIME TYPE STUDENT(S)

MAKING ART: A MUSICAL CANVAS

MPAC 005 2:00-2:15 performance Brieanna Mangette

"COMME UNE PRIERE" A DUET FOR CELLO AND GUITAR

MPAC 005 2:15-2:30 performance Aaron Frick, Jamie Van Dyke

SEMPRE LIBERA - OPERA ARIA PERFORMANCE AND EXPLANATION

MPAC 005 2:30-2:45 performance Cierra LeVan

MUSIC TRACK 9B

Facilitator: Kristen Yeon-Ji Yun

LOCATION TIME TYPE STUDENT(S)

SCORING IN LIFE

MPAC 005 2:45-3:00 oral Alec Brown

IS MUSIC EDUCATION JUST MUSIC?

MPAC 005 3:00-3:15 oral Madilyn Slocomb

"ROUND ONE" - PRODUCING A MUSIC VIDEO PERFORMED BY THE CMU ROWDY BRASS BAND

MPAC 005 3:15-3:30 oral Caleb Talkington

VOICE TO GUITAR: ERIC WHITACRE'S A BOY AND A GIRL

MPAC 005 3:30-3:45 oral Aaron Frick, Calvin Lindberg







Physical and Environmental Sciences - Geology Track 10A

Facilitator: Andres Aslan

LOCATION TIME TYPE STUDENT(S)

DETERMINING PROVENANCE OF ANCIENT COLORADO RIVER SEDIMENTS USING DETRITAL SANIDINE 40AR/39AR GEOCHRONOLOGY

WS 2nd Fl. S. Hallway 2:00-3:45 poster Alejandro Jaquez-Caro

EFFECTS OF ASPECT, PREVAILING WIND DIRECTION, AND TIMING OF SOLAR RADIATION ON GLACIAL DYNAMICS IN THE COLORADO ROCKIES

WS 2nd Fl. S. Hallway 2:00-3:45 poster Cullen Meurer

ANALYSIS OF UNAWEEP CANYON, COLORADO FOR POSSIBLE TRAVERTINE DEPOSITS

WS 2nd Fl. S. Hallway 2:00-3:45 poster Reno Davidson

LATE QUATERNARY EVOLUTION OF THE UNCOMPAHGRE RIVER VALLEY BASED ON A NEW GEOLOGIC MAP COMPILATION

WS 2nd Fl. S. Hallway 2:00-3:45 poster Jonathon Hutson

GEOCHEMISTRY AND MINERALOGY OF OUTCROPS OF THE NIOBRARA MEMBER OF THE MANCOS SHALE ON THE BLUFFS OF THE COLORADO RIVER IN CLIFTON, COLORADO

WS 2nd Fl. S. Hallway 2:00-3:45 poster Brianna Trump

PETROGENESIS OF THE GRAND MESA VOLCANIC FIELD

WS 2nd Fl. S. Hallway 2:00-3:45 poster Sarah Dedecker

NEW MAPPING OF MAGNETIC ANOMALIES USING PROTON PRECISION MAGNETOMETERS WITHIN THE NORTHEASTERN PART OF THE UNCOMPAHGRE PLATEAU

WS 2nd Fl. S. Hallway 2:00-3:45 poster Ryan Mumby

EARTHQUAKES IN THE RATON BASIN, COLORADO AND CONNECTIONS TO WASTEWATER INJECTION

WS 2nd Fl. S. Hallway 2:00-3:45 poster Justin Humenik

NEW TERRACE MAPPING AND CONSTRAINTS ON THE TIMING OF GREEN RIVER INTEGRATION

ACROSS THE EASTERN UINTA MOUNTAINS WS 2nd Fl. S. Hallway 2:00-3:45 poster Edward Martin

CHARACTERIZING THE OHIO CREEK FORMATION USING GEOCHEMICAL AND GAMMA RAY

SPECTROMETRY, MESA, COLORADO, USA

WS 2nd Fl. S. Hallway 2:00-3:45 poster Laura Green

THE FORMATION OF CAVERNOUS WEATHERING FEATURES AND ARCHES IN RATTLESNAKE CANYON, COLORADO

WS 2nd Fl. S. Hallway 2:00-3:45

poster Tristan Bates

## Physical and Environmental Sciences - Physics Track 10B

Facilitator: Brian Hosterman

LOCATION TIME TYPE STUDENT(S)

EXPERIMENTAL VERIFICATION FOR CLASSICAL ELECTROMAGNETISM THEORY OF OPTICAL INTENSITY

WS 2nd Fl. N Hallway 2:00-3:45 poster Justin Endicott

NUMERICAL SOLUTION FOR THE EQUATION OF MOTION OF A PARTICLE IN A 1D POTENTIAL USING RUNGE-KUTTA 4 WITH PYTHON

WS 2nd Fl. N Hallway 2:00-3:45 poster Trey Jiron

STATISTICS OF LASER LIGHT

WS 2nd Fl. N Hallway 2:00-3:45 poster Dillon Merenich

APPLICATIONS OF A TEMPERATURE-CONTROLLED HEATING STAGE FOR RAMAN

SPECTROSCOPY

WS 2nd Fl. N Hallway 2:00-3:45 poster Abraham Selenke

Physical and Environmental Sciences - Chemistry Track 10C

Facilitator: Sam Lohse

LOCATION TIME TYPE STUDENT(S)

NOVEL GOLD(III) COMPLEXES FOR THE UTILIZATION OF STRONG C-H BONDS COMPARABLE TO THOSE FOUND IN PETROLEUM

WS 2nd Fl. N Hallway 2:00-3:45 poster Mahli Hernandez, Briana Maestas

DETERMINING UNDERLYING CORRELATIONS OF MULTIPLE AIR QUALITY SENSORS WITH **PYTHON** 

WS 2nd Fl. N Hallway 2:00-3:45 poster Matthew Wilson

AIR QUALITY ANALYSIS: PUTTING THE SERIES 900 OZONE DETECTOR TO THE TEST

WS 2nd Fl. N Hallway 2:00-3:45 poster James Dawe, Joshua Vincent

COMPARISON OF CONTINUUM AND ATOMISTIC NUMERICAL SIMULATIONS OF HEAT TRANSFER AT THE SOLID-FLUID INTERFACE

WS 2nd Fl. N Hallway 2:00-3:45 poster Jacob Bollinger

EFFECTS OF ALGAE ON GOLD NANOPARTICLE STABILITY

WS 2nd Fl. N Hallway 2:00-3:45 poster Tori Catlett









## Physical and Environmental Sciences - Env. Sciences Track 10D

LOCATION TIME TYPE STUDENT(S)

A REVISION OF CURRENT BEST PRACTICES FOR GRAFFITI REMOVAL

WS 3rd. Fl. N Hallway 2:00-3:45 poster Sara Clark, Savanna Peake

DESIGNING AND TESTING OF AN ALGAL TURF SCRUBBER TO REDUCE SELENIUM FROM

COLORADO RIVER WATER

WS 3rd. Fl. N Hallway 2:00-3:45 poster Colton Berg, Amanda Seuell,

Casev Williams

DESIGNING A GREEN ROOF SYSTEM FOR THE HAMILTON RECREATION CENTER AT COLORADO MESA UNIVERSITY

WS 3rd. Fl. N Hallway 2:00-3:45 poster Zachary Blumenthal, Savana Cummings,

Henry Wondolleck

A COMPARATIVE ANALYSIS OF GREENHOUSE GAS EMISSIONS FROM COLORADO MESA

UNIVERSITY FROM 2012 TO 2018

WS 3rd. Fl. N Hallway 2:00-3:45 Sydney Lyons, Delaney Robison, poster

Max Roumph, Sarah Staats

A COMPREHENSIVE PLAN FOR THE POST-FIRE RESTORATION OF SKIPPER ISLAND

WS 3rd. Fl. N Hallway 2:00-3:45 poster Ethan Archer, Tanner Rust,

Nathaniel Scully

LIFE CYCLE ANALYSIS OF CANNABIS SATIVA IN MESA COUNTY

WS 3rd. Fl. N Hallway 2:00-3:45 poster Jeffrey Purdy, Dillon Rosenberg,

Anthony Vanden-Plas

ASSESSING THE SUSTAINABILITY OF GREEN ROOFS IN SEMI-ARID ENVIRONMENTS

WS 3rd. Fl. N Hallway 2:00-3:45 poster Jeffrey Purdy

COMPARING PATTERNS OF PINYON PINE AND JUNIPER REGENERATION OF FIRES AND BARK-

BEETLE OUTBREAKS

WS 3rd. Fl. N Hallway 2:00-3:45 poster Ethan Archer, Jeffrey Purdy, Tanner Rust,

Nathaniel Scully, Amanda Seuell

A PLAN OF ACTION FOR ECOLOGICAL RESTORATION AND COMMUNITY ENGAGEMENT AT

THE CLIFTON NATURE PARK IN CLIFTON, CO

WS 3rd. Fl. N Hallway 2:00-3:45 poster Emmett Johnson, Joy Von Guerard, Joshua Worth

Facilitator: Dave Weinberg

LOCATION TIME TYPE STUDENT(S)

MAGNETIC SURVEY & GEOCHEMICAL ANALYSIS OF RYAN PARK-UNAWEEP CANYON

WS 160 2:00-2:15 oral JD King

CONSTRAINING FRIEDMANN-ROBERTSON-WALKER COSMOLOGY IN D-DIMENSIONS

WS 160 2:15-2:30 oral Shawn Fox

ANALYTICAL AND COMPUTATIONAL MODELS OF EXOPLANETARY ATMOSPHERES

WS 160 2:30-2:45 oral Joshua Lindsey

THE CORRELATION AND ORIGIN OF ALLUVIAL TERRACES ALONG THE WESTERN AND SOUTHERN FLANKS OF THE GRAND MESA, WESTERN COLORADO

WS 160 2:45-3:00 oral Alejandro Conde

CONTROLLED GOLD NANOPARTICLE (AUNP) AGGREGATION: AGGREGATE TOXICITY IN D. MAGNA

WS 160 3:00-3:15 oral Christopher Vandermeer

SYNTHESIS AND CHARACTERIZATION OF BA\_(1-X)SR\_XTIO\_3 CERAMICS

WS 160 3:15-3:30 oral Nicholas Wright

SOCIAL AND BEHAVIORAL SCIENCES

TRACK 11A

Facilitator: Eliot Jennings

LOCATION TIME TYPE STUDENT(S)

WEAPONIZED RELIGION AND THE COLD WAR

H 135 2:00-2:15 oral Madeline Ancell

THE SKY'S THE LIMIT: SOVIET AND AMERICAN AVIATION DEVELOPMENT IN THE COLD WAR

H 135 2:15-2:30 oral Taran Pennington

A COMPETITION OF STATESMEN IN THE COLD WAR

H 135 2:30-2:45 oral Bryan Waite

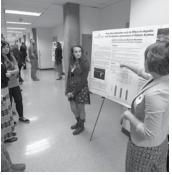
AN EPIC STORY: FEAR, THE COLD WAR, AND POPULAR NOVELS

H 135 2:45-3:00 oral Carson Pipher

THE COLD WAR BEYOND THE BATTLEFIELD: CULTURAL WARFARE AND THE SPACE RACE

H 135 3:00-3:15 oral Jack Holt





TRACK 11C

TRACK 11D

Sara Garcia, Alexander Smith

## Social and Behavioral Sciences

Facilitator: Michael Delaney

LOCATION TIME TYPE STUDENT(S)

TRUTH-SEEKING

H 133 2:00-2:15 oral Elias Acevedo, Sarah Douglas

TO RETURN OR TO KEEP?: VARIATIONS IN RESPONSES TO DROPPED MONEY ON COLLEGE

CAMPUS 3 2:15-2:30 oral Rachel Geertgens H 133

THE LINK BETWEEN CRITICAL THINKING AND PERSONALITY: INDIVIDUAL DIFFERENCES IN

HEY DOC, WANNA SKYPE?

2:30-2:45 oral Jamie Hall, Marisa Jahnke

DOES MORE SEX EQUAL GREATER HAPPINESS?: AN INSIGHT INTO THE RELATIONSHIP BETWEEN GENERAL HAPPINESS AND SEXUAL FREQUENCY

Jessica Jolley H 133 2:45-3:00 oral

SOCIAL AND BEHAVIORAL SCIENCES

Facilitator: Christine Hein

LOCATION TIME TYPE STUDENT(S)

OCCUPATIONAL OASIS

2:00-2:15 oral Courtney Cross, Shannel Wilson

ABORTION ATTITUDES AS THEY RELATE TO CHURCH ATTENDENCE 2:15-2:30 oral Gerald Ellis

AMERICA'S TALE OF ENVIRONMENTAL RACISM: HOW MINORITIES FACE PERIL IN URBAN SPACES H 201 2:30-2:45 oral Mikaela Lopez

SOCIAL AND BEHAVIORAL SCIENCES

Facilitator: Justin Gollob

LOCATION TIME TYPE STUDENT(S)

2:00-2:15

THE SCAVENGING PATTERNS OF FERAL CATS ON HUMAN REMAINS IN AN OUTDOOR SETTING

H 107

FOSSIL FREE CMU

2:15-2:30 oral Meghan Cline

oral

WATER CONSERVATION IN THE GRAND VALLEY

2:30-2:45 oral Tyler Schwartz

KALAMAZOO RIVER OIL SPILL: A CASE STUDY ON MASS-SCALE ENERGY TRANSPORT

2:45-3:00 oral Brigittah Erickson Facilitator: Erika Jackson

LOCATION TIME TYPE STUDENT(S) AN INTERVIEW OF AMANDA BYNUM 2:00-2:15 oral Kate Beagle AN INTERVIEW OF WENDY KELLY oral 2:15-2:30 Fatima Attoumani AN INTERVIEW OF NATALIE STRONG 2:30-2:45 oral Savannah Bernal AN INTERVIEW OF RALUCA LILES Cera Hammond 2:45-3:00 oral AN INTERVIEW OF SHELLEY SCHULZ 3:00-3:15 oral Samuel Moreno AN INTERVIEW OF KATE CACCAVAIO 3:15-3:30 oral Jordan Sheehan AN INTERVIEW OF MELISSA RIVEST H 203 3:30-3:45 oral Kristen Smith

SOCIAL AND BEHAVIORAL SCIENCES

TRACK 11F

Facilitator: Tim Casey

LOCATION TIME TYPE STUDENT(S)

THE USE OF A METAL DETECTING PROBE TO EXAMINE CREMAINS

H 1st Fl. Hallway 2:00-3:45 poster Gabrielle Lopez

OIL AND GAS DEVELOPMENT ON THE WESTERN SLOPE
H 1st Fl. Hallway 2:00-3:45 poster Troy Redding

INVESTIGATING MATERIAL CULTURE ITEMS FOUND IN ALLEGED CREMATED REMAINS

H 1st Fl. Hallway 2:00-3:45 poster Morgan Camp

PREHISTORIC SETTLEMENT PATTERNS OF THE GRAND MESA, UNCOMPAHGRE, AND GUNNISON NATIONAL FORESTS

H 1st Fl. Hallway 2:00-3:45 poster Adam Grotjohn





## **TEACHER EDUCATION**

**Facilitator: Stephanie Stelljes** 

LOCATION TIME TYPE STUDENT(S)

SUPPORTING ENGLISH LANGUAGE LEARNING THROUGH LITERATURE

DH 110 2:00-2:15 oral Mikayla Redd-Bennett, Anna Woodfield

INCLUSION

DH 110 2:15-2:30 oral Gemini Fernandez, Alexys Sanchez,

Sarah Solinger

THE IMPACT OF EARLY SPEECH INTERVENTION

DH 110 2:30-2:45 oral Amanda Charles, Heather Wilczek

WHY S.T.E.A.M LEARNING AND WHAT IS IT?

DH 110 2:45-3:00 oral Michelle Moore, Jennifer Romo

ADD, ADHD, AND MEDICATION

DH 110 3:00-3:15 oral Sasha Bizer

HYDROTHERAPY: BENEFITS FOR YOUNG AND DEVELOPING CHILDREN

DH 110 3:15-3:30 oral Noelle Berg, Bailey Rogers, Julia Simmons

**TEACHER EDUCATION** 

TRACK 12B

Facilitator: Nick Bardo

LOCATION TIME TYPE STUDENT(S)

OPPOSITIONAL DEFIANT DISORDER

DH 111 2:00-2:15 oral Amber Sanborn

AUTISM SPECTRUM DISORDER AND NUTRITION

DH 111 2:15-2:30 oral Brianna Bower, Cori Fix, Carly U-Ren

THE IMPACTS OF SENSORY OBJECTS IN THE CLASSROOM

DH 111 2:30-2:45 oral Morgan Bond, Kaylie Williams

SEVERE NEEDS BEHAVIOR

DH 111 2:45-3:00 oral Julie Boano, Lindsay Carpenter

USING STEM TO ENRICH A DEFICIT IN LEARNING

DH 111 3:00-3:15 oral Lynnette Reddin

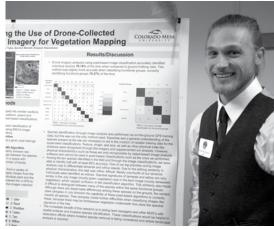
ANIMAL ASSISTED THERAPY IN EARLY CHILDHOOD EDUCATION

DH 111 3:15-3:30 oral Paige Burnham









STUDENT(S)

TEACHER EDUCATION

TIME

**Facilitator: Alison Morris** 

LOCATION

Track 12C

LOCATION	IIIVIE	ITPE	310DEN1(3)
MICROSOFT ADAPTIV	E CONTROLLEI	R	
DH 1st Fl. Hallway	2:00-3:45	poster	Cara Giancaterino, Halle Harrison, Mackenzie King, Paige Luke
DYSLEXIA	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	
DH 1st Fl. Hallway	2:00-3:45	poster	Hailey Knight
LET THEM PLAY!			
DH 1st Fl. Hallway	2:00-3:45	poster	Jessica Pike
EFFECTIVE TEACHING	STRATEGIES F	OR CHILDREI	N WITH ADHD
DH 1st Fl. Hallway	2:00-3:45	poster	Morgan Hoffmeister
SENSORY SIDEWALKS			
DH 1st Fl. Hallway	2:00-3:45	poster	Samantha Johnson
HEALTH LITERACY AN	D DISCHARGE	PLANNING	
DH 1st Fl. Hallway	2:00-3:45	poster	Jamie Hyatt, Rachel Kotris,
			Callie Rubalcaba, Cassie Rubalcaba

**TEACHER EDUCATION - EXHIBIT** 

Track 12D

Facilitator: Ann Gillies

LOCATION TIME TYPE STUDENT(S)

EFFECTIVE TEACHING FOR DIVERSE LEARNERS

DH 1st Fl. Hallway 2:00-3:45 other

Sasha Bizer, Chris Cole, Payton Dearboarn, Allie Dilldine, Morgan Hoffmeister, Jill Hook, Hailey Knight, Angela Koch Ortiz, Leighanne Matson, McKenna Morgan, Lauren Popp, Katie Remmers, Amber Sanborn, Kellen Shaw, Christopher Sorensen, Wesleigh Williams

#### THEATRE ARTS - PERFORMACE

#### Facilitator: Amanda Benzin

LOCATION TIME TYPE STUDENT(S)

A SCENE FROM: THE IMPORTANCE OF BEING EARNEST

Robinson Theatre 2:00-2:15 performance Jordan Gray, Ryland Mahre

AMAZED, THEN CURIOUS, BELIGERENT THEN HEARTBROKEN

Robinson Theatre 2:15-2:30 performance Blake Hood, Kyra Young

WAITING FOR GODOT

Robinson Theatre 2:30-2:45 performance Thomas Jacobs, Justin Whittenburg

THE TAMING OF THE SHREW

Robinson Theatre 2:45-3:00 performance Ashli Alderman, Peter Kisiel

AGORAPHOBIA

Robinson Theatre 3:00-3:15 performance Collin Hood, Peter Kisiel,

Shandon Rushton

THEATRE ARTS - DANCE

TRACK 13B

Facilitator: Amanda Benzin

LOCATION TIME TYPE STUDENT(S)

THE EMBODIMENT OF A PERFORMER: ONE CHOREOGRAPHER'S STORY THROUGH MOVEMENT

Robinson Theatre 3:15-3:30 performance Alana Koch

COMMUNICATION COLLABORATION CREATION

Robinson Theatre 3:30-3:45 performance Ashlee Arline

HOW THE EYES SEE

Robinson Theatre 3:45-4:00 performance Quiana McElroy





### THEATRE ARTS - MUSICAL THEATRE

Facilitator: Jill Van Brussel

LOCATION	TIME	TYPE	STUDENT(S)	
EXCERPT FROM "HIDII	NG"			
MPAC 136	2:00-2:15	performance	Jonathon Botello	
LEGALLY BLACK				• • • • • • • • • • • • • • • • • • • •
MPAC 136	2:15-2:30	performance	Heidi Snider	
HELLO, MY NAME IS				
MPAC 136	2:30-2:45	performance	Lauren Valdez	
ALL DRESSED UP AND				
MPAC 136	2:45-3:00	performance	Alyssa Gose	
I DON'T KNOW, SO ST			Assas Duradia	
MPAC 136	3:00-3:15	performance	Anna Dworkin	
PUZZLE PIECES	2.15 2.20		Katalan Carin	
MPAC 136	3:15-3:30	performance	Katelyn Craig	
OUTSIDE THE LINES	2.20 2.45		Annia lasas	
MPAC 136 	3:30-3:45	performance	Annie Imes	
AND LAST BUT CERTA			Kura Vauna	
MPAC 136	3:45-4:00	performance	Kyra Young	
THEATRE ARTS - Facilitator: Dee Cham		Speaking		Track 13D
		Speaking type	STUDENT(S)	Track 13D
Facilitator: Dee Cham	nbers TIME	TYPE	·	Track 13D
Facilitator: Dee Cham LOCATION CREATING EVIL SPECIE EH 307	TIME	TYPE	N'S MEDIA	Track 13D
Facilitator: Dee Cham LOCATION CREATING EVIL SPECIE	TIME	TYPE ER OF CHILDRE oral	N'S MEDIA	Track 13D
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE	TIME ES: THE POW 2:00-2:15	TYPE ER OF CHILDRE oral	N'S MEDIA Collbren Lang	Track 13D
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE	TIME ES: THE POW 2:00-2:15	TYPE  TER OF CHILDRE  oral  oral	N'S MEDIA Collbren Lang	Track 13D
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307	TIME ES: THE POW 2:00-2:15 2:15-2:30	TYPE  TER OF CHILDRE  oral  oral	N'S MEDIA Collbren Lang Hope Brown	Track 13D
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE EH 307	TIME  ES: THE POW 2:00-2:15  2:15-2:30  2:30-2:45	TYPE  TER OF CHILDRE  oral  oral  oral	N'S MEDIA Collbren Lang Hope Brown Dana Liesegang	
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE	TIME  ES: THE POW 2:00-2:15  2:15-2:30  2:30-2:45	TYPE  TER OF CHILDRE  oral  oral  oral	N'S MEDIA Collbren Lang Hope Brown Dana Liesegang	
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE EH 307  THEATRE ARTS -	TIME  ES: THE POW 2:00-2:15  2:15-2:30  2:30-2:45	TYPE  TER OF CHILDRE  oral  oral  oral	N'S MEDIA Collbren Lang Hope Brown Dana Liesegang	Track 13D
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE EH 307  THEATRE ARTS - Facilitator: Dee Cham LOCATION	TIME  ES: THE POW 2:00-2:15  2:15-2:30  2:30-2:45  RESEARC  abers  TIME	TYPE  FER OF CHILDRE oral  oral  oral  CH PRESENT	N'S MEDIA Collbren Lang Hope Brown  Dana Liesegang  TATIONS  STUDENT(S)	
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE EH 307  THEATRE ARTS - Facilitator: Dee Cham	TIME  ES: THE POW 2:00-2:15  2:15-2:30  2:30-2:45  RESEARC  abers  TIME	oral  OTAL  OTAL	N'S MEDIA Collbren Lang Hope Brown  Dana Liesegang  TATIONS  STUDENT(S)	
Facilitator: Dee Cham LOCATION  CREATING EVIL SPECIE EH 307  ART AS MEDICINE EH 307  SELF-RELIANCE EH 307  THEATRE ARTS - Facilitator: Dee Cham LOCATION  MUSIC AS THE ROOT OF THE STATE S	### TIME  ### ES: THE POW    2:00-2:15	TYPE  TER OF CHILDRE  oral  oral  Oral  TYPE  SIICATION AND COORAL	N'S MEDIA Collbren Lang Hope Brown  Dana Liesegang  CATIONS  STUDENT(S)  CONNECTIONS Christie Thammavong	TRACK 13E
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## THEATRE - ORAL PRESENTATIONS

TIME

Track 13F

Facilitator:	Paula	Casey
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LOCATION

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DIGITAL AUDIO IM EH 324	AGINATION 2:00-2:15	oral	Daniel Davidek
DANCE AND AUTI EH 324	SM 2:15-2:30	oral	Olivia Crochet
A CHOREOGRAPH EH 324	ER'S PROCESS: A S 2:30-2:45		ALTHY LEADERSHIP Carly Nugent
BANGS CANYON TEH 324	THROUGH DANCER 2:45-3:00	S' EYES oral	Laura Huwa, Linnaea Zaenger
DEW DROP EH 324	3:00-3:15	oral	Emily Predovich

STUDENT(S)

TYPE

# WESTERN COLORADO COMMUNITY COLLEGE - EXHIBIT TRACK 14A Facilitator: Casey Dry

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LOCATION	TIME	TYPE	STUDENT(S)
HYDRAULIC ACTUA	TED ROBOTIC AR	М	
Plaza (Tent)	2:00-3:45 d	emonstration	Joshua Chaffee, Joseph Penkaty, Christopher Roche, Bradly Schiesser, Brandon Wilson, Wade Young
GO-KART SUPERCH	ARGER PROJECT		
Plaza (Tent)	2:00-3:45 d	emonstration	Marco Bravo, Allen Cochran, Edward Dry, Gretchen Kowalczyk, Joel Woodward
ELEVATOR FUN			
Plaza (Tent)	2:00-3:45 d	emonstration	Andrew Bennett, Chris Urbanski
2X72 INCH BELT GR	RINDER FOR KNIF	E MAKING	······································
Plaza (Tent)	2:00-3:45 d	emonstration	Wade Young

#### WESTERN COLORADO COMMUNITY COLLEGE - EXHIBIT TRACK 14B

Facilitator: Casey Dry

STUDENT(S) LOCATION TIME TYPE

ROOM TEMPERATURE AND LIGHT DETECTION ROBOT

2:00-3:45 demonstration Nicholas Howland

The following WCCC students will be presenting alongside the Teacher Education tracks. Abstracts can be found in the Teacher Education section of the program.

INCLUSION

2:15-2:30 oral DH 110 Gemini Fernandez, Alexys Sanchez, Sarah Solinger

WHY S.T.E.A.M LEARNING AND WHAT IS IT?

2:45-3:00 oral Michelle Moore, Jennifer Romo

THE IMPACTS OF SENSORY OBJECTS IN THE CLASSROOM

DH 104 2:30-2:45 oral Morgan Bond, Kaylie Williams

LET THEM PLAY!

DH 1st Fl. Hallway 2:00-3:45 poster Jessica Pike





Listed alphabetically by department then alphabetically by title within each department.

#### ART & DESIGN

Title: A BRIEF HISTORY OF PHOTOGRAPHY

Presenter(s): Taylor Bartholomew, Benjamin Haver

Faculty Sponsor: Meghan Bissonette

Track:

Abstract: There is a shift in photography from a documentation tool to an artistic

practice. In the earliest days of photography, this tool was viewed as just that, a tool for scientific documentation. It wasn't until the technology improved that it was taken up by artists. The first mainstream technique is the daguerreotype. As time marched on new technologies came online. These revolutionized the practice. While the next breakthrough was

Talbot's calotype that had a negative to make multiple copies, it is the wet

collodion method that takes center stage. The wet collodion technique had the durability of the daguerreotype as well as the reproductive qualities of the calotype. In the current age, many artists rely on DSLR cameras and processing programs. Because there is a documentation quality specific to photography the product is often viewed to hold a certain level of truth. This trait is exploited by artists to blur the line between carefully crafted composition and a raw depiction of life. By looking at different artists and their practices we will chart a trajectory on how the medium has evolved

over the nearly 200 years of its existence.

ACCEPTING MY IDENTITY THROUGH MY ARTWORK Title: Presenter(s): Addison Minailton Alison Harris-Ludlow Faculty Sponsor:

Track:

Abstract: My skin tone gives the impression that I don't struggle fitting into

> the majority, which is untrue. Attempting to fit into either category of black or white I find myself in a grey paint stroke overlapping the two, not completely blending into one color or the other. The subjects and situations in my paintings are taken from photographs of my mixed race family. The paintings I make help represent the experiences of the mixed race individual, their lack of acceptance within contemporary and political societies, and their struggle to fit into one race or the other. I use photographs of my father's side of the family. There is so much beauty in their lives, even as they struggle to live up to white standards. Our country has developed a complicated relationship between races, and though time has passed there is little progress mending the relationship between the two. Through my artwork I try to understand how my family has dealt with these relationships and my own racial identity as a mixed woman. My artwork reflects my racial identity. Through my imagery I educate others about accepting human diversity. The minority figure belongs in art as much as the white figure.

Title ART THROUGH CRAFT

Presenter(s): Hannah Martin KyoungHwa Oh Faculty Sponsor: Track:

Abstract: Hannah Martin will be presenting on ceramic processes involving hand

building, and surface design. This presentation is designed to showcase the versatility of ceramics and the large variety of possibilities that come from working with clay. Through these demonstrations the artist will show the expressive capabilities which are unique to her techniques. Highlighting how ceramic objects are always there recording all the quiet moments, conversations, and memories throughout our everyday lives. Functional pottery is aligned with craft because of its relationship with the user. Because these items are meant to be used and not viewed, their artistic integrity is put into question. This functionality allows for a unique transfer of the artists intentions through both a visual and a physical lens. This debate continues today with the question of whether a functional object can be art.

Title: BALANCE

Presenter(s): Layna Johnson, Jessica Hedlun, Samuel Speir, Troy Utley, Alexandra Wiuff

Faculty Sponsor: Joshua Butler

Track: 1A

Abstract: This artwork is a visual representation of the necessary act of balance within one's journey. As an art educator and studio artist, I am consistently reminded of how imperative it is to find equilibrium within the ebbs and flows of life. I am currently a myriad of roles simultaneously. As with most people, I am not clearly defined by one concise identity. I am a teacher,

people, I am not clearly defined by one concise identity. I am a teacher, a student, a mother, a disciplinarian and a caretaker. I am consistently confronted with aspects of life, both dark and light, and I am learning how to balance it all. Much like the Greek God Atlas, I often feel it is my responsibility to hold up the world on my shoulders. My piece is a reminder to those who feel the weight of their responsibility that achieving balance in

life is much like riding a bicycle, you must keep moving.

Title: CREATIVE REPRESENTATION

Presenter(s): Sage Meyer, Dejan Jestrovich

Faculty Sponsor: Eli Hall Track: 1B

Abstract: The creative community has recently undergone a change caused by new

updates in certain social media applications. While social media was still fairly new, there were no promoted and sponsored posts. The amount of exposure someone had directly correlated with a number of followers. Today, that has changed. Algorithms have altered the interface of social media by personalizing content based off what the viewer likes and ignores. This means the posts with less likes get shoved to the back of the line. Posts are no longer guaranteed to be ordered sequentially based on the time they were posted. A user may see a post from three days ago appear at the top if their timeline while another post uploaded ten minutes ago and may never be seen. Social media is a critical outlet for artist. If utilized, social media will expose viewers to works they may have never seen otherwise. I will be submitting a presentation on a mural created by myself. The presentation will cover what the mural means to me and its purpose for

others. It will also touch on spray paint techniques and other notes about

the tools used.

Title: IN-HOUSE DESIGN

Presenter(s): Dejan Jestrovich, Taylor Bartholomew

Faculty Sponsor: Eli Hall Track: 1B

Abstract: Internships can prove to be an invaluable glimpse at future career life for

students. This presentation will cover a graphic design student's experience interning at Enstrom Candies. The internship began as an operator for a Large-Format Roland UV Printer making custom lids for clients and ended offering rare design opportunities for a student designer. This presentation will show the process and capabilities of a printer with a z-axis as well as highlight some of the involved design projects working as an in-house designer. Included in these projects is a lid designed for a holiday themed

box sold in all Enstrom retail store locations. Another began with creating an asset for a product's package and ended with the approval of a proposed package design of the student. Over the length of three months this internship provided a practical work experience that no amount of schooling could. The goal of this presentation is to share this experience and in turn show the importance and impact internships can have for students.

Title: MESA COUNTY LIBRARIES INTERNSHIP PORTFOLIO

Presenter(s): Logan Wagner Faculty Sponsor: Fli Hall

Faculty Sponsor: Eli Ha Track: 1B

Abstract: The summer of 2018 I had the opportunity to complete an internship at

the Mesa County Library Central Branch underneath David Goe, their inhouse graphic designer. Design elements including evergreen social media advertisements, library branch handouts, logo for Discovery Garden, and promotional stickers were all created during this time. The focus project for the showcase will be the logo for Discovery Garden, a community garden managed by the library. This newly annexed land will support a growing and learning community. The logo serves to protect the ideals of the library's unconventional outreach efforts and re-defining what libraries can be.

Title: SPACE SERIES

Presenter(s): Benjamin Haver, Layna Johnson

Faculty Sponsor: Eli Hall

Track: 1B

Abstract:

The Space Series project highlights how screen printing and multimedium design expand graphic design students' core competencies. After experiencing a CMU-taught screen printing course, a newly developed passion was sparked. Combined with the expansive creativity allowed at CMU and compliments from the Kiln Coffee Bar inspired this project. Space was the chosen theme for this project to express the fun and limitless possibilities in art. To further emphasize newly ignited passions developed by art experimentation, screen printing was the selected medium. The process of screen printing includes design development, screen preparation and burning and multi-layered, single-colored layers. The entire procedure is an outlet for creativity that requires a true love for the art. Open, fun and meaningful art is intended for everyone and those curious about the rare art of screen printing would be interested in this project presentation.

Title: SWEET SUCCESS

Presenter(s): Breanna Meininger, Sage Meyer

Faculty Sponsor: Eli Hall

Track: 1B

Abstract: The project will demonstrate how the graphic design program and the education I have received at Colorado Mesa University, aided in my ability to obtain a full time job before graduation. Specifically, I will discuss how I obtained an internship and how that led Enstrom Candies to create a job for me in my profession. The presentation will include packaging design, travel opportunities, process imagery as well as past and current design pieces I have completed while working at Enstrom Candies. The presentation aims to exhibit how Colorado Mesa University's Graphic Design program prepares its students for the future and the value of a well-rounded education. Anyone interested in seeing how graphic design is

being applied in our community, may be interested in this presentation.

Title: THE FROGMAN'S DEMONSTRATION: MONOTYPE, INTAGLIO,

AND LITHOGRAPHY

Presenter(s): Alexandra Wiuff, Breanna Meininger

Faculty Sponsor: Joshua Butler

Track: 1A

Abstract: After attending and representing CMU at the 2018 Frogman's Print

Workshops hosted by the University of Nebraska at Omaha, one of the world's largest printmaking conferences, students from the Printmaking Guild will present a variety of techniques learned from leading professionals in the field. Traditional printmaking is the artistic process of reproducing an image from a plate or matrix by printing it onto another surface. Inspired by the diversity and flexibility of this medium, this exhibit will touch on monotype, intaglio, and lithographic processes. The presentation aims to show the capacities of printmaking today in addition to providing historical context and raising awareness of this medium. The presentation will include a portfolio of prints completed at Frogman's Print Workshops, original printing plates, and an outline of three different printmaking processes. Anyone who is unfamiliar with the art of printmaking and its use in the modern era may be interested in this presentation.

#### **BIOLOGICAL SCIENCES**

Title: CHANGES IN NUTRITIONAL QUALITY IN PIKA DIET OVER THREE

DECADES AT NIWOT RIDGE, COLORADO

Presenter(s): Zoe Carnes-Douglas Faculty Sponsor: Johanna Varner

Track: 2B

Abstract: Climate change is affecting mountain ecosystems by increasing

temperature, decreasing precipitation, and increasing atmospheric CO2. As a result, plants may increase carbon-based defenses such as phenolics and tannins, potentially affecting food quality and habitat suitability for herbivores. The American pika (Ochotona princeps) is an alpine herbivore that often consumes plants high in phenolics and therefore is an excellent system to study these questions. Alpine avens (Geum rossii) is one such plant species that comprises 50-75% of pika winter diet in Colorado. We repeated a protocol performed by Dearing (1997) to compare changes in plant chemistry and overwinter preservation in pika food caches over the last three decades. Specifically, we collected avens on the West Knoll from 2013-2018 and measured phenolic concentrations. We also exposed avens overwinter in artificial haypiles and measured remaining biomass the following summer. Avens showed a marginally significant increase in phenolic content since 1993. However, biomass preservation was significantly higher in 2018 compared to 1993, which could be due to a variety of different factors (e.g., microbial processes, chemistry, etc.). These increases could be beneficial for the preservation of haypiles; however, if pikas must further delay consuming these plants, foraging costs may

outweigh nutritional gains.

Title: DO ENVIRONMENTAL TEMPERATURES DRIVE LOCAL ADAPTATIONS IN

GARTER SNAKES (THAMNOPHIS ELEGANS)

Presenter(s): Isabella Bettinger Faculty Sponsor: Paul Hampton

Track: 2A

Abstract: Through natural selection an organism's physiology should be adapted

to their environment. The performance of ectotherms is particularly constrained by the temperature of their environment. We hypothesized that natural selection would favor physiological adaptations for optimal

performance associated with climate in garter snakes. To test this hypothesis, we captured garter snakes at various elevations representing different climates near Grand Junction. At the time of each snake capture we recorded soil, air and active body temperatures. Snakes were brought to the lab to determine preferred body temperature. The snakes were placed in a chamber with a temperature gradient of 20-40 °C. Cloacal temperature was taken every 30 minutes to determine preferred body temperature. We also measured metabolic rates by recording oxygen consumption for 1 hour using a closed respirometry system at 26 °C. Results show that there was no difference between preferred body temperature and active body temperature in the field. Snakes from higher elevations had lower preferred body temperatures. Metabolic rates were negatively correlated to preferred body temperature. Together these data indicate local adaption to climate in garter snakes.

Title: EFFECTS OF HIGH ALTITUDE HYPOXIA ON THE ACTIVATION AND FUNCTION OF AMP-ACTIVATED PROTEIN KINASE (AMPK) AND

PEROXISOME PROLIFERATOR ACTIVATED RECEPTOR GAMMA (PPAR?)

Presenter(s): Alexandrea Doyle Faculty Sponsor: Megan Sherbenou

Track: 2A

Abstract:

The deprivation of an adequate oxygen supply at the tissue level is termed as hypoxia. Chronic hypoxia of high altitude (>2500 m or 8200 ft) raises the frequency of diseases in pregnancy, like preeclampsia and intrauterine growth restriction (IUGR), threefold. This is due, in part, to a reduction of blood flow in the uterine artery, which directly causes a loss of blood flow to the fetus. AMP-activated protein kinase (AMPK) is a regulatory enzyme found in metabolic and stress response pathways. When phosphorylated (P-AMPK), AMPK is activated and can phosphorylate other proteins to induce regulated responses. Previous work suggests that AMPK activation plays a role in regulating systemic blood flow by acting as a vasodilator in the uterine artery. Peroxisome proliferator activated receptor gamma (PPAR gamma) also has regulatory functionality and is an important regulator in uteroplacental vascular development and function. Through western blot, this study found that the expression of AMPK, P-AMPK, and PPAR gamma decrease in mice placenta in hypoxic conditions compared to normoxic conditions. Thus, this work suggests that AMPK and PPAR gamma are able to function in and regulate pathways associated with pregnancy in hypoxia,

which may lead to learning how to decrease the negative effects of IUGR.

Title: EXPLORING DRIVERS OF ANTIBIOTIC OVER-PRESCRIBING

Presenter(s): Janet Benedict Faculty Sponsor: Kathleen Hall

Track: 2A

Abstract:

Inappropriate antibiotic prescribing contributes to rising rates of antimicrobial resistance, healthcare costs, and public health concerns. This study explored the reasons why clinicians prescribe antibiotics against national recommendations. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses methodology guided this systematic literature search. The final analysis included 19 articles. An inductive interpretive framework informed this mixed-methods meta-ethnography through metaphoric reductions and interstudy translations. All 19 studies included examples of clinicians contending with various forms of time constraints, suggesting they either directly or indirectly contributed to inappropriate prescribing. Additional contributors included patients' demands, clinicians' need to preserve patient satisfaction, diagnostic uncertainty, and clinician fatigue. Seventeen studies focused on changing clinicians' behavior. Providers in six studies practiced delayed prescribing, as recommended by national guidelines in some countries other than the United States

for low-risk patients with respiratory illnesses where a provider writes a prescription to be filled later at a patients' discretion. Not all clinicians welcomed delayed prescribing, believing it complicated decision-making. Future research should investigate antibiotic overprescribing, improving adherence to recommended guidelines, reducing antimicrobial resistance, and enhancing patient satisfaction through increasing consultation times and reducing clinician fatigue.

Title: INFLUENCE OF OFF- HIGHWAY VEHICLES (OHV) USE ON GREAT BASIN SPADEFOOTS (SPEA INTERMONTANA)

Presenter(s): Billie Williams Faculty Sponsor: Paul Hampton

Track: 2

Abstract: The Grand Mesa Jeep Club has installed and is maintaining a boundary that restricts OHV use in a portion of riparian breeding grounds in

that restricts OHV use in a portion of riparian breeding grounds in Hunter Canyon. This species is a second highest conservation concern for Colorado. The objective of this project was to monitor OHV impacts on habitat use, survival, and breeding activity within and outside of the boundary. Between May and early July of 2017 and 2018, a total of 48 toads were captured and tagged with radio transmitters. Burrows were found for 18 toads with a burrow count between 1- 22 (average 10±6.7) for 2017. The same number of toads were tagged in 2018, with a burrow count between 1-17 (average 6±4.3). For both seasons 22% of burrows were observed in the traffic area. In 2017 one burrow was observed ran over. Burrows were typically located in soft soil and leaf litter adjacent to the stream bed at an average depth of 2.2±2.6 inches. Soil temperatures of burrows averaged 19.5±3.9°C for 2017 and 19.5±6.4°C for 2018 but varied as ambient temperatures became cooler. Water temperatures where tadpoles were found averaged 19.5±12.8°C. Our study provides some of the first baseline data for Great Basin spadefoot toads in Colorado.

MOLECULAR CHARACTERIZATION OF THE ARUNDO SCALE INSECT

Presenter(s): Payton Wills

Faculty Sponsor: Zeynep Ozsoy Bean

quarantine procedures.

Track: 2A Abstract: A

Title:

Arundo donax, more commonly known as Giant Reed is a European ornamental grass that was introduced into America in the 1500's. A. donax grows at a rapid rate and is monopolizing riparian ecosystems by dominating water sources. This is causing a loss of biodiversity in the continental United States. This invasive behavior needs to be managed and there are many strategies that have been implemented. One of these strategies includes the Arundo scale insect, *Rhizaspidiotus donacis*, which can stunt the growth of the plant and reduce leaf production. Although scale insects are native to Europe, they have been recently found in Southern California on Arundo. The purpose of this project is to compare the Arundo scale insects collected in California to those considered by the USDA as biological control agents. This will be done by sequencing the mitochondrial cytochrome oxidase genes. If the scale insects found in California are of the same origin as those that have been considered by the USDA, they can be immediately utilized in riparian ecosystems in other parts of the United States, instead of going through the

Title: SEASONAL VARIATION IN PIKA GLUCOCORTICOID METABOLITES IN

AN ISOLATED POPULATION IN COLORADO

Presenter(s): Tabitha McFarland Faculty Sponsor: Johanna Varner

Track: 2A

Abstract: Noninvasive measurements of stress (glucocorticoid metabolites/GCM)

from scat are becoming a popular method for assessing population health in wildlife. Pikas are small mammals (order Lagomorpha) that do not hibernate and are relatively active throughout the year. Evidence suggests that climate change may be causing declines in some pika populations, leading to widespread interest in using noninvasive methods to assess population health. Although this method has been validated in many ways, we lack an understanding of seasonal patterns of stress within individuals. In this study, we collected scat in 2018 from 6 different latrine sites on the Grand Mesa from June through early November. This population is relatively isolated from other, high-elevation pika populations. We extracted GCM from the scat and performed an ELISA to measure GCM concentration. We observed a decrease in stress in August, but the exact timing of this decrease was variable between individuals. These results were consistent with a similar study conducted at Niwot Ridge Ecological Station, where lower stress levels were also observed in August. Variability in our results may be due to territory intrusion, which could result in scat being collected from multiple individuals. Understanding seasonal patterns

of stress in this species is important for conservation.

Title: USING RESTRICTION FRAGMENT LENGTH POLYMORPHISM ANALYSIS
AS A NEW METHOD FOR SPECIES IDENTIFICATION IN DIORHABDA SPP.

Presenter(s): Christopher Schaaf Faculty Sponsor: Zeynep Ozsoy Bean

Track: 2A Abstract: Die

Diorhabda spp. (tamarisk leaf beetles) were introduced into the United States as a biological control agent for tamarisk, with some populations thriving and others failing. Through tracking of the hybridization status of the various Diorhabda species, a possible link between species hybridization and population success can be identified. Species identification is traditionally performed by Sanger sequencing of the CO, gene. The preparation of genetic samples for the Sanger sequencing reaction requires DNA isolation, PCR, gel extraction, quantitative gel electrophoresis, preparation of the Sanger sequencing reactions, and the Sanger sequencing reaction itself which is performed by an outside laboratory. This traditional protocol is taxing on researcher time, budgets, and laboratory materials. Through this research, a new method for species identification of the Diorhabda genus has been developed that utilizes restriction fragment length polymorphism to target nucleotide sequences within the CO, gene that are unique to each species. By performing two restriction enzyme digests that target these non-conserved sites, a significant difference in DNA fragment lengths can be observed through gel electrophoresis that allows for positive species identification. This method allows species identification to be performed cheaper, faster, entirely in-house, and with less of an environmental impact than the

traditional protocol.

Title: VALIDATION OF MOLECULAR PROTOCOL FOR SEX IDENTIFICATION IN

DEMOGRAPHIC STUDIES OF THE AMERICAN PIKA

Presenter(s): Gabrielle Gines Faculty Sponsor: Johanna Varner

Track: 2A

Abstract: Today climate change is influencing behavioral deviations in animals, but

understanding the population-level mechanisms that drive these changes requires detailed demographic studies over time. Sex determination can be straight forward for some species but challenging for others. It is difficult to sex the American pika (*Ochotona princeps*) in the field due to their inverted genitalia. Researchers now look to use molecular sexing to study animal demographics. In the summer of 2018, 12 pikas were trapped in the La Sal mountains near Moab, UT and ear clipping samples were collected. The purpose of this study was to identify pika sex via extraction of total DNA, polymerase chain reaction (PCR), and gel electrophoresis. To do this, two PCR reactions were conducted for each animal using primers for an autosomal microsatellite marker (Ocp10) gene and a male specific (SRY) gene. The protocol that was followed was tentatively adjusted based on the facilities accessible at Colorado Mesa University. Of the 12 animals sampled, three were male and nine were female. The ability to determine sex in a basic lab allows for researchers to reduce handling time in the field

and provides a reliable distinction between males and females.

VARIABILITY IN CONDITION FOR SAND LANCE (AMMODYTES SPP.)

ON STELLAWAGEN BANK

Presenter(s): Teresa Giandonato Faculty Sponsor: Margot Becktell

Track: 2A

Title:

Abstract: St

Stellwagen Bank National Marine Sanctuary, located in the Gulf of Maine, provides a habitat for a forage fish known as northern sand lance (Ammodytes dubius). These planktivorous fish are a prominent prey organism for many species of marine predators in the Gulf of Maine. Therefore, understanding variability in the condition of sand lance can lead to a better understanding of their role in the ecosystem as a prey item. We hypothesized that reproductive and zooplankton cycles dictate intra-annual variation in lipid content and feeding. Sand lance were collected seasonally on Stellwagen Bank from 2016-2018 using a combination of van-Veen grabs and beam trawls. Lipid content was assessed gravimetrically from whole sand lance using a modified Folch method. Results indicate that sand lance have a greater lipid content during late spring and early summer with a decline in lipid content through late summer and early fall, suggesting lipid stores are used for gonad development. In addition, increase in sand lance lipid content in March and May closely follows the seasonal increase in density of the copepod Calanus finmarchicus. Further analyses will investigate the relationship between sand lance lipid content and factors

such as temperature regimes and prey abundance.

Title: A COMPREHENSIVE STRATEGY PROPOSAL TO ENHANCE

RECRUITMENT, RETENTION AND MAINTENANCE OF

COMMUNICATION IN COLORADO MESA UNIVERSITY'S DEPARTMENT

OF BUSINESS

Presenter(s): Riley Brodie, Donovan Harwell, Megan Lawson, Megan Liborio,

Bryce Roberts, Alicia Ruybal-Enriquez

Faculty Sponsor: Steven Norman

Track: 3A

Abstract: The senior cohort of the Business Honors Program has created a

strategic proposal that ultimately aims to enhance student and faculty recruitment and retention within the Department of Business, as well as the maintenance of communication with the department's alumni. This was done by analyzing research, surveying students and faculty and working directly with the Admissions Department, Marketing Department and Alumni Association. The main objective of this proposal was to provide a detailed action plan that outlines what should be done, who should do it, when it should be done, how much it will cost, how much planning it will require and how to advertise. This proposal will be presented in six sections: Environmental Analysis, SWOT Analysis, Objectives, Recommendations and Strategy, Implementation and Evaluation.

Title: ADVANCED INFORMATION SYSTEMS CAPSTONE

Presenter(s): Devon Fierberg, Ashley Lozinski, Steven Pack, Erik Platou, Patrick Rewers,

Makoto Watanabe

Faculty Sponsor: Johnny Snyder

Track: 3A

Abstract: We will be presenting our capstone project, which is a website redesign

for a local Bed and Breakfast. This redesign is going to include a website makeover, integration of TripAdvisor and QuickBooks, as well as creating a database to keep track of past, current and future customers information.

Title: ANALYZING USER ACCOUNT HEALTH, A PREVENTATIVE FRAMEWORK

Presenter(s): Adam Davenport Faculty Sponsor: Thomas Chapman

Track: 3D

Abstract: Modern day IT administrators are tasked with a multitude of jobs including

support, security, expansion and daily operations. This research aims to identify key variables, which indicate that network user accounts may be compromised, as exhibited through traffic analysis, SNMP analysis, and deviations from intended use. By better identifying these variables, and ultimately creating a webservice which can analyze network traffic, we hope to better detect possible attacks against a network user account. Our methodology to accomplish this will employ a combination of qualitative interviews with IT managers followed by a survey to determine the factors

most associated with user account health.

Title: ANIMAL SHELTER STATISTICS

Presenter(s): Rikki Cook, Danielle Fleig, Nathan Garcia, Brian Kimbrell

Faculty Sponsor: Johnny Snyder

Track: 3B

Abstract: A consolidation and graphic representation of Colorado animal shelters was

constructed from a publically available data set provided on the Colorado Information Marketplace. The data sourced for this analysis has some gaps, as the information was gathered by the shelters themselves. The purpose of the following project is to assess the metrics of stray animals to shelters in the state of Colorado. It will look at how many and by what means these animals leave the shelters. Shelters can utilize this information

to better understand the types of animals they most commonly receive by comparison to other shelters in the area. It can also be used to determine a feasible estimate of how many animals they can rehome. Shelters can use this information to coordinate where animals can go based on the adoption preferences of a given region.

APPLYING TOC PRINCIPLES TO IMPROVE PRODUCTION KPI'S AT JABIL

LEWIS ENGINEERING

Presenter(s): Daniel Grace Faculty Sponsor: Kyle Stone

Track:

Title:

Abstract: In today's business landscape, many companies invest time, money, and

resources towards finding efficient ways to produce product quicker. cheaper, and of higher quality. An entire discipline of operations management has been created with expansive research performed to find ways to improve the efficiency of production operations. From this research, Lean manufacturing, just-in-time, and Toyota production system are some of the philosophies that have been argued as best practice. Another less heralded philosophy, known as Theory of Constraints (TOC), was formulated by physicist Eliyahu Goldratt in the 1980's. This philosophy focuses on identifying and improving flow through system bottlenecks. TOC reiterates the principles of a simple universal concept: A chain is only as strong as its weakest link. This project aims to look at the production process of Jabil Lewis Engineering (JLE), an aerospace manufacturing company located in Grand Junction, CO. The processes will be analyzed through the lens of TOC, with the purpose of answering the following question: Can the application of TOC principles be used to improve production KPI's at JLE?

AUDITORS: THE UNSUNG HERO OF THE BUSINESS WORLD Title:

Presenter(s): Kathleen Nelson Faculty Sponsor: Suzanne Owens Track:

Abstract: Auditing is an extremely important part of the business world. Audits of

an organization's financial statements ensure that creditors, investors, and third-party beneficiaries all receive accurate, reliable information on a company's financial position and results of operations. An audit is essential for confirming and verifying that organizations are not only following the proper regulations but are presenting their financial statements in the most transparent way possible. As an auditor, professional judgement and skepticism is used throughout the entire process of evaluating an organization's financial statements and internal controls. It is critical to demonstrate professional ethics and critical thinking skills while on the audit and to watch out for any suspicious activities or any potential misstatements, whether due to error or fraud. Auditors continually maintain a questioning mind while sorting through the documentation of an organization and are able to provide an opinion on the financial statements after various tests and a constant exercise of due professional care.

AUTOMATIC DOOR FOR CHICKEN COOP Title:

Presenter(s): Grayson Greeley, Olin Klovdahl, Anne Lapeira, Seth Mewhinney, Hannah

More, Brandon VanDenBosch, Josiah Wilson

Faculty Sponsor: Georgann Jouflas

Track: 30

Abstract: A common problem that chicken owner's encounter is the task of

opening and closing the coop door at the beginning or end of a day. Whether its cold, the owner is busy, or they just don't want to go outside, several chicken owner's have expressed annoyance over this problem. A multidisciplinary team consisting of eight students, majoring in business,

engineering, and music, have designed and created an automated door for a chicken coop using a previous design from group member, Josiah Wilson, who created one for his coop at home. This design uses a light sensor that triggers the door to open for the chickens when the sun rises and close the coop door at night, allowing chicken owners to stay in and check the status of their coop on a monitor from the comfort of their home.

Title: BADA PIZZERIA SPORTS BAR

Presenter(s): Hannah Belich, Chad Heiden, Lucas Martin

Faculty Sponsor: Britt Mathwich

Track: 30

Abstract: Bada Pizzeria and Sports Bar will be a casual, downtown dining experience

established in Grand Junction, Colorado. Three students developed a simplistic restaurant concept and designed "Bada Pizzeria and Sports Bar" for the university's Food and Beverage course curriculum. This presentation is being developed to gain interest from potential investors. Bada Pizzeria offers guest-oriented staff to develop exceptional service and gain repeat customers. We will add value to the guest experience by offering the convenience of a mobile app and delivery service to suit the needs of customers' everyday lifestyles. Guests can expect a comfortable. weekend experience offering sports games, craft beers, high quality food and connecting with other Grand Junction locals. In this presentation, the restaurant concept, menu selection and marketing plan will be discussed. Service hours, and high-volume philosophy will be instituted. Finally, space design will be demonstrated, which will consist of restaurant layout and designated location. With the support of our co-owners and investor's capital the Bada Pizzeria and Sports Bar will be able to offer an exciting atmosphere unique to the Grand Junction area.

aumosphere unique to the Grand Junction area.

Title: BETTER MARKETING FOR ENERGY DEVLOPEMENT COMPANIES

Presenter(s): Broderick Alexander Faculty Sponsor: David Ludlam

Track: 3A

Abstract: A

A common problem that a lot of energy companies have is their public appeal. There is a lot of misconceptions of how oil and gas is extracted and how it is beneficial for humanity as a whole. This problem could be related to several things, but one of the major aspects that there is a lacking focus on true and accurate information in American education system and energy companies lack of upstream companies' involvement in those aspects. My proposal is a simple, but potentially very effective measure that could drastically improve the general public's thoughts and knowledge on the actual energy demands of the American public, how much of each energy type we use (solar, wind, oil, gas etc.), what those energy types are involved in, and how they impact the earth. While this may seem obvious to the people that are involved in the industry, it is not common knowledge. This is problem for oil and gas companies but the public as well. We are seeing more and more government reforms that are proposed by state legislatures that are a common hindrance to oil and gas companies and can actually be a giant disadvantage to the American people.

Title: CAPACITY PLANNING AT POWDERHORN MOUNTAIN RESORT

Presenter(s): Stephen Dunn Faculty Sponsor: Kyle Stone Track: 3G

Abstract: Powderhorn Mountain Resort has experienced one of their most attended seasons in history, with the success this season comes challenges for the

seasons in history, with the success this season comes challenges for the resort. The limited capacity in the parking lot and ski lodge of Powderhorn has resulted in bottlenecks for customers, employees, and daily operations. This has not only left customers unhappy and employees overwhelmed in the ski lodge but also led to legal and safety issues in the parking lot

at Powderhorn. This project, through process analysis; which will include observation, interviews, and examining Powderhorn's Management Reporting System (MRS) hopes to find the current capacity, bottlenecks and pinch points of both the parking lot and ski lodge. Providing this information to the management of Powderhorn to answer the general question, what can be done to make the most out of the limited space provided?

Title: COLORADO AND HEMP

Presenter(s): Bryce Roberts Faculty Sponsor: Carlos Baldo

Track:

Abstract: Colorado alone is poised to outproduce the entirety of Europe in the

acreage of hemp produced by 2020. This research followed the current pattern of the Marijuana industry and its current oversupply and drop in demand. This situation leaves growers with decreasing profits and applies that same trend to the CBD and hemp industry that is blossoming in the US. From the extensive literature review, interviews, and testimonials, this research introduces global implications of a large US hemp industry, global and local issues that hemp can solve, and proposes how Colorado hemp growers and other industries can take advantage of industrial hemp on a global scale in unique, sustainable, and profitable ways. Topics approached in the paper include the hemp industry in Colorado, other major hemp producing countries, hempcrete, shiv, hemp fiber, cannabidiol (CDB), and other uses for hemp byproducts.

COMPARATIVE ANALYSIS FOR IT VENDORS AT LOCAL ACCOUNTING FIRM Title:

Presenter(s): Steven Schopen Faculty Sponsor: Kyle Stone Track:

Abstract: Accounting firms rely on their information systems to assist their employees

in collecting, interpreting, and synthesizing data, whether they are in tax, audit, or consulting. A Grand Junction accounting firm is planning on upgrading their information systems through higher services from their technology provider. They have narrowed down their options to two providers, but would prefer more advanced evaluation to make sure they are making the right choice. The two vendors will be contacted, and data will be collected about the features of each of their offerings, including cloud capability, security, storage features, level of customization, and user friendliness. The cost of the systems will also be a major factor, in terms of operating costs, cost structure, and implementation costs, in terms of both money and time. Once the differences between the two providers are identified, a needs assessment through the firm will show which provider

will be the best fit.

Title: **CUSTOMER PROBLEM, TEAM SOLUTION** 

Presenter(s): Tristin Bina, Seth Coisman, Christopher Sarabia, Garrett Shudinis,

Gregory Waldorf, Alexander Weaver

Faculty Sponsor: Georgann Jouflas

Track: 3D

Abstract: We are a team of six students doing a project for Exploring

> Entrepreneurship Opportunities. Our team consists of five Mechanical Engineering students and one Business student. The main point of this project is to emphasize the key topics learned in the classroom. We are trying to solve a problem for our customers who are disabled or have had recent surgeries. By conducting interviews with disabled people, families of the disabled, and people with recent knee surgeries to find a problem they all face. The main problem found is with knee braces failing and wearing out. We are trying to solve this so that our proposed customers have an at

home fix for this problem.

Title: ENERGY: WHAT'S IT WORTH?

Presenter(s): Cole Smith Faculty Sponsor: David Ludlam

Track: 30

Abstract: Energy is the foundation of life that provides millions of people with what

they need, such as food, water, and shelter on a daily basis. For some, these three items can be challenging to afford. Currently around 12.3% of Americans live in poverty. This is based on a calculated annual cost of a subsistence food budget for households of different sizes and types. This comes without factoring in costs like rent, transportation, and even internet access which are all essential. The country's current energy agenda is more focused on creating green alternative energies that substitute for fossil fuels rather than providing efficient, affordable energy. The movement towards different types of energy are motivated by people's desire to give back to the world by eliminating their carbon footprint, thus benefiting the planet. Although these beliefs have good intentions, they do not have the interest of those less fortunate in mind. The pursuits of these alternative energy solutions do not come at a small price. During a period from 2010 to 2018, a federal budget of around 140 billion dollars was spent in pursuit of green energy goals. These figures do not include government subsidies costing around eight to ten billion dollars per year. This money comes from United States taxpayers; so although the green energy outlook is motivated towards improving the environment, it does not benefit those who are less fortunate. Energy is critical to a modern quality of life so creating an understanding of how we use and provide affordable energy options to all Americans should be of upmost importance in the discussion regarding energy development and consumption.

Presenter(s): Parker Cushing Faculty Sponsor: Yen-Sheng Lee

Track: 3E

Title:

Abstract: This presentation attempts to understand where college students stand

ENVIRONMENTAL VALUES OF COLLEGE STUDENTS

on climate change and how they not only perceive climate change, but also how they can personally contribute to reducing their impact on the environment they call home. The study will strategically outline a set of survey questions that the selected respondents will answer to the best of their abilities. The survey will use the guideline of "strongly agree," "agree," "neutral," "disagree," "strongly disagree" as metrics to further gauge interpretation. Then after completion, the results will be interpreted accordingly based off the responses, in an attempt to remedy a potential solution that's catered to the college student population. The study will use a fixed survey questionnaire to evaluate each response accordingly and will interpret the results to gain better understanding of where college students stand on environmental sustainability. This study will provide valuable insight on how to address and further comprehend what climate change beliefs young adults have and how they can personally play a significant role in shaping a better future for generations to come.

Title: EMPLOYEE TURNOVER IN THE PERMIAN BASIN

Presenter(s): Jacob Druce Faculty Sponsor: Kyle Stone Track: 3G

rack: 30

Abstract: WBS Coatings, Inc. (WBS) is considered a premier coatings application

contractor in the Western United States. Performing internal and external maintenance through protective coatings, focused primarily in the oil and gas industry, WBS has created an elite mobilization unit centralized in the Permian Basin of West Texas. Experiencing harsh conditions and

strenuous work days, WBS has been combating the issue of a very high turnover rate, costing the company a substantial amount of income with earnings being put back into hiring new and qualified employees. Through qualitative research methods involving an extensive exit interview process, management has sought to locate the primary reason for the extensive employee turnover with intentions of implementing new practices in efforts to retain valued employees for long periods of time. The exit interview process began in 2018, consisting of 29 employees who either voluntarily or involuntarily left the company. Through one year of research, WBS has been able to narrow down the primary factors for its turnover in 2018 and has made it a mission to increase employee satisfaction and increase the employee retainage rate for future years to come.

FACTORS INFLUENCING COLLEGE STUDENTS SATISFACTION WITH Title: INDEPENDENT-OWNED CAFES IN GRAND JUNCTION

Presenter(s): Erin Krueger, Hannah Menees Faculty Sponsor: Chen McCain Shiang-Lih Track:

Abstract:

In 2016, there were more than 22,000 coffee shops with a combined annual revenue of \$12 billion. With increase disposable income and consumer confidence, the coffee shop industry is expected to grow and reach \$46.2 billion (SBDC National Information Clearinghouse, 2016). According to Tuttle (2012), 64 percent of American adults prefer coffee daily. Coffee has become popular in college-aged consumers. Fifty percent of consumers ages 18-24 reported they drink coffee daily (National Coffee Association, 2017).

In Grand Junction, there are approximately 15 Starbucks. There's been an increase of locally independent-owned cafes. Due to increased competition, it's critical for local independent-owned cafes to compete with established chains.

Therefore, this study investigated how atmosphere, product quality, and service quality influenced CMU students' overall satisfaction. Forty-nine students participated, 25 were male, 24 were female. The majority (83.7%) reported visiting their favorite independent-owned café 1-2 times weekly. The results from regression analysis identified customer satisfaction was impacted by café's product quality (t=3.491; p=.001), service quality (t=2.270; p=.028) but not atmosphere (t=1.782; p=0.81). The possible explanation is participants in the study did not spend enough time in the café. They paid more attention to product attributes. Recommendations regarding how to enhance customer satisfaction are provided.

Title: GETTING THE BIG FOUR ACCOUNTING FIRMS TO CMU

Presenter(s): **Anais Torres** Faculty Sponsor: Kyle Stone Track:

Abstract:

The "Big Four" refers to the top four, international professional service firms in the world. These firms provide a wide array of professional services including audit and tax services, consulting, and risk assessment. While each of the Big Four firms have offices in Denver, Colorado, the Big Four accounting firms do not recruit students from Colorado Mesa University and therefore, only a small percentage of CMU alumni work, or have worked for a Big Four firm. Through numerous interviews with professionals at each of the Big Four, the researcher will evaluate the recruitment needs of these firms and how the university's office of career services can accommodate their needs to attract the Big Four to CMU. Furthermore, the accounting students at CMU will be surveyed to determine whether they know about the Big Four accounting firms, what their perceptions of these firms are,

and whether they would be interested in working for a Big Four. The study will conclude with recommendations on what the office of Career Services can do to get the Big Four firms to recruit students from CMU.

Title: GRAND JUNCTION REGIONAL AIRPORT - PRICE ELASTICITY OF

**DEMAND ANALYSIS** 

Presenter(s): Joshua Shapiro Faculty Sponsor: Kyle Stone

Track: 3G

Abstract: Grand Junction Regional Airport is a regional airport operated out of the

city of Grand Junction, Colorado. In 2018 Grand Junction Regional Airport had the 40th most expensive flight price, per one-way ticket, in the United States. This has created a unique problem not only for the airport but the airlines that operate there. The airport is facing an issue where a significant portion of the citizens in their defined catchment area are leaking to other airports in the region. A study was conducted to analyze the price elasticity of demand and analyze a price point that may help the airport retain more demand within their catchment area. This study has shown that the airport/airlines pricing strategy is not very far off, although a small decrease in price may increase demand substantially. With the recent passing of Measure 2A in Mesa County, Colorado the increase in the lodging tax will give the airport the ability to incentive airlines in new and more efficient ways. Overall, this analysis of Grand Junction Regional Airport shows the unique complexities and opportunities that lie ahead.

Title: HOW MAVERICKS INVEST \$100,000

Presenter(s): Parker Cushing, Anthony Gerken, Ashley Hulet, Austin Smith, Jared Taylor

Faculty Sponsor: Yen-Sheng Lee

Track: 3A

Abstract: The CMU Investment Fund is a club where students can hone-in their

theoretical knowledge of investing strategies in a more practical setting. The Fund has a total of \$100,000 (real USD) to put towards various investments, which consist of a diversified portfolio of stocks, bonds, and other financial instruments. Students will be able to practice analysis techniques such as fundamental and technical analysis to help determine which ETFs will benefit the fund the most. The funds goals are to not only provide CMU students with a valuable investing opportunity that hedges real money, but also take long-term valued positions in the market to compound on itself annually. Once the fund has been established and the prudent foundation set, the fund will pursue more short-term market positions to capitalize on arbitrage opportunities that arise. In the formal presentation, our objective is to showcase our analysis on how we determine the most profitable positions to raise interest throughout the community and school. Ultimately, the main goal of this presentation will be to increase exposure of the CMU Investment

Fund to student and outside businesses alike.

Title: INTERNATIONAL BUSINESS EXPERIENTIAL LEARNING - DESTINATION:

**COSTA RICA SPRING 2019** 

Presenter(s): Dylan Brewer, Riley Brodie, Madison Donnafield, Natalie Gaul, Sandra

Kostjushko, Joshua Levy, Haley Lewis, Megan Liborio, Richard Penny III, Ryan Smallwood, Cody Staggs, J B. Stahl, Erik Tabiolo, Dylan Varra, Nicolas

Weckerly, Charles Young, Bryce Roberts

Faculty Sponsor: Carlos Baldo

Track: 3H

Abstract: Experiential learning is considered a process of learning through

experience. In the case of subjects like International Business, common experiences include study abroad and faculty lead trips. During the Spring break of 2019, the International Business course (BUGB401-001) visited Costa Rica. Through the trip, the students visited more than 10 companies

like HP, Intel, Starbucks, AD Astra Rocket and Bosh. The experience also included learning sustainable agri-business and entrepreneurial practices at Earth University. This poster presents a pictorial matrix of some of the iconic visits and experiences.

Title: LET'S GET JUICY!

Presenter(s): Mikayla Brewer, Lauren Essman, July Hendriksen

Faculty Sponsor: Britt Mathwich

Track: 3C

Abstract: Juicy will be a local, quick stop smoothie shop to refuel after a long day

of mountain biking or snowshoeing, located in Palisade, Colorado. Three students developed a unique concept to provide farm to table smoothies to healthy Colorado residents on-the-go. They will be presenting the business plan, along with an organizational chart as part of a project for Hospitality Management 396: Food and Beverages Operations. Juicy will be conveniently located between the Palisade Basecamp RV Resort and the upcoming Palisade Plunge biking trail. Guests will have the opportunity to rejuvenate after a long day on the trails with a healthy smoothie or granola bar throughout all seasons of the year. The restaurant concept includes the target market, location, and competitive analysis. Menu items will be discussed, along with restaurant layout and environmental considerations. With the support from owners and investors, Juicy will be able to offer a healthy food experience to a wide array of active guests in the Grand Valley.

Title: LNG IMPORTS IN THE CARIBBEAN

Presenter(s): Tyler Heinsma Faculty Sponsor: David Ludlam

Track: 3

Abstract: LNG imports and exports have potential to address deforestation and

poverty in underdeveloped countries in the Caribbean. Underdeveloped countries wanting to import LNG products have been a significant topic of discussion in the worldwide energy crisis. Countries like China and India get most of the attention, but there are countries closer to the United States that would benefit from importing LNG rather than using biofuel and damaging their ecosystems. Haiti and the Dominican Republic are two countries that share an island but are vastly different in the ways they use energy and their economic growth. This showcase will explore the opportunities to improve the quality of life in underdeveloped countries in the Caribbean through energy imports from the U.S. while improving their

environment by reducing deforestation.

Title: OIL AND GAS PRODUCTION IN PERU

Presenter(s): Kasey Emrich Faculty Sponsor: David Ludlam

Track: 3

Abstract: In the United States there has been a history of disagreement and conflict

between indigenous people and energy companies. The most recent protests in the United States was at Standing Rock. There are many other countries dealing with indigenous people who are protesting production of oil and gas and Peru is one of them. What can Peru do to be able to make the indigenous tribes happy and still keep up production of Oil and Gas? Oil and Gas exploration in Peru is rising but what is this new step in the country's growth doing for its economy? Peru has twenty sedimentary basins, 1 billion sq. km, where oil and gas production is possible. Peru has the only LNG Plant in South America, which made it an energy leader of South America. From 2000 to 2018, Peru's GDP has had a growth rate of 131.7% mainly from their oil and gas production. In 2015, there were multiple protests from indigenous people who are against oil and gas production in the country. This project will look into how to improve the

economy of Peru and also, what can be done to keep the peace between the industry and the indigenous people.

Title: OIL SHALE - WESTERN COLORADO POTENTIAL

Presenter(s): Geoffrey Kice Faculty Sponsor: David Ludlam

Track: 3B

Abstract: With the current state of turmoil in major oil exporting countries such as

Venezuela and Saudi Arabia, it is important that the United States has enough spare export capacity to meet global demand. If these countries were to shut down oil production, their oil and gas demands would be shifted onto the other producers of the world. While the U.S. does have the energy resource base to support global demand, the research and advancements of alternative methods of production should not be forgotten. Western Colorado is sitting on one of the largest deposits of oil shale in the world, with many other large basins spanning the nation as well¹. These potentially critical sources should not be overlooked. Efforts, such as Exxon's and Shell's, to bring oil shale to market have come and gone due to environmental and technical concerns. However, according to Kimberly Amadeo, an economic analysis and business strategy expert, "The end product is much lighter and cleaner than most crude oil" (Amadeo, 2018). Oil demand is globally prevalent, and with potential needs for new sources, oil shale must not be overlooked.

Fowler, Pete. "Study Finds More Oil Shale in Piceance Basin." Post Independent Citizen Telegram, www.postindependent.com/news/studyfinds-more-oil-shale-in-piceance-basin/."

OPERATIONAL PROCESS ANAYLSIS AT MJ THOMAS PHOTOGRAPHY

Presenter(s): Rylie Vavra Faculty Sponsor: Kyle Stone Track: 3F

Title:

Abstract:

Due to technological advances and easier access to enhanced cameras, such as cell phones, the photography business is experiencing problems related to sales growth and innovation. MJ Thomas Photography has been in business for 25 years, mostly focusing on school pictures as well as sports leagues. With over 500 schools signed in Grand Junction, Denver, and Albuquerque, they have managed to stay competitive. With high demand and increasing competition brings operational issues such as productivity and consistency. Through process analysis, the business operations will be observed and analyzed to connect each process to the next. Also, time observations will be conducted for each department to see where the wastefulness is and where production can increase. The research will focus on decreasing throughput time to increase efficiency, reduce bottlenecks, and eliminate errors. Also, improving on-time delivery, from when the photographs are taken to when they are sent out to the customer, will aim to improve sales and maintain high customer satisfaction.

Title: PUBLIC PERCEPTION ON OFFSHORE DRILLING

Presenter(s): Travis Vineyard Faculty Sponsor: David Ludlam Track: 3E

Abstract:
Oil spills are always perceived to be catastrophic but, these big spills are rare, and when they happen it is a big deal. The BP event in 2010 forever changed the world's view of the Oil and Gas Industry, which resulted in 11 deaths. Once the public saw this disaster they were mortified. Regulations were set in place and put a six-month moratorium on drilling in the Gulf of Mexico. The year after BP in 2011 the House of Representatives passed a bill that would nullify the Obama administration's moratorium of offshore

drilling in the Gulf Coast of Mexico (LH., 2014). In the by Kahane LH he discusses the factors affecting the way legislators would vote on the bill, he further explains his results and they reveal that potential employment effects swayed how the voted. The misconceptions of how oil spills are dealt with in the Gulf Coast of Mexico were forever changed after this event. Oil spills aren't dealt with in the way of the BP event, there are procedures to make sure the spills get cleaned up in a timely matter. Most spills are much smaller and are taken care of in a couple days or less.

Title: QUALITY OF EDUCATION RECEIVED BY STUDENT ATHLETES

Presenter(s): Austin Beswick Faculty Sponsor: Kyle Stone

Track: 3G Abstract: The

The NCAA (National Collegiate Athletic Association) has long provided student athletes the opportunity to develop their skills, both on the field, but also in the classroom, years following high school. "More than eight out of 10 student-athletes will earn a bachelor's degree, and more than 35 percent will earn a postgraduate degree." But what quality of education are these athletes receiving? Of what percentage of them use their degree following graduation to obtain their dream job, or at least a job in their field.? Athletes "don't have the opportunities that they need to go out and look for jobs or develop themselves for a career besides just being an athlete," nor have equal time to study and prepare their coursework in their desired field. Becoming a colligate athlete does come with a cost, where time demands are steep, weekly schedules are crammed, and personal wellbeing is tested. This research project will analyze the relationship between the quality of education athletes are really receiving with their "student athlete" title, and how any athletic pressures may influence them to pursue alternative, uninterested fields of study, to sustain their eligibility. These results will highlight reasons behind those graduated athletes who have ended.

Title: RESEARCH PRACTICUM – RIVER FRONT DEVELOPMENT AT LAS

**COLONIAS PARK** 

Presenter(s): Dominique Marquez

Faculty Sponsor: Kyle Stone Track: 3F

Abstract: Located in Grand Junction Colorado new business development is

underway at Las Colonias Park along the Colorado River. The RiverFront project is a 15 acre Businesses Park for outdoor recreation and techrelated businesses. The development will provide a unique opportunity for businesses seeking an outdoor-centric setting by integrating access to the outdoor environment, a collaborative business community, and highquality aesthetics. The city of Grand Junction, as development owner, has leased the business park to the Las Colonias Development Corporation (LCDC), a nonprofit organization who will oversee the management and long-term success of the project. The focus of this study analyzes the financial feasibility of the project and provides a property management plan for the LDCD. The study examines market and property specific data to create a financial model of revenues and expenses that will provide a basis to make recommendations for allocating working capital, designing leasing structures, and managing property upkeep to maintain a profitable operation. The goal of the management plan is to facilitate long-term success and profitability of the RiverFront development project from the perspective of the Las Colonias Development Corporation.

Title: RIVER CITY LOUNGE DEVELOPMENT PLAN

Presenter(s): Kori Brenner, Kimberly Miller, Justin Pascual

Faculty Sponsor: Britt Mathwich

Track: 3C

Abstract: Three students in the CMU Food & Beverage program would like to

present a conceptual restaurant presentation that seeks support from CMU, CMU Alumni, and Angel Investors. River City Lounge is an establishment with a relaxed night-life atmosphere that offers a wide variety of wine and mixed drinks. In addition, customers can create their own unique mix of local microbrews and imports for enjoyment in the lounge or in the comfort of their own home. It is a place for individuals or groups to mingle, kick back, and enjoy a sample platter of creative appetizers named after Colorado Mesa University professors. Guests can experience a taste of CMU through a wide array of students needing to acquire an internship. Departments included in this program are culinary students from WCCC, business students, and any other students wanting to learn the ins-and-outs of business management and hospitality. River City Lounge offers a wide variety of opportunities to students and the community. The restaurant concept includes a marketing plan, a sustainability program, a marketing

program, and a culinary program.

**Title:** SHIN-BAR
Presenter(s): Joshua Levy
Faculty Sponsor: Georgann Jouflas

Track: 3D

Abstract: A shin splint or MTSS tool used for soft tissue massage and the breaking

up and healing of scar tissue caused by MTSS from athletic training. The duck-bill head of the tool is used with muscle rub and specific technique to reduce the injury impact and pronation caused by Medial Tibial Stress Syndrom or MTSS. This is a self-treatment tool for use at the customers or athletic training programs own expense. It is a cheaper, more viable option to help relieve stress in the soft-tissues involving MTSS. This product was designed to save people money while doing a much better job than traditional treatments. The customer can now treat their own shin splints or MTSS without a doctor or athletic trainer. This can be distributed throughout Athletic training programs to save time, money, and reduce the athletes' discomfort while performing. This product also has potential to become an at-home, user friendly device for anyone experiencing shin pain regardless of if they are suffering from MTSS. Combined, the complete

device is used to relieve symptoms of MTSS.

Title: SHOULD UNIVERSITIES SWITCH TO WEB-BASED EVALUATIONS?

Presenter(s): Ana Holquin

Faculty Sponsors: Carlos Baldo, Johnny Snyder

Track: 3

Abstract: When it comes to the university classroom, people tend to question the

adequacy of pedagogy. This traditionally has been evaluated by student success and the effectiveness of the professor. This project explores the growing presence of technology in the classroom by measuring students' perceptions when evaluating a course. The analysis had the students of 21 professors who had two sections of the same course, from Colorado Mesa University evaluate the course. Both sections were given the same evaluation, one section online and the other paper based. After a hypothesis test was performed and the averages calculated, the scores were found to vary between each data set but as a whole had little to no difference. This analysis contained a small sample size that was limited to the Business Department of the University. The main findings of this project are that online and paperbased student course evaluations yield approximately the same score for the course, meaning there is a possibility of switching to a more efficient system

for student course evaluations. Keywords: Online Survey, Paper Survey,

Student Evaluations, Higher Education.

SNAP-ON LONGBOARDING SHOE SOLE Title:

Presenter(s): Alain De la Bastide, Stephen Drozda, Brian McMahon, Zachary Reeder,

Heather Skufca

Faculty Sponsor: Georgann Jouflas

Track: 3C.

Abstract: Longboarder skate shoes typically wear out within one to two months given that they travel via longboard, daily. While riding, many longboarders use

one foot to brake and push and the other foot to turn or guide the board. The shoe that longboarders push and brake with quickly wears out due to excessive friction forces acting between the shoe sole and pavement. The other shoe does not wear as quickly because it is stationary on the board. As a solution, the team of five entrepreneurs have designed a longboarding skate shoe sole that snaps onto any skate shoe. The snap-on sole provides a cost-effective rubber sole that can be used as a protective shield over your original shoe. The purpose of this product is to provide longboarders with the opportunity to prolong the duration of their skate shoes. The snapon skate shoe sole is very affordable for any longboarder who wants to save money from buying brand new skate shoes when one shoe wears out. The entrepreneurs have designed and analyzed the durability of the snap-on

sole and demonstrated the effectiveness of the design.

Title: SOFA BRAND

Presenter(s): Austin Gonsalves, Spencer Lee

Faculty Sponsor: Carlos Baldo

Track:

Abstract: Spencer Lee, and I (Austin Gonsalves), have created Sofa Brand, a company

that produces high performance motocross apparel. The technology we have created is patent pending, and provides riders with a whole new

functioning gear set.

Title: STARTING A PERSONAL PHOTOGRAPHY BUSINESS

Presenter(s): Susan Moore Faculty Sponsor: Georgann Jouflas

Track: 3C

Abstract: As a student, majoring in Management, I have begun working on starting

> a business of my own in photography. The name of the business is: A Moment In Time Photography. Not only is photography a passion that I have, it is something that I want to do for my own career. I want to be a low-cost photographer who is able to provide quality service and capture those memories that one will cherish for a lifetime. The first phase is with the Business Model Canvas to primarily show the customer segments. The next step is to offer free or low cost sessions to a few people and/or families in exchange for rights to use their photographs for my portfolio. This presentation will go over the process of planning and starting this business.

Title: SURFACE DISTURBANCE AND OUTPUT BY SOURCE

Presenter(s): Kelly Smallwood Faculty Sponsor: David Ludlam

Track:

Abstract: Not all energy production has an equal environmental impact on the earth's

surface. A careful analysis reveals the surface impact differences between wind, solar, coal and natural gas, while measuring overall energy output on a per acre basis. Proponents of "Renewable" energy sources claim these sources to be more environmentally responsible and less damaging than conventional sources, and modern society is still at the forefront of this great debate. Accurately weighing the benefits and consequences of

energy production by source is an important part of mitigating avoidable environmental consequences. The U.S. Energy policy decisions must minimize and assess all environmental impacts including surface damage and not just atmospheric quality.

Humanity should strive for a future where the maximum amount of energy is produced in the least environmentally disturbing manner, and surface disturbance is an important part of measuring these impacts. As technology continues to advance humanity must ensure that the impact on the environment will decline, however political bias and apathy often hide the truth.

Title: SUSTAINABILITY AND A SMALL SENIOR LUNCH PROGRAM

Presenter(s): Kanako Sherrill Faculty Sponsor: Kyle Stone

Track: 3F

Abstract:

The 2010 U.S. Census reported that 11 million or 28% of people older than age 65 lived alone. This population of seniors is expected to grow. All baby boomers are projected to be over 65 years old by 2030, outnumbering children for the first time in U.S. history (U.S. Census Bureau, 2017). Studies found that seniors are at increased risk of social isolation and loneliness, which contribute to poor eating habits and a higher risk of mortality, longterm illness, and cognitive decline. To combat such issues, a small senior lunch program was established in a nearby County in 2017. It provides nutritious meals and opportunities for socialization and educational learning three times a month. The program has grown to consistently host 40 to 70 seniors at each event, partner with other organizations, and attract committed volunteers. However, it has struggled to obtain a sufficient funding to cover costs and become sustainable. This study identified significant elements of sustainability based on the literature review. Financial document analysis was conducted to assess the cost structure and revenue. The organizational structure was analyzed and appropriate key performance indicators for outcome measurement were discussed. Finally, the study concluded with recommendations based on these findings.

Title: THE \$100,000 INVESTMENT PROJECT

Presenter(s): Anthony Gerken, Ryan Stahl, Espen Thune-Larsen

Faculty Sponsor: Yen-Sheng Lee

Track: 3H

Abstract: The CMU Investments Fund is a club designed for students to learn and

practice various investing strategies and financial analysis techniques. The fund currently controls \$100,000 in real money, which is used to invest in a differentiated portfolio consisting of stocks, bonds, and mutual funds. The fund's ultimate goal is to earn profit through long-term trading, enabling a lasting fund through the years. However, we also participate in short-term trading which can range from a few days to a few months before closing transactions. The fund requires students to not only present their own investment ideas, but to analyze those ideas and convince the fund that the investment would be both profitable and within the fund's personal risk tolerance and investment strategy. In this informative exhibit, we will analyze our initial investments and outline our investment strategy, trading plans, and long-term goals in order to increase our recruitment and support

for the club.

Title: THE DEAD ZONE & NATURAL GAS DERIVED FERTILIZER

Presenter(s): Clayton Harrison Faculty Sponsor: David Ludlam

Track: 3B

Abstract: This showcase will underscore the reasons why the natural gas industry in

America may want to make a concerted effort into finding a way to mitigate the issue of the dead zone in the Gulf of Mexico. The dead zone in the Gulf is an area depleted of oxygen due to over supplementation of rich nutrients. Man made fertilizer deriving from natural gas has overtime made its way from the soil to the Gulf through runoff. This specific region has generated quite a lot of backlash from the large populations residing in the near-gulf areas, which have considerable voting power in elections. It may not be in the natural gas industry's best interest to continue to ignore this issue, since the industry relies heavily on the demand of man made fertilizer to grow crops. Should the populous in these areas turn against the industry heavily, the pressure to step back from natural gas derived fertilizer may increase.

Title: THE DISPARITY OF FEMALE COACHES IN DIVISION II ATHLETICS

Presenter(s): Hannah Pollart Faculty Sponsor: Kyle Stone Track: 3F

Abstract: T

The athletic department at Colorado Mesa University is host to 27 NCAA varsity sports lead by 51 NCAA varsity coaches. Of these 51 coaches,

varisty spots lead by 3 TNCAA Varisty Octoles. Of these 51 coaches, seven of them are female. Previous research found that, since the adoption of Title IX in 1972, female coaching positions in the NCAA have seen a steady decline. The percentage of women in leadership roles in the NCAA is substantially smaller than in other major career fields. Due to this steady decline, it is likely the imbalance of female to male coaches that is present at Colorado Mesa University is occurring at other NCAA Division II institutions. The purpose of this study is to investigate the decline of women in coaching at Colorado Mesa University and throughout all NCAA Division II institutions. For this study, an email survey will be administered to head and assistant coaches of NCAA Division II volleyball and basketball programs gathering data that may help illuminate the decline. By

addressing the potential steady decline of female coaches in Division II athletics, answers as to why there is a decline and potential solutions for institutions to help minimize the issue should arise.

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Title: THE POINT: A GROWING BUSINESS

not just theory.

Presenter(s): Rick Voss

Faculty Sponsor: Georgann Jouflas

Track: 3C

Abstract: The goal of The Point this semester is to find out how to increase

patronage to the bar from the student body. Doing so, we will accrue knowledge on how to run a business. The Point will also provide a safe place, convenient for students. The Point has been around campus for five years. The Point serves food as well as beer and wine. It is managed by a class of twelve and an advisor. The Point has been profitable for three years with tap beers providing most of the income. This semester, the class is focusing on promoting food items and increasing sales to those under 21, which are less than 25% of our sales. They will not purchase beer, but instead our non-alcoholic beverages and food. By the end of the semester, we will measure the effectiveness of our marketing plan to determine we can see growth based on which items we promote. The staff will show how their comprehensive targeted marketing campaigns affect the sales of specific products. The Point offers students a place to learn by experience,

Title: THE VALUE OF A MILESTONE CLASS: ENTREPRENEURSHIP

Presenter(s): Kaitlyn Bilsing Faculty Sponsor: Georgann Jouflas

Track: 3A

Abstract: This project focuses on the value of Maverick Milestone classes at

Colorado Mesa University. This value is illustrated by a personal account of lessons learned in a Milestone. This presentation will touch on a variety of techniques and lessons to enhance creativity and develop the entrepreneurial mindset. This can be everything from brainstorming, activities based in creativity, public speaking skills, and the insights from many TED talks. Growth vs. fixed mindset theory from the famous Developmental Psychologist Carol Dweck will be discussed as well as the Six Categories of Entrepreneurial Mindsets. Activities to increase curiosity, resourcefulness, determination, ability to connect ideas and people, creativity, and tolerance for ambiguity will also be included. This presentation will focus on strategies for team-building and collaboration. The ability to create new ideas and pitch them has been an integral part of the class.

The main point of this presentation will be how a Milestone class at CMU not only taught a student the basics of Entrepreneurship; it helped with personal growth. This class took a graduating student from fear of the unknown future to excitement for all of the wonderful ideas and opportunities to ahead.

Title: VISTAS AND VINEYARDS

Presenter(s): Ahmad Alojairi, Samuel Cioara, John Elliott, Brian Kimbrell, Oscar Olivas,

Patrick Reilly, Stavan Vanscoy

Faculty Sponsor: Johnny Snyder

Track: 3A

Abstract:

In the day and age of growing technology, it is important for a business to have a functional website. Bed and breakfasts have a heightened need for functionality in their websites, so their customers can easily navigate the user interface to meet their needs. Customers who are not satisfied and cannot easily navigate a website will be less likely to use the services the business provides. It is vital to have an optimized website for readability and usability in the world of mobile computing. This project addresses a website remodel for the Vistas and Vineyards bed and breakfast in Palisade. This remodel will provide their business with the tools they need to please their customers from the initial impression to the end of their stay.

Title: WHAT CMU CHARACTERISTICS ARE ATTRACTIVE TO VETERANS

Presenter(s): Amanda Herron Faculty Sponsor: Kyle Stone

Track: 3G

Abstract: There are 9,492 students attending Colorado Mesa University (CMU) for

Spring 2019. Currently, 388 of these students are veterans or dependents who are using VA education benefits. One of the goals of the Veteran Services office, on campus, is find a way to recruit additional veterans to CMU. In order to do this, they need to find out what these students like about the university. The research practicum will answer the question of what CMU characteristics are attractive to veterans. Surveys are used to find out, from current student veterans, why they chose CMU and what services are especially important to them. The results of this research can help CMU better utilize their time when trying to attract additional veterans

to school.

Title: WHAT DRIVES CONSUMERS TO PURCHASE IN BEST BUY RATHER

THAN ONLINE?

Presenter(s): Suzann Acovio Faculty Sponsor: Kyle Stone

Track: 3F

Abstract: Consumer behaviors are continuously evolving when it comes to purchase

behaviors; especially in technology retail stores such as Best Buy. This may be attributed to the purchase behavior of shopping online as well as through mobile applications through direct competitors like Amazon. As a student of the MBA program, the purpose of this project is to find out the features and attributes that Best Buy has to offer inside the store that persuade customers of different generational cohorts to purchase in a brick and mortar store rather than make their technology purchases online. These desired attributes may include but are not limited to sales associates, product demonstrations, price matching and the ability to satisfy the need for instant gratification. Finding out this information may lead Best Buy into changing or renovating their stores to better satisfy customers so that these customers will decide to purchase in store rather than online. The primary research method for this project is survey research. Using this method of research will provide customers the opportunity to share their interests and help to identify desirable attributes and features that Best Buy provides in order to retain their customer loyalty.

Title: WHAT GOES AROUND COMES AROUND: CORRUPTION IN VENEZUELA

Presenter(s): Vincent Giandonato

Faculty Sponsor: Carlos Baldo

Track: 3B

Abstract: China has become a major Foreign Direct Investment player in the global

economy. An example of this statement is the large amount of Chinese investments in countries like Venezuela. This research outlines how the corruption in Venezuela has impacted Chinese companies investing there. The Chinese government extended a series of loans to Venezuela from 1999 to the current that were meant to be used to construct new factories, plants, and infrastructure. In some cases, the money has simply evaporated. The study uses news and media articles to chronicle loans as they developed and the progress the projects, or lack thereof. The research is limited to English media contents and no reporting form the Venezuelan

government.

Title: WILDLIFE AND DRILLING IN HARMONY

Presenter(s): Riley Tucker Faculty Sponsor: David Ludlam

Track: 3E

Abstract: The research presented in this presentation is focused on the Alaskan

National Wildlife Reserve and how it presents the unique relationship of drilling, wildlife and exploration living in harmony. It is crucial for respective communities to have the conversation of the importance of drilling and exploration of resources because the US and other developed nations have become dependent on hydrocarbon resources. One of the best examples of this topic of debate is a place located in the most northern hemisphere called the Alaskan National Wildlife Reserve. This is a vast area of nearly 18.5 million acres of open land. Only eight percent (1.5 Million acres) of ANWR is being considered for exploration in the 1002 area off the coastal plain. Some individuals and parties however, believe that the environmental impact would be too great to justify developments towards this area, but ANWR could be the perfect place for exploration and discovery. This is important because in the most recent resource assessment, conducted in 1998, the USGS estimated that the total technically recoverable crude oil resource for federal lands, state waters, and native lands in the coastal plain had a mean estimate of 10.4 billion barrels still to be uncovered.

Title: YOLKS ON YOU FOOD TRUCK

Presenter(s): Alexander Rowe, Tristan Cloyd, Cruz Tijerina

Faculty Sponsor: Britt Mathwich

Track: 3C

Abstract: Yolks On You will be a food truck established in Grand Junction Colorado.

It was planned and designed by 3 college students for the Food and beverage class to be presented in the Student Showcase at Colorado Mesa University. This food truck will have a fun theme of having a fried egg (any style) on top of every entree. We are committed to not only keeping our customers healthy but the earth as well. We will have all organic and local ingredients, and sustainable materials. (i.e biodegradable utensils cups and straws). We will be located in and around the college campus as well as by the retirement community, and the local bars on weekends. We will be presenting this in the showcase with the intent of getting an investor. We will come prepared with the first three segments of a marketing plan, as well as a full outlined concept of the truck. This will include, menu, food cost analysis, facilities, location(s), target market, and competitive analysis. We will also be presenting a design of the truck. We our very confident in our idea, and with support from investors, Yolks On You will be able to offer a new kind of food truck experience for the Grand Valley.

Computer Science. Mathematics & Statistics

Title: A CHI-SQUARE TEST ON ST. MARY'S HOSPITAL DATA

Presenter(s): Tia Leray Kroschel Faculty Sponsor: Richard Ott

Track: 40

Abstract: St. Mary's Hospital has conducted a survey of medical practices in

Colorado that presents data on the services provided by family doctors. In this project, we use various statistical methods to analyze this data and to compare services of physicians throughout four different regions in Colorado. These services include ambulatory care, family medical

physicians, and prenatal care.

Title: A LOGISTIC REGRESSION MODEL FOR NCAA BASKETBALL

TOURNAMENT PREDICTIONS

Presenter(s): Brittany Goshia Faculty Sponsor: Clay King Track: 4C

Abstract: In this project, we provide discussion of the motivation and structure

behind logistic regression and then present a logistic regression model to predict the NCAA Division 1 Men's Basketball Tournament. Using data from the past five years, we found 13 variables that have a significant impact on the probability that the higher seeded team wins. We then apply this model

to predict the 2019 NCAA Division 1 Men's Basketball Tournament.

Title: ANALYZING LIBRARY HEAD COUNT DATA TO PREDICT FUTURE

LIBRARY USAGE

Presenter(s): Rachel Dillmann Faculty Sponsor: Clay King

Track: 4C

Abstract: A time series is a sequence of measurements of the same variable collected

over time. In this project, we analyze head-count data from the Colorado Mesa University library, which is collected hourly by floor during one week of every month excluding June and July. We investigate how day, month, year, and floor affect the number of people using the library and analyze

the data for trends, cycles, seasonal variations, and irregular fluctuations. Using these results, we create a model for predicting future library usage.

Title: ATTORNEY'S ASSISTANT: LAW FIRM CLIENT MANAGEMENT

SOFTWARE

Presenter(s): Richard Hakes, Jacob Lambdin, Munna Rai

Faculty Sponsor: Lori Payne

Track: 4B

Abstract: It is important for an attorney to have an organizational tool that enhances

their productivity by maintaining their schedule and streamlining access to client information. Managing a large client load is difficult and stressful, and an inefficient office will quickly lose their clients' trust. Our product facilitates the attorney's ability to do critical tasks over the life-cycle of a case from the initialization of a "client-attorney" relationship to the case's resolution. Attorney's Assistant has a simple, elegant interface that gives

credence to a simple and quick tool.

Title: BPMBOX

Presenter(s): Bryn Loftness Faculty Sponsor: Karl Castleton

Track: 40

Abstract: Many times, people do not realize or properly acknowledge the stress

accumulated through everyday activities and routines. Unmanaged, these high stress levels can wreak havoc on the body, heart, and overall wellbeing. The immediate effect of high stress levels on the body can include increased heart rate, anxiety, muscle tension, fatigue, and exhaustion. Having an enhanced understanding of how the body is functioning during a stressful class period or important meeting could make a profound difference in ensuring that effective measures are taken to remediate and

recover from tension.

One way to track the bodies reactions is to offer a more accessible system for personalized heart rate monitoring. The BPMBox project incorporates a wearable system coupled with a software component that records heart rates and sends real-time data and recommendations based on that data. If the heart rate is abnormal, the user would receive notifications that include tools or suggestions to alleviate excess stress. In creating this system, users would have an accessible tool to monitor their bodies, oversee their stress levels, and increase overall well-being through convenient tools that promote healthier habits throughout everyday life.

Title: CIRCULATORY SYSTEM MODELS

Presenter(s): Erika Esquinca Faculty Sponsor: Lisa Driskell

Track: 4C

Abstract: Since the boom of computational math models, we have been able to better understand the world in which we live. For instance, looking at the

better understand the world in which we live. For instance, looking at the systems of the human body, we can now model their complexities while considering the mathematical properties that naturally arise. For this project we describe the circulatory system based on circuit models with varying assumptions. These models involve the theory of multiple compartments and symmetry within the closed system. We also explore the sensitivities and simplifying assumptions involved in representing the circulatory system

as a circuit.

Title: CLUB CALENDAR PROJECT (CCP)

Presenter(s): Matthew Behnke, Emerson Flom, Janina Pohorecki

Faculty Sponsor: Lori Payne

Track: 4B

Abstract: Current systems in place to inform students of club events on campus

are inefficient, non-intuitive, and unfriendly. If a student wants to see what is happening on campus he/she has to either log into an ineffective Orgsync or walk around campus to find posters publicizing events. The Club Calendar Project (CCP) will replace these systems with a user-friendly, web-based calendar that makes planning, creating, and viewing events easy and intuitive for students and club leadership. Students will be able to streamline their calendars by following clubs that interest them. The CCP will increase students' awareness of campus events and proliferate student

participation in clubs.

Title: CONFIDENCE INTERVAL PERFORMANCE ANALYSIS

Presenter(s): Logan Litle Faculty Sponsor: Clay King Track: 4C

Abstract:

A confidence interval is an interval of real numbers generated by sample statistics, which should contain a population parameter a predetermined percentage of the time. Typically, the goal is ninety-five percent confidence that the parameter is within the interval. But how often do such intervals truly perform at that exact level? The answer is that it depends; there are many types of confidence intervals, which do not all perform the same. Some intervals are narrower, some have more precise coverage, and others depend heavily on the statistics and sample size being in a particular range to perform well. In this project, such attributes of various confidence intervals are analyzed. Data from exponential and binomial distributions

intervals are analyzed. Data from exponential and binomial distributions was simulated in R, then confidence intervals were formed using statistics from relevant distributions, and the coverage probabilities were determined at varying values of parameters and sample size. Results show that the Wald interval for binomial proportion was outperformed by the Wilson score interval. Similarly, the Wald interval for mean was outperformed by

the exponential score interval.

Title: FIREMAP

Presenter(s): Caleb Gartner, Joshua Mathews, Thayne Wilson

Faculty Sponsor: Warren MacEvoy

Track: 4A

Abstract: The 2018 wildfire season was among the most destructive in American

history, claiming the lives of 98 civilians and 6 firefighters in California. Colorado faced its own share of fires and over 400 thousand acres were destroyed. Firefighters depend on up-to-date maps that display terrain information and fire boundaries. They are often in areas where cellphone service is limited, which can delay efforts and risk the lives of both firefighters and civilians. FireMap addresses this issue by aggregating and rendering these maps on Android devices. These maps will then be stored on their devices, enabling them to be viewed in remote locations with limited service. This project will help Colorado firefighters effectively combat wildfires and ultimately help protect the lives and natural resources

of the state we call home.

Title: GLACIER ICE ARENA'S NEW WEBSITE

Presenter(s): Mitchell Bohn, Merle Reynolds

Faculty Sponsor: Warren MacEvoy

Track: 4A

Abstract:

Grand Junction's Glacier Ice Arena is a business dedicated to creating and hosting ice rink events. Their previous website made it difficult for both the users and administrators to access and share information. The appearance needed to be modernized, and the navigation needed rerouting. We have created a new website to help save the business time and money. With a cleaner user interface for the administrator and users, Glacier's target audience no longer has to worry if they are looking at the correct schedule. Meanwhile, administrators can easily update hockey scores and keep the website updated about important upcoming events.

Title: **GROVE HAVOC VR** 

Presenter(s): Lucas Bingham Faculty Sponsor: Warren MacEvoy

Track: 4A

Abstract: The video game market is constantly evolving. Trends, development tools,

and technology are in flux every year. In recent years, the field of virtual reality has gone from a Star-Trek-esque dream to a surprisingly tangible reality. Headset position tracking plus independent hand controller position tracking creates many opportunities for immersive and physically engaging experiences., and I have endeavored to create one. Grove Havoc VR tasks the player with fighting enemies in a forest grove. The player must fight repeated waves of multiple enemies, resting between each encounter. The player is outnumbered, and must rely on their sword and a simple set of movement powers to beat each wave. This physically engages the player as they draw, swing, and sheath their sword, as well as execute punches and shoves to use their movement capabilities, zooming around the level, hopping off of boulders and tree trunks as they slash at their foes. By building this game for virtual reality, anyone that plays this game is able to enjoy a satisfying video game combat challenge along with a workout.

Title: **JUPYTERBIN** 

Presenter(s): Bader Alkhamees, Daniel Powell, Amanda Smith

Faculty Sponsor: Warren MacEvoy

Track: 4Δ

Abstract: Jupyter Notebook is an open-source tool popular in computer science

and data analytics classrooms around the world. It makes it easy to display a lesson with live, interactive code snippets, math equations, and data visualizations that each student can interact with and edit in real time. The pain point is that the process to set up and share the notebooks between teacher and student or between student and student is complex and takes up valuable classroom time. JupyterBin makes it simple for a teacher to set up a server where each student will not need to install or configure anything, and can simply run and share their notebooks in their browser.

Title: MILOG: MILEAGE TRACKING MADE SIMPLE

Presenter(s): Robert Dunski, Scott Lowe, James Mathson, Riad Shash, Jesus Velasquez

Faculty Sponsor: Warren MacEvoy

Track:

Abstract: Mileage tracking is an important necessity for travelling employees that

can be difficult to accomplish effectively. Popular mileage tracking apps record the distance travelled by recording a new trip when the user begins moving, and ending the trip once they have stopped. This can be a problem if multiple stops are made in a day, as it will save each trip separately, forcing the user to combine them manually. MiLog is a mileage tracking app that addresses these pitfalls and allows users to customize

their logging experience and generate records regardless of whether they are an Android or iOS user. An accompanying website has many of the same functions in addition to more advanced reporting tools. This app lets users choose specifically when to begin or end a trip and features a pause function that lets the user temporarily suspend the trip in case of nonbusiness errands or emergencies. The app keeps track of different vehicles as well as any tolls or parking fees accumulated. This helps individuals keep concise logs of their travels and simplifies itemizing deductions. Whether you are an independent contractor or a business owner, MiLog is the last mileage tracker you will ever need.

MONEY MANAGEMENT APPLICATION Title:

Presenter(s): Jacob Boyce, Seifeldin Ezzat, Aaron Gossage, Domonic Tafoya

Faculty Sponsor: Lori Pavne

Track:

Abstract: Trying to manage your money and keep up with bills can be a tedious

task for college students. The MMA makes these tasks simple and easy to accomplish. By entering information like the student's weekly paycheck and monthly bills. MMA will tell them how much money they need to save each week and remind them of when their bills are due. MMA aims to simplify

college life by knocking out your bills.

Title: QUICK TO THE LIFT RENTAL SYSTEM

Presenter(s): Keren Angeles, Jackson Hill, Kellie Larsen, Merle Revnolds

Faculty Sponsor: Lori Payne

Track:

Abstract:

Board and Buckle is a local ski shop in Grand Junction, Colorado, Currently, all rental reservations are hand-written and rentals are processed using paper forms, which can create difficulties for employees, management, and customers. The Quick to the Lift Rental System (QLRS) introduces a simple and efficient rental system for employees and managers. QLRS will improve the tracking of rental histories and reservations, and increase efficiency. QLRS will allow Board and Buckle to create a satisfying customer

experience by making the rental and reservation process a breeze.

QUICKCONNECT Title:

Angeline Fletcher, Wyatt Hurst, Kellie Larsen, Warren Story Presenter(s):

Faculty Sponsor: Warren MacEvoy

Track:

Abstract: The District Court of Grand Junction has been searching for an application

> that adolescents in the court system can use to easily access important contacts. This poses an interesting problem since they are not able to store any information about minors online. QuickConnect is able to act as a messaging system between the adolescent and the people they trust without storing personal information such as their name. QuickConnect addresses this issue by providing an application for iOS and Android devices that kids can use to view contacts, message them within the app, customize their home page, and send emergency alerts in serious situations. The administrator website allows court system officials to add and update contacts, provide important resources such as housing and medical, and add other administrators to maintain the system easily. QuickConnect helps adolescents in the court system feel more safe and secure by providing them with a private method of communication only accessible by them, as well as a simple way to get help in situations where

dialing 911 may be risky or impossible.

Title: RASCAL TRIANGLE

Presenter(s): Oxana Allen

Faculty Sponsor: Markus Reitenbach

Track: 4C

Abstract: In this project we investigate properties of the Rascal Triangle and

compare them to the properties of Pascal's Triangle. A brief history of the Rascal Triangle will be presented and proofs of some of its properties will

be included.

Title: SIMPLE INVENTORY MATRIX

Presenter(s): Angelo Adams, Andrew Gaines, Cody Grinstead

Faculty Sponsor: Lori Payne

Track: 4B

Abstract: Warehouses have to keep track of a massive flow of inventory. Managing any

volume of inventory requires a system that needs to do multiple tasks. Our software helps to track all inventory, providing a powerful way to manage a warehouse. To accomplish this efficiently and dictate the progress of the warehouse, we introduce you to SIM, the Simple Inventory Matrix.

warehouse, we introduce you to SIM, the Simple Inventory Matrix.

Title: SNAGHUB

Presenter(s): Joseph-lan Bongar, Neifi Campas, Brian Claymon, Joseph Jimenez

Faculty Sponsor: Warren MacEvoy

Track: 4A

Abstract: Snaghub is a mobile app that takes advantage of the fact that many people

have power tools sitting in storage that don't get used as much as they could. Snaghub allows people without these tools to "snag" or borrow these tools from the people who own them. The borrowed item is insured to accommodate issues with the return of an item. Snaghub is integrated through Facebook so you can see your friend's "snagable" items if they are signed up with the app. The price per day of borrowing an item is 4% of the actual price of that item on Amazon. Also, if an item is not posted by a user, a search feature is available that will check Amazon for the item and provide a link to purchase that product. The idea is to eventually be an affiliated advertiser for Amazon. HTML is the front end with Cordova compiling the app for Android and IOS platforms. The database is SQL and

all of the API calls to Facebook and Amazon use Javascript.

Title: STATISTICAL ANALYSIS OF BIAS IN NEWS COVERAGE OF

CONTROVERSY

Presenter(s): Karen Prather Faculty Sponsor: Richard Ott

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Track: 4C

Abstract: Using Konstanz Information Miner (KNIME), we can investigate patterns

of U.S. news companies in their expression of world events to determine existence and prominence of message bias. Consumers worry about bias in news material and the consequent skew of information they may be exposed to, especially when companies report on contentious issues. Through categorical analysis of headline verbiage, article tone, and diction, we can determine which differences exist in information delivery. We will analyze articles concerning topics like mass shootings, political scandal, and police brutality that are heavily covered by all news organizations, no

matter their political affiliation.

A MODEST APPROACH TO CONSTRUCT A PMG (PERMANENT Title: MAGNET GENERATOR)

Presenter(s): Taylor Guerra, Vicente Trevino, Garrett Westerhoff, Charles White Sarah Lanci Faculty Sponsor:

Track: 5Α

Electromagnetism is a tough subject for some to wrap their head Abstract:

around. To aid in students' understanding, the team constructed a small electric generator for Physics 132 and 112 class. The generator will help demonstrate the concept of Faraday's law, Lenz's Law and Ohm's Law to determine electromagnetic induction. These describe the basic formulas to analyze the interactions of magnetic fields and coils of wire. The only guidelines given on what had to be built was that it must power a common light bulb while displaying the interior components. With the idea of a basic prototype made of wood to develop the inner mechanics, the team used this prototype to find the amperage generated and needed to power the light bulb. The physics side of the generator's development was not the most difficult. Making sure the coils, magnets, and crank worked efficiently was the perfectly assigned engineering task for the team. After development, clear acrylic was used to display the inner mechanics for the Physics classes.

AUTOMATED DISPENSING AND STACKING PROCESS FOR Title:

CERAMIC COMPONENTS

Presenter(s): Stephen Drozda, Jaden Koos, Dillon Vavak

Chris Penick Faculty Sponsor:

Track:

Abstract. Employees at CoorsTek individually place ceramic parts from a stack

onto a machine, termed the Nuball cleaner, which rinses and dries them. After clean parts exit the Nuball cleaner, employees pick up the parts and stack them again. Two employees unstacking and stacking ceramic parts from the Nuball cleaner process an estimated 7,500 parts in four hours. The purpose of this project was to design and construct an automated dispensing and stacking system to increase productivity by decreasing the amount of time it takes to dispense and stack parts to and from the Nuball cleaner. The dispensing design includes a cartridge that holds 450 parts, extension springs to raise the parts on a platform, and pneumatic cylinders to dispense individual parts. The stacking system includes three cartridges with three belt-driven actuators that lower a plate, allowing the 450 parts to stack in the cartridges. The components used in this design were incorporated to provide a cost-effective and simple user-interface. The designers have built and tested the part dispensing and collecting systems on the Nuball cleaner and have demonstrated the effectiveness of

the design.

Title: AUTOMATED DRILL PRESS

Carter Anderson, Noah Beaver, Justin-Shay Ellsworth, Dakota Yourkowski Presenter(s):

Faculty Sponsor: Scott Bevill

Track: 5D

The project will display a fully-functional CNC drill press, which was Abstract:

constructed by a team of junior engineering students. Hours of design, building, wiring, and testing went into the realization of this prototype device. The CNC drill press has the ability to drill any hole pattern

programmed by the user with minimal user input. It is also able to complete drilling tasks in 150% of the manual labor time it would take to do the same job. This device was created as part of an assignment to build a 2- to 3-axis CNC machine for the course ENGR 345: Integration I. CNC machines, 3D

printing, and plasma cutting all contributed to manufacture the frame. The designers will demonstrate the press functionality and present the manufacturing process.

Title: AUTOMATION OF COORSTEK BIOCERAMIC CUTTING SYSTEM FOR

**GREEN CERAMIC BILLETS** 

Presenter(s): Jesus Aguirre, Jody Bailey, Jacob Pacheco, Peter Ward

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: The current process used at CoorsTek Biocermics for cutting ceramic billets

into blanks that are turned into hip joints is unsafe and inefficient. The company reached out to CMU to find a way to automate this process and make it safer. A group of senior mechanical engineering students devised a method to automate an up-cut miter saw to perform the billet cutting process in a safe, efficient manner that requires no direct human supervision. The team designed and built a system that employs a series of pneumatic cylinders, aluminum stops and 3D printed rails to cut and place the ceramic blanks in a collection tray. The complex pneumatic circuit is controlled using various valves connected to an automation controller that uses sensors to track each billet from start to finish. The system allows a worker at CoorsTek to attend to other tasks while billets are automatically cut.

Title: BAR BUDDY

Presenter(s): Tristin Bina, Ethan Davis, David Hale, Cody Hedrick, Diana Montes

Faculty Sponsor: Scott Bevill

Track: 5D

Abstract: Restaurants and bars alike are often bombarded with patrons requiring

their drinks to taste consistent and to arrive in a timely manner. Similarly, restaurant owners want to ensure that a bar tender can prioritize and maximize drink output while keeping consistent and having minor waste. The purpose of this project was to design a prototype device to address these needs. The design developed (nicknamed the "Bar Buddy") is an automated six-shooter style system small enough to mix drinks on a countertop. The bottles rotate on a carousel above a glass, and an actuator dispenses a measured volume of liquid out of the bottles into the glass

below, to make a well measured and consistent drink.

Title: BARREL PUMP REDESIGN

Presenter(s): Grant Duta, Anne Sponheim, Justin Stenman

serviceability, and ease of use.

Faculty Sponsor: Sarah Lanci

Track: 5A

Abstract: The Outdoor Program (OP) at Colorado Mesa University leads outdoor

trips almost daily. Due to the college's proximity to the Colorado River, the group leads many rafting trips and also rents out rafting gear to students for recreational use. The OP prefers using greaseless, low-pressure barrel pumps for inflating river rafts. They are large in size (6 inches in diameter and roughly three-feet tall) made out of PVC that includes a pump handle, swivel connection from pump to hose, metal-ribbed hose, and small foot holds. The replacement cost of the pumps is too high for the OP and since the pumps are rented out they are at the mercy of user error, often breaking to the point of being unrepairable. This project focuses on the redesign of the barrel pump optimizing low cost, high durability,

Title: CLOUDS FOR THE USE OF PARTICLE DETECTION

Presenter(s): Amado Capetillo, Manuel Monroy Ramirez, Gage Nettleblad,

Joshua Stricker

Faculty Sponsor: Kelly Bevill

Track: 5B

Abstract: Particles not visible to the human eye travel from space and bombard Earth

constantly. A Cloud Chamber is a device that can be used to make these normally invisible particles, visible. This Cloud Chamber allows observers to see the paths that charged particles leave as they pass through a fog of evaporated isopropyl alcohol. Vapor condenses on the ions as they travel into this fog, and leaves behind trails that can then be observed. Based on the appearance of the trails, it is possible to differentiate specific types of particles. Some of the particles that can be observed include radon emitting an alpha particle, muons, electrons or positrons (the antimatter version of electron), and particles decaying. By designing a Cloud Chamber, visitors to the Eureka! McConnell Science Museum will be able to see the types of particles in our atmosphere that are not visible to the naked eye.

Title: CONTRACTIONAL SANDBOX

Presenter(s): Braxton Anderson, Trey Peltier, Caleb Rodriguez, Dominic Sailors

Faculty Sponsor: Kelly Bevill

Track: 5B

Abstract: Many may not know what a contractional sandbox is or what it does but the

main concept behind it is to show how mountain ranges along with showing how depressions form. The group of designers will ultimately recrate these naturally accruing cycles that happen in nature. There are many ways to display these ranges and depressions, some are contained to a small level of a box or table size, while others are on a much larger scale. For this project the designers will create a contractional sandbox that is on a smaller scale for class room use, as our client requested. Overall the designers will design and test the sandbox so that students can visualize how depressions

and mountain ranges are formed.

Title: DEMONSTRATION OF FORCES IN HELICAL GEAR TRAIN

Presenter(s): Carter Lambert, Noah Steinbach, Lawrence Vaalburg, Benson Wu

Faculty Sponsor: Jody Kliska

Track: 5C.

Abstract: A helical gear is a gear with slanted teeth. The teeth on helical gears

engage more gradually than the teeth on other types of gears, making helical gears useful for high speed and power transmission with less noise. Because of their slanted teeth, helical gears create forces in different directions on their axes. A demonstration was built with two stages of helical gears mounted on shafts supported by ball bearings. The bearings are mounted with some give in all directions on the gearbox walls as to allow for force measuring devices. The casing of the gearbox was made of polycarbonate for visibility of the gears and durability. The input shaft has a hexagonal pattern mounting nub to allow for both a hand crank and the ability to be used with a power drill. The output shaft is linked to a brake that applies resistive force to increase load on the gears. The demonstration will help in understanding the properties of helical gears and

aid in the design of gear assemblies.

Title: DESIGN AND DEVELOPMENT OF A PEDAL-ACTIVATED WIRE CUTTER

FOR SEEK OUTSIDE

Presenter(s): Joel Fiedler, Caroline Qualls, Abram Sanchez, Katelynn Schwerdtfeger

Faculty Sponsor: Sarah Lanci

Track: 5A

Abstract: Seek Outside is a manufacturing company that specializes in the production

of lightweight backpacking and outdoor equipment. In recent months

they expanded their reach overseas to countries such as Japan while still growing their local dispenses. Due to this growth, it has become evident that production methods will need to become more efficient and structured. One product, the outdoor stove, requires braided wires of various lengths and diameters to be measured, cut, and collected for shipment. This process is currently done completely by hand which results in wires that vary slightly in length. Customers have complained about this variability so, to address this issue, Seek Outside requested the design and development of a mechanism that is able to precisely measure and cut these wires. In order to meet these parameters, a manually-operated wire cutter has been constructed that allows for the insertion of both braided diameters, measures the desired lengths, and cuts the wire through a pedal action. This design will provide the necessary parts for the outdoor stove, satisfy the customer, and increase production efficiency for Seek Outside.

Title:

#### DESIGN AND DEVELOPMENT OF ROLL-OFF ANGLE TESTING APPARATUS

Presenter(s):

Elliot Buchanan, Antonio Gueretta, Alexander Weaver

Faculty Sponsor: Chris Penick

5F

Track: Abstract:

Dr. John Pellegrino and his research team at the University of Colorado Boulder tasked a senior mechanical engineering design team from the CU/CMU mechanical engineering partnership program to build an apparatus to aid in developing different polymer-based membranes for research purposes. A fundamental aspect of advancing research for these materials is characterizing material properties. The apparatus is designed and built to measure the roll-off angle of various liquids placed on polymer-based membranes to aid in material characterization. The roll-off angle is the angle at which liquid droplets begin to roll off of a surface. While similar apparatuses are commercially available for \$10,000 to \$50,000, this design was built for less than \$2,000 and has similar capabilities to that of commercial models. These capabilities include 3-dimensional motion of the microscope camera, ability to test different liquid compositions simultaneously, and providing real-time image feedback of the liquid droplets.

Title:

# DESIGN AND FABRICATION OF A CARBON FIBER BICYCLE RIM SURFACE PREPARATION MACHINE FOR DT SWISS USA

Presenter(s):

Dakota Amos, Noah Jackson, Grant Miller, Eric Pipkin

Faculty Sponsor: Chris Penick

Track: 5E

Abstract:

DT Swiss is an international company with a facility in Grand Junction, CO. They design, manufacture, and market high-quality bicycle components including spokes, nipples, hubs, rims, complete wheels, and suspension systems. At the Grand Junction facility, carbon fiber bicycle wheels are assembled. During the wheel assembly process carbon fiber rims must have their surface prepared by increasing the surface energy to ensure the successful application of waterslide decals. Currently, an employee rubs each carbon rim by hand using an ultra-fine abrasive pad. Each rim must be handled for 2.5 minutes making the task both exhausting and strenuous. To automate this process, a machine was designed and built that automates the rim surface preparation process for 27.5" and 29" rims that are between 25-35 mm wide and 20-80 mm deep. The machine reduces employee strain associated with the manual manufacturing process. It also successfully increases the surface energy of a carbon rim to 58 mN/m in less than 2.5 minutes with minimal operator input.

Title: DESIGN AND IMPLEMENTATION OF HUMAN CARDIOVASCULAR

**EXHIBITS FOR CHILDREN'S MUSEUM** 

Presenter(s): Sara Gladding, Lindsay Gnesios, Aric Harper, David Hunt

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: The Eureka! McConnell Science Museum is remodeling its human health

exhibit area and has tasked a senior design team, consisting of students from Colorado Mesa University and the University of Colorado Boulder engineering programs, with developing new exhibits for this area about the human cardiovascular system. The two exhibits developed for this project are focused on human blood vessel health and human blood circulation. The blood vessel health exhibit demonstrates the difference in blood pressure between healthy and clogged arteries via a pump and three fluid pathways of varying flow restriction. The human blood circulation exhibit utilizes a crank operated pump that simultaneously pushes red and blue liquid, representing oxygenated and de-oxygenated blood, through simulated blood vessels within a human shaped silhouette. Both exhibits deliver new ways for children to learn about the human cardiovascular system through the use of physical interaction, visual and tactile feedback.

Title: DESIGN AND MANUFACTURE OF A FATIGUE TESTER FOR ACRYLIC MATERIALS

Presenter(s): Mitchell Dilley, Westlyn Johnston, Joshua McGarity, Sean Snediker

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: The project goal was to design, build, and validate a machine capable of

generating fatigue life comparisons of proprietary acrylic pieces bonded in different ways. Reynolds Polymer Technology (RPT) was interested in developing a greater understanding of the fatigue properties of the material they manufacture for use worldwide in large aquariums and similar structures. With this project, safety and life expectancy can be verified. The team designed, developed, and produced a functional fatigue tester that RPT can use to perform fatigue tests. Relationships between parent material strength and the strength of different bonded samples were acquired. From testing of their proprietary polymer, RPT will gain a better understanding of the fatigue life of their material. This affects how long they should warranty their product, and when they should notify a customer

that a product is unsafe and should be replaced.

Title: DESIGN, CONSTRUCTION, AND TESTING OF A COLLISION-TYPE

ATOMIZER FOR GENERATION OF NANO-PARTICLES

Presenter(s): Dominick Heskett, Conner Swatloski

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: A collision-type atomizer is an apparatus that uses pressurized air to

generate an aerosol of fine particles suspended in air. The Vance Laboratory at the University of Colorado Boulder requires a collision-type atomizer to assist in conducting air quality research. The atomizer will be used to calibrate various tools and systems within their laboratory. The Vance Laboratory also requires an atomizer that can produce various aerosol flowrates with different solutions. All commercially available collision-type atomizers have orifices built into the body of the atomizer. This means the aerosol flow rate is not adjustable. The Vance Laboratory requires an atomizer with a modular orifice to allow for variable aerosol flowrates. Inner dimensions of the atomizer govern the size of the aerosol particles and the rate at which these particles are produced. The inner dimensions were analyzed to generate the desired particle sizes and particle production rate. With the collision-type atomizer designed, fabricated, and tested by

this team, the Vance Laboratory will be able to reliably and consistently calibrate their testing equipment.

Title: DESIGN OF A MECHANICAL SAFE-AND-ARM DEVICE FOR USE IN

AIRCRAFT COUNTERMEASURES

Presenter(s): Andris Balodis, Marc Brandt, David Madrid, Chad Merrick

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: As technology advances, threats facing our military while patrolling the

skies are becoming more threatening. For this reason, we must counteract threats with "smarter" defenses. Threats typically come in the form of guided missiles, which can be deterred by means of countermeasures. A countermeasure is a device launched from an aircraft to distract incoming missiles. The team was tasked with developing a prototype mechanical safe-and-arm device for use in countermeasures manufactured by Capco Inc., a defense contractor located in Grand Junction, Colorado. This safeand-arm device prevents the ignition of a countermeasure in the event that it fails to eject from the aircraft. This is of utmost importance because it provides a sense of confidence to the pilot that they are able to trust their defenses and not face self-inflicted damage to their aircraft from a failed countermeasure deployment. The students tested two separate designs by 3D printing ten models, five of each design. The results were that both designs were able to restrict the flow of gasses from the ignition source to the countermeasure when the exit ports were blocked. This proves that the designs were successful and have the potential to be incorporated within military aircraft units.

Title: DESIGNING THE TACTICAL AWARENESS KIT "AMMO BOX"

Presenter(s): Marc Fiot, Colton Futter, Jacob Payer, Garrett Zanon

Faculty Sponsor: Sarah Lanci

Track: 5A

Abstract: The TAK Rugged "Ammo Box" is intended to house the Department of

Fire Preventions Tactical Awareness Kit (TAK). The TAK is a kit that contains technology to track and identify first responders on the front line. The kit's enclosure must protect the internal equipment, be easy to use, and must be portable. This project focused on using a heavily modified heavy-duty case (similar in size to a ammo box) with power/communication pass-throughs, an internal battery, and shock-proof mounting. The final goal was to meet the client's design requirements with added ease-of-use features to the TAK interface in addition to being shockproof and dustproof. The design is built to be maintainable and reliable, and may be used by any emergency service.

Title: DEVELOPMENT OF AN ENCLOSED BALL-BEARING
DEMONSTRATION TO SHOW ATOMIC STRUCTURE IN MATERIALS

Presenter(s): Cadle Burrell, Angel Enrique, Zane Knapp, John Mosnes

Faculty Sponsor: Sarah Lanci

Track: 5A

Irack: 5A

Abstract: Materials science is a required course for all CMU mechanical engineering

students. It is the study of materials and their properties. Understanding the atom structure of a crystalline solid is an important part of the course. However, it is not possible to view atomic behaviors with the naked eye. Thus building a portable hands-on demonstration to show this will help alleviate the learning curve associated with understanding defects that occur naturally in crystalline solids. The hands-on demonstration tool created will allow students to view a two dimensional crystalline solid in which atoms are simulated with ball bearings. The design should be capable of showing crystal structures and defects such as grain boundaries,

vacancies, and dislocation motion.

Title: **EUREKA! BUSY BOARD** 

Presenter(s): Hayden Gardner, Chandler Livingston, Wade Rose, Fernando Tena

Faculty Sponsor: Kelly Bevill

Track: 5A

Busy boards have been around for many years to help encourage the Abstract:

development of children's sensory and motor skills. A busy board is a fun, interactive activity for pre-kindergarten aged children to help develop their sensory and motor skills and learn about different daily objects all in one place. Sensory experiences are crucial for the development of children's brains and busy boards give children the opportunity to explore a range of textures and sensations that will help them develop their essential sensory and motor skills through interactive play. The design of the busy board for the Eureka! McConnell Science Museum will include a portable busy board and a permanently fixed board that will feature multiple everyday objects and features to encourage natural curiosity and

investigative skills in young children.

Titla۰ **EUREKA! PIPE SLIDE ENGINEER** 

Presenter(s): Colby Beckett, Alex Campbell, Scott Funston, Austin Germann

David Clapp Faculty Sponsor:

Track: Abstract:

Recently there has been a push to introduce middle school students to Science, Technology, Engineering and Mathematics (STEM) careers due to the increasing need for technological innovation. The Eureka! McConnell Science Museum in Grand Junction, Colorado consists of STEM themed interactive exhibits to introduce kids to the sciences. A popular exhibit at the museum is called the Pipe Slide Engineer. The Pipe Slide Engineer allows kids to build an abstract slide so a small tennis ball can roll through PVC piping, allowing it to run wild through various piping configurations. However, the exhibit has a list of issues. Magnets that are bolted to PVC pipes make the slide and allows it to adhere to a steel wall. The magnet fixtures are easily broken, and they damage the expensive vinyl picture on top of the steel wall. The proposed solution is to 3D print custom magnets sleeves and devise a new mounting solution to alleviate the problems. This will allow the Eureka! McConnell Science museum to have a well-

functioning exhibit once again.

FALLING CHIMNEY DEMONSTRATION Title:

Joshua Burget, Bree Johnson, Brendan Schott, Michael Skinner Presenter(s):

Faculty Sponsor: Jody Kliska

Track:

Abstract: The falling chimney demonstration is a simple experiment. It shows that an

upright board, anchored from the bottom, will fall more rapidly than a freefalling object dropped at the same time. The designers of this project were tasked with re-creating this demonstration in such a way that it is obvious to the observer that a plank anchored on one end will fall faster than a ball. An LED screen was used to display the time between the plank and ball hitting the ground, to hopefully give students a better idea of how the experiment

itself works, and how it can be applied in real life situations.

Title: **GEARBOX CUTAWAY** 

Alex Heckman, Estevan Maldonado, Chapin Schott, Parker Smith Presenter(s):

Faculty Sponsor: David Clapp

Track:

5B

Abstract: Gearboxes are used in numerous industrial applications that require power

transfer as well as controlling equipment speeds. A common example would be the transmission in an automobile. This project will fabricate cutaways of several gearboxes, to be used by engineering students to better understand the internal workings of a gearbox. Each gearbox will

showcase different varieties such as Worm, Parallel, 90 degree Helical, and Inline. This project will disassemble the gear boxes, mill the outside casing, and reassemble to reveal the inner workings of the gears. Along with the cutaway, the milled width of the casing will be painted a different color to reveal the cut out sections. As a result, this project provides engineering students with better knowledge of gearbox design and fabrication.

Title: **HOBO 8K SOLAR RADIATION SHIELD** 

Presenter(s): Timothy Gloor, Gabriel Liebelt, Mar Y El Torres

Faculty Sponsor: Jody Kliska 5B

Track:

Abstract: Solar shields for temperature sensors in outdoor habitats have problems dealing with heat transfer resulting with inaccurate measurements along with theft of measurement devices. This project designed a radiation shield for temperature sensors that authorize air flow with a discreet design

to successfully gauge temperature in pika habitats. The radiation shield created was an innovative design that uses louvers, which are angled slats, to block the sunlight yet allowing air flow through our shield. A light color with a natural pattern will be added to the shield to keep it from absorbing heat and be disguised to prevent theft. The designers will demonstrate the functionality of their natural looking radiation shield that allows the sensor

to correctly gauge temperature.

IMPLEMENTATION OF A ROBOTIC ARM TO AUTOMATE A Title:

MANUFACTURING QUALITY CONTROL PROCESS

Presenter(s): Brogan Butler, Dirk Smuin, Timothy Watrous

Faculty Sponsor: Chris Penick

Track:

Abstract: Robotic automation is common in modern manufacturing. This trend will

> only increase in the future as robots become more sophisticated and costeffective. While a robot is good at automating a simple repetitive task, some tasks are not so simple. This project demonstrates the complicated task of automating a quality control process in which a robotic arm picks up a CNC machined part, properly orients it, and places it on an already automated quality control stage. Due to the geometry of the part, the robot must be able to determine the a parts rotational position to within  $\pm$  0.1° before placing it on the quality control stage. To accomplish this, a photosensor was developed, tested, and integrated into this automated process. With this system, the client, Rocky Mountain Manufacturing, can produce and inspect parts autonomously 24 hours a day, increasing part

output for the company.

IMPULSE SOUND SOURCE FOR ACOUSTIC MEASUREMENTS OF Title:

REVERBERATION TIME

Presenter(s): Caleb Barnes, Jack Dorrance, Jose Lopez Ramirez, Logan Schroeder

Faculty Sponsor: Jody Kliska

Track:

The length of time it takes for sound to die down in a room is called the Abstract:

reverberation time; a long reverberation time in a classroom can make it difficult for students to understand their teacher, or for students to understand each other when discussing with one another. Therefore, when designing a room, the goal is to make the reverberation time as short as possible. The common range of sound frequencies that are emitted from a human speaking falls in the range between 200 hz to 4,000 hz and an expensive twelve-sided speaker is typically used as a sound source to mimic a sound that can be used to measure the reverberation time in a room. The purpose of this project was to design a clapping device that emits all frequencies from 200 hz to 4,000 hz at a loud volume, so that when the

device is clapped together, it is an efficient, yet inexpensive sound source

for testing the reverberation in a room.

Title: INTERACTIVE CRANE EXHIBIT

Presenter(s): Adam Bartels, Harrison Benoit, Payton Sanders, Miguel Vasquez

Faculty Sponsor: Kelly Bevill

Track: 5A

Abstract: The ancient Greeks built the first cranes around 1,000 A.D. Since then,

cranes have been used to create some of the most stunning works of architecture and power the world has ever seen. This project focuses on the design and construction of a miniaturized crane exhibit in an effort to inspire young children to be creative and build on new ideas. The exhibit design consists of a crane fixed to a platform, and electric motors to control movement with a main joystick and button that will engage and disengage an electromagnet. With the help of electric motors, the crane will be able to rotate 360 degrees and include an electromagnet on a geared track that extends and contracts along the crane arm for increased adjustability and movement. Using electric motors, gears, and an electromagnet, we will design an interactive crane exhibit allowing children to simulate the movement of a real crane at the Eureka! McConnell Science Museum.

Title: LOAD DISPERSION IN VARYING FILLET RADII

Presenter(s): William Doherty, Jackson Ferguson, Brian Kennedy, Evan Lavin

Faculty Sponsor: David Clapp

Track: 5B

Abstract: Fillets are inherently stronger than 90-degree corners, and the larger

the radius of the fillet the greater the distribution of the load. This is an important concept in component design and can be difficult to demonstrate in a learning environment. The object was to show students this concept with a comprehensible, hands-on model. The goal of this project was to verify that the greater the radius of the fillet the greater the distribution of the load. Using birefringence and LCD polarizers, one can visualize the stress on varying degrees of filleted, backlit, clear plastics. The team quantified the stress lines shown through the LCD polarizers and demonstrated the difference in load dispersion between fillets of larger radii and those closer to a 90-degree angle. Ultimately, this project should

confirm visually that fillets are indeed stronger than edges.

Title: MAV-5 BY MESA MOTORSPORTS

Presenter(s): Jesse Boyce, Alan Carrasco, Jorden Hall, Justin Marker, Lucas Mitchell,

Matthew Stokes, Ryan Zinke

Faculty Sponsor: Scott Kessler

Track: 5F

Abstract: Mesa Motorsports is a team dedicated to building formula style racecars.

Every year the team builds a competition racecar from scratch. The purpose of this yearly project is for team members to develop skills for use in their future professional careers. This year the team focused on cutting weight by 15 lbs. The team sponsored three senior engineering design teams to attack three different systems of the car. A new engine control unit was developed for more reliable engine tuning. The rear subframe of the car was redesigned to be lighter and simpler. The air intake and exhaust have been redesigned and manufactured using carbon fiber components for weight loss and power gain. This year's car, dubbed the MAV-5, is the

lightest car produced to date.

Title: MODELING THE ANISOTROPIC MECHANICAL PROPERTIES OF

FUSED DEPOSITION MODELING ABS USING AN ARTIFICIAL NEURAL

NETWORK – PART 2 OF 2

Presenter(s): Sara Gladding, Aric Harper

Faculty Sponsor: Scott Kessler

Track: 5D

Abstract: Fused deposition modeling (FDM), commonly known as 3D printing,

has been used for some time as a tool for rapid product prototyping. As technology has improved, both in FDM printers and in filament material, demand has grown for FDM produced end-user components. The FDM process produces highly anisotropic parts, with mechanical properties varying based on layer height, infill density, air gap and printing pattern. To produce viable end-user components, it is necessary to be able to accurately predict the mechanical properties of a component given the above variables. Part 1 of this study focused on creating tensile specimens to validate previous research about mechanical properties as a function of input parameter, and to create a database for part 2. In part 2, we trained an artificial neural network (ANN) using the MATLAB Levenberg-Marquardt backpropagation algorithm to predict the mechanical properties of FDM ABS. Research shows that the ANN is capable of predicting the desired mechanical properties with a high level of accuracy.

Title: OPTICAL CHOPPER

Presenter(s): Sean Bohling, Nicholas Merelli, Rylee Shayne O'Neill

Faculty Sponsor: Jody Kliska

Track: 5C

Abstract: The speed of light has been measured to be 299,792,458 m/s. The purpose

of this project was to design an instrument to verify this fact. An optical chopper device was designed for use in a classroom setting. The optical chopper takes a solid beam of light and breaks it into evenly spaced pulses. The chopper consists of a wheel with evenly spaced spokes attached to a motor that spins at various speed settings. After the beam has been split into pulses and been put thorough a beamsplitter, one part hits a sensor and the other reflects off a mirror. Then, the light travels back to a second sensor. To determine the speed, the data from the two sensors was evaluated to determine the change in time, and the distance to the mirror served as the distanced travelled. The designers will demonstrate and verify

the optical choppers role in measuring the speed of light.

Title: PARALLEL AND SERIES PUMPS

Presenter(s): Dylan Amos, Caden Aragon, Jeffrey Davis, Mathew Matamales

Faculty Sponsor: David Clapp

Track: 51

Abstract: The purpose of this project is to design and construct a parallel and series

pump system demonstration that determines pump power and efficiency within a modest budget for a classroom setting. Parallel and series pump demonstrations can be very costly and therefore unaffordable for educational uses. The pump combination will use sensors, gauges, motors, and valves which can be altered to vary pressure and flow rate for different configurations by opening and closing valves. The project will demonstrate the functionality of two pumps working either in series or parallel to show pump curves and efficiency while staying under budget. A pump curve is data defining a pump's ability to produce different fluid velocities against

specific pressures in the piping system.

Title: PEARLITIC MICROSTRUCTURE

Presenter(s): Uchechukwu Chiedu, Gabriel Martinez, Edgar Palacios, Christian Romrell

Faculty Sponsor: Jody Kliska

Track: 5C

Abstract: The material science course offered in a sophomore-level class teaches

its students about elements and compounds such as iron, carbon, steel and their various combinations. This project focused on the combination of ferrite which is iron rich, cementite which is a combination of iron and carbon, and how the two together produce pearlite. By applying the lever rule calculation, it is possible to determine how much of each phase is formed at different temperatures using phase diagrams, however a visual representation of these mixtures would provide better knowledge of what happens when elements are mixed together. The goal of this project was to design and construct a 3-D model of the pearlitic microstructure to be assembled and disassembled. This would help students in material science understand the pearlite structure and help the students to understand the calculations used to determine the relative amounts of each phase.

Title: PROJECT AMMO CAN

Presenter(s): Mahmoud Elgayar, Marlon Heskett, William Vrooman, Clark Willis

Faculty Sponsor: David Clapp

Track: 5B

Abstract: In highly stressful wildland fire environments, it is imperative that firefighters have the proper training and equipment to prevail.

Reliable communication is critical to success. This project provides that communication via a rudimentary version of military Team Awareness Kits (TAK), used in combat situations to provide information between aircraft and soldiers on the ground. Inside the TAK "Ammo Can" there are multiple antennas, receivers, a power source and a touchscreen. In addition to reliable communication, it must be hardy enough to withstand abuse, such as being rattled around in the back of a truck, and be resistant to smoke and dust commonplace in firefights. These "Ammo Cans" will be used as a form of communication "bridge" for firefighters who would otherwise be

unable to communicate with incoming firefighting aircraft.

Title: REDESIGN AND MANUFACTURE OF A FORMULA SOCIETY OF

AUTOMOTIVE ENGINEERS (FSAE) RACECAR SUBFRAME FOR REDUCED

WEIGHT AND INCREASED STRENGTH-TO-WEIGHT RATIO

Presenter(s): William Bovard, Carolina Yamada, Ryan Zinke

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: The purpose of this project was to redesign the rear subframe of an

FSAE racecar to reduce weight while improving suspension geometry and increasing the drive chain adjustability. A reduction in weight and precision milled suspension components allowed for better acceleration and handling. To reduce the weight of the rear subframe the two structural plates that mount the engine, differential, and suspension were reduced by half an inch, and incorporated suspension and control arm mounts into the subframe eliminated the need for the heavy steel webbing utilized on the 2018 racecar. To address normal wear and slack in the drive chain an improved differential mounting system was incorporated via eccentric differential plates that rotate in 10-degree increments to provide a finer resolution to adjust the front sprocket to differential distance, which reduced chain slack. Stress-strain analysis was performed on the 2018 racecar to identify and quantify the loads experienced by the subframe components so that the rear subframe could be accurately modeled and properly loaded in a finite element analysis to ensure the design provided the suspension and powertrain systems with the structure and alignment

Title: REDESIGN AND OPTIMIZATION OF FSAE RACE CAR INTAKE AND

**EXHAUST SYSTEM** 

Presenter(s): Cody Dozoretz, Micah McLaren, Cesar Reyes

Faculty Sponsor: Scott Kessler

Track:

Abstract: Colorado Mesa University's Formula Society of Automotive Engineers

(FSAE) team, Mesa Motorsports, identified the need to redesign and manufacture both the intake and exhaust systems on the race car that they will be taking to Brooklyn, Michigan for competition in May 2019. The sponsor, Mesa Motorsports, has asked the 2018/2019 Colorado Mesa University senior design team to complete this task. Optimizing the systems for the desired engine performance allowed the team to achieve faster times during races and perform better at competition due to an increased airflow through the new intake. Through the use of flow simulations the intake and exhaust systems were designed to improve the airflow into the engine thus increasing engine efficiency. To further improve performance, the exhaust headers were designed to produce scavenging in the engine. Scavenging occurs is when a low-pressure wave follows expelled exhaust thus sucking engine air into the cylinder. The intake and exhaust systems were also designed to be lighter than those used on previous year's car. The muffler was also designed to keep sound pressure levels within the

Title: RUNWAY RUBBER REMOVAL

Presenter(s): Jennifer Dennison-Jones, Vail Hall, James Prescott, Alan Wheeler

allotted threshold required by competition rules.

Faculty Sponsor: Chris Penick

Track: 5E

Abstract: Commercial aircraft deposit large amounts of rubber onto runways during

landing. These rubber deposits cover critical runway markings used by pilots to identify runway lines for landing. The Grand Junction Regional Airport (GJRA) is seeking a proposed solution to remove rubber from runway centerlines. Currently, the process used to remove rubber is costly and time-consuming. To remove the rubber currently costs \$50,000 and requires the runway to be shut down for two nights. The proposed solution will be used to keep runway stripes visible at GJRA and within FAA specifications between major annual runway cleanings. The team designed and built a system that deposits rubber onto a painted portion of runway asphalt to simulate the actual deposition of rubber by an aircraft. This system provides test specimens to conduct research on different removal methods using water pressure including nozzle selection, configuration, and recommended pressures and temperatures for operation. The deliverable will be the rubber depositor and a proposed solution with test data to support our design decisions. The deliverable will allow for future design and fabrication of an apparatus to remove rubber from runway stripes at GJRA.

Title: SELECTION OF ENGINE MANAGEMENT SYSTEM AND WIRING DESIGN

FOR MESA MOTORSPORTS' 2018-19 FSAE RACECAR

Presenter(s): Keaton Kemper, Connor Lumley, Nicolas Maraschin, Philip Nelson

Faculty Sponsor: Scott Kessler

Track:

Abstract: The purpose of this project is the selection and integration of a

standalone engine management system for Mesa Motorsports' 2018-19 Formula Society of Automotive Engineers (FSAE) racecar. This included the selection of an engine control unit (ECU), the design and construction of a wiring harness, calibration of the ECU, and adjustment of 3D control and tuning tables in the ECU. For its range of tuning capabilities and competitive price, the MegaSquirt 3 Pro EVO was selected for the ECU. The wiring diagram and harness were designed for ease of installation on

the racecar. With the implementation of this ECU, the power output of the racecar was increased.

Title: SOLAR HEATER

Presenter(s): Camden Brown, Matthew Haskell, Ramiree Quick, Conor Woltman

Faculty Sponsor: Sarah Lanci

Track: 5A

Abstract:

In cold climates snow and ice accumulation in shaded areas presents a number of hazards. The suns's rays cannot heat and melt the excess snow. For many people, elderly especially, they do not have the ability or time to safely maintain these shaded areas on their property. Hiring help or purchasing specialized equipment to remove the snow quickly is easy but expensive. A more efficient approach is with renewable energy. Using solar energy as opposed to chemical, mechanical, or electrical solutions will address the problem. This project focuses on the design and development

excess expense or the need for manual labor.

Title: STICK-SLIP DEVICE

Presenter(s): Jacob Dexter, Parker Giles, Christian Mendez, Jay Shuman

Faculty Sponsor: Richard Livaccari

Track: 5C

Abstract: Tectonic plates move and shift beneath our feet every day, jabbing and

gliding as they crash into one another. A Stick-Slip Device demonstrates how the coefficient of static friction effects the way these plates move. To demonstrate this, one can use a motor running a conveyor belt with an interchangeable block (and belt) on top attached to a spring. The block will follow the movement of the conveyor belt until the tension in the spring becomes higher than the coefficient of static friction holding it to the conveyor belt. At that point the spring will compress and drag the block back up the conveyor belt. The displacement of the block and the tension in the spring can then be recorded. Using this Stick-Slip Device, the designers will demonstrate the functionality of how tectonic plates move,

of a small-scale system to convert solar light to thermal energy without

stick, and then slip under each one of our feet every single day.

Title: TANGRAM EXHIBIT FOR EUREKA! MCCONNELL SCIENCE MUSEUM

Presenter(s): Erik Brygger, Jacqueline Linn, Kyle Wharton

Faculty Sponsor: Jody Kliska

Track: 5C

Abstract: A tangram is a square that is broken down into different shapes that can be re-assembled into a different object. A display was needed for the Eureka

science museum in order to incorporate hand eye coordination with pattern recognition. The tangram exhibit will spark interest about geometry in younger children. Tangram pieces are colorful and capture participation of young children as well as older people. The tangram for the Eureka Math & Science Museum must be robust to withstand the use and abuse inflicted by its young and often careless users. The purpose of the tangram display is to use all of the pieces to construct a shape such as a tree or bird. Results from peer conversations indicated that a wall display is more effective for younger users. A transparent tabletop display was also created that utilizes robust pieces that do not chip or hurt the younger target audience. Each puzzle has the Eureka logo with is the puzzle as well as a number on the

back in order to count the pieces at the end of the day.

Title: THE DEVASTATOR: AUTONOMOUS ROVER

Presenter(s): William Brown, Jacob Doose, Dylan Hallett, Isaac Zepeda

Faculty Sponsor: Scott Bevill

Track: 5D

Abstract: The goal of this project was to design and construct a small scale,

autonomous rover capable of a variety of missions. The rover is capable of navigating to a specific GPS waypoint received from a RF transmitter, avoiding obstacles along the trip, and delivering a 1.5"x1.5"x1.5" block at the GPS waypoint. The rover was designed with robustness in mind and is able to maintain performance after an 18" drop and is weather-resistant. The project in its entirety is documented on a website designed created by the team. A demonstration of the rover and any future modifications to the

rover or code will be presented.

Title: TRUSS TESTING APPARATUS

Presenter(s): Aaron Enright, Kyle Krauland, Cinthya Luna Ramos, Brio Rookey

Faculty Sponsor: Jody Kliska

Track: 5C

Abstract: Structural engineers design and analyze many objects we encounter in

our daily lives, from bridges to buildings. When designing a structure, engineers rely on the results of various empirical tests to predict the performance of their structures. The team was tasked with making an apparatus that will test the strength of different truss configurations under shear conditions. This apparatus was able to test a truss under variable loads before failure. These results showed future engineering students

which truss models are best for the application.

### KINESIOLOGY

Title: A COMPARISON OF VERTICAL JUMP HEIGHT BETWEEN STANDING

TWO-FOOT JUMP, ONE-FOOT APPROACH JUMP, AND TWO-FOOT

APPROACH JUMP

Presenter(s): Kelli Van Tassel Faculty Sponsor: Brent Alumbaugh

Track: 7A

Abstract: The purpose of this research was to evaluate the differences in vertical jump heights of Division II female basketball players between a two-foot

standing jump, one-foot approach jump, and two-foot approach jump. Nine Division II women's basketball players voluntarily participated in the study. After measuring each subject's standing reach height, they then completed a standardized warm-up of jogging and dynamic stretching. Each subject completed five standing two-foot jumps, five one-foot approach jumps, and five two-foot approach jumps in a randomized fashion. Jump height data were collected using the Vertec device. The approach jumps required the participants to start behind a marked line five meters away from the measuring device. Each subject's highest jump height for each type of jump was used for statistical analysis and comparisons were made using a two-tailed paired t-test. Participants jumped significantly higher on the one-foot and two-foot approach jumps compared to the standing two-foot jump (p<.05). There was no significant difference between the vertical jump heights between the one-foot approach jump and the two-foot approach jump (p>.05). The data could suggest that more time needs to be spent on improving the jump heights of other jumping techniques since varying

techniques are used throughout play.

DOUBLE PEAK MUSCLE ACTIVATION PATTERN IN A BASEBALL SWING Title:

Presenter(s): Garrett Ball, Nicholas Cardinale

Faculty Sponsor: Brent Alumbaugh

Track:

The double peak muscle activation pattern has shown a positive Abstract:

relationship with enhanced speed and force in rotational sports. The purpose of this study was to observe muscle activation patterns of a baseball swing using surface electromyography (sEMG). Single subject analysis of muscle activation while hitting a ball off a tee was performed on six NCAA Division II male baseball athletes. Surface EMG electrodes were attached to the left and right rectus abdominis and left and right lumbar erector spinae muscles of each subject. While using a high-speed camera, muscle voltage was recorded and compared to the three different phases of the swing: initial movement towards the ball, early to mid-swing phase, and bat to ball contact. Double peak muscle activation patterns were observed in the swings of all subjects. In the swings that produced a double peak, there was increased muscle activation during initial movement towards the ball, a decrease in muscle activation in the early to mid-swing phase, and another increase in muscle activation during bat to ball contact. Future research should be conducted to determine the relationship between double peak muscle activation, bat velocity, and hitting performance.

Title: EFFECTS OF UPPER SHOE DESIGN ON GOLF SWING BIOMECHANICS AND COMFORT AMONGST EXPERIENCED GOLFERS

Presenter(s): Alexander Pollock Faculty Sponsor: Brent Alumbauah

Track:

Abstract:

There is limited scientific evidence to suggest that golf shoe design improves shot distance, accuracy, stability or comfort. Some evidence suggests a correlation between plantar pressure and club head speed. If golf shoe design, in this case upper shoe design, were to influence these factors, it would have a significant impact on the industry. In this study, we explored this possibility by measuring biomechanical variables. Eight subjects performed swings which were recorded with a motion capture system and force plates. Biomechanical variables measured were ground reaction force, shear force, rate of shear force development, club head velocity, distance between malleolus and calcaneum markers, shot distribution on the golf club head. We hypothesized that upper shoe design could improve distance, accuracy or stability and comfort.

**EVALUATION FOR RETURN-TO-PLAY FOLLOWING ACL** Title:

RECONSTRUCTION

Presenter(s): Madeline Farmer Faculty Sponsor: Michael Reeder

Track:

Abstract:

The return to play process following an anterior cruciate ligament (ACL) reconstruction, has been a continued focus within orthopedic rehabilitation. Deciding when a patient can return to activity is crucial in preventing future injury. The Monfort Family Human Performance Lab has created a protocol for testing patient status post-ACL reconstruction. The test has multiple components, including hopping tests for speed and distance, strength tests, as well as high speed video evaluation and ground reaction force testing. Both the operative and non-operative sides are tested, and then compared by taking a ratio of the results, known as the limb symmetry index (LSI). LSI is one of the main predictors used when determining an athlete's readiness to return to play. It has been found that patients with a LSI of less than .90 and a decreased hamstring to quadriceps strength ratio, are at four times greater risk for re-rupture. This testing will be illustrated with data of CMU athletes

tested, and details of the testing procedures. By utilizing these testing

protocols, in addition to continued evaluation by a physician, risk of re-injury can be greatly reduced.

Title: INJURY REPORTING IN DANCE, SWIMMING, AND GYMNASTICS ATHLETES

Presenter(s): Melissa Stokes Faculty Sponsor: Jeremy Hawkins

Track:

Abstract: The purpose of this research is two-fold, one, to examine differences

> between injury reporting in dance majors, swimming/diving athletes, gymnastics athletes and dance minors, two, to examine differences between injury reporting in those intending to become professional level and not intending to become professional level. While there is little information on this topic in the literature, background research reveals that iniury reporting is not uniform across young elite dance and gymnastics performers (Krasnow, 1999). Additionally, injury data in recent studies have been reported by the coaching staff, athletic training staff or other medical provider (Davis, 1991). Therefore, the aim of this research was to investigate the lack of understanding on self-reporting injury rates. Participating athletes were asked to fill out a twenty-one item survey to determine their reporting rates. Results of this preliminary study showed that 56.25% of athletes did report their injuries regardless of the program type. However, respondents who intended to become professional reported their injury 82% of the time compared to non-professional athletes who stated they would report 62% of the time. While conclusions can be made that these athletes would self-report, there is a gap in reporting rates between future

professional athletes and non-professional athletes.

Title: J ROBINSON INTENSIVE WRESTLING CAMPS ATHLETIC TRAINING

INTERNSHIP EXPERIENCE

Presenter(s): Megan Atkin Faculty Sponsor: Jeremy Hawkins

Track:

Abstract: Wrestling is an intense sport that challenges athletes both physically and

mentally. J Robinson Intensive Wrestling Camps are the most challenging and prestigious wrestling camps in the country, pushing athletes to their limit in all aspects of the sport. As an undergraduate athletic training student entering my senior year in Colorado Mesa University's program, I was given the opportunity to be an intern with their sports medicine team for the summer of 2018 as the camp traveled across the United States. In providing acute medical care during this time, I was exposed to many unique injuries and skin infections, including a jaw dislocation, a compound fracture of the radius/ulna, idiopathic seizure activity and rhabdomyolysis to name a few. The experience I gained in treating these injuries and other medical conditions has provided me with many skills that have proven to be beneficial in the athletic training setting as well as improving my confidence as an independent clinician. Many of these infrequent injuries aided in the development of my interactions with physicians and first responders as well as gave me the experience needed to apply my critical thinking skills in

emergency situations.

NATIONAL DISABLED VETERANS WINTER SPORTS CLINIC Title:

VOLUNTEER EXPERIENCE

Presenter(s): Megan Atkin, Madeline Farmer

Faculty Sponsor: Jill Cordova

Track:

Abstract: The National Disabled Winter Sports Clinic is a week-long adaptive sports

experience for United States veterans that provides them with rehabilitation activities and physical training in a variety of sports. This clinic is designed for veterans with traumatic brain injuries (TBIs), amputations, visual impairments,

and other disabilities, it creates an empowering setting for veterans to overcome the challenges they face in their everyday lives. As students, we are given the opportunity to participate in this week-long experience as a volunteer in the various areas of adaptive sports the veterans will learn during the week. These sports include Nordic skiing, alpine skiing, sled hockey, curling, and rock wall climbing, among many others. This clinic provides the opportunity for students to interact with a variety of healthcare professionals, including physical therapists, occupational therapists, prosthetists, and world class sport instructors. The presentation of this clinic will include video documentary, poster, as well as personal student testimonies of their experience at the clinic. Due to the wide variety of therapeutic disciplines this clinic exposes students to, this presentation will interest many kinesiology students looking to pursue these professions.

Title: PHYSICIAN ASSISTANT PROGRAM NUTRITIONAL EDUCATION INITIATIVE

Presenter(s): Amber Gillard, Benjamin liames, Aaron Rayford

Faculty Sponsor: Michael Reeder

Track: 7B

Abstract:

Poor diet and limited nutritional education are a concern for our health care system and evidence has shown that diet is one of the most significant risk factors for disability and pre-mature death in the United States. However, evidence shows limited nutritional education for medical providers in the medical education system, and this effect impacts both medical providers and their patients. By making nutritional education a priority, medical providers will impact their patient's quality of life and decrease health care costs. Therefore, the Physician Assistant Program at Colorado Mesa University is addressing these challenges by implementing additional nutritional education to benefit both their own health and their future patients. This nutritional initiative provides tools necessary for having healthy nutrition. The initial phase was an eight hour "hands-on" healthy cooking class, taught by Chef Wayne Smith. The goal of the additional nutritional education for the CMU Physician Assistant students is to enhance their overall health and equip them with tools to educate their future patients on the value of healthy nutrition. The future implication of this project is to improve and inspire the provider-patient conversation about healthy eating and the role of diet in disease prevention and treatment.

Title: THE DIFFERENCE OF MUSCLE ACTIVATION IN COLLEGIATE VOLLEYBALL PLAYERS ON SAND VS INDOOR SURFACES

Presenter(s): Olia Barskey, Jeremy Ehlers, Cheyenne-Asia Hutto

Faculty Sponsor: Michael Reeder

Track: 7A

Irack: /A
Abstract: Pro

Previous literature has investigated the differences of surface voltage on different surfaces, including hard, soft, unknown, and known. There is limited research on the differences between a hardwood court versus a sand court in collegiate female volleyball players. In order to further investigate the effects of different surfaces on surface electromyography (EMG), at least four female DII collegiate indoor and outdoor volleyball players will conduct three trials of block jumping on a hard surface and on sand, with surface EMG electrodes placed on the rectus femoris, biceps femoris, and gastrocnemius of the right leg. Mean surface voltage from the beginning of the countermovement to the jump landing will be compared to determine if voltage differences exist between surfaces. The hypothesis of this descriptive study is that surface voltage in the muscles will be greater when jumping on sand versus jumping on hardwood surfaces.

Title: THE EFFECT OF REFLEXIVE NEUROMUSCULAR STABILIZATION ON HAMSTRING FLEXIBILITY AND HIP FLEXION RANGE OF MOTION

Ina Elise Campbell, Matthew Miller

Presenter(s): Ina Elise Campbell, Mat

Faculty Sponsor: Brent Alumbaugh

Track: 7A

Abstract: Lack of hamstring flexibility has been hypothesized to have adverse

effects on activities of daily living. Research has been conducted showing the positive effects of a number of stretching techniques on flexibility, particularly proprioceptive neuromuscular facilitation (PNF). There is limited evidence on whether reflexive neuromuscular stabilization (RNS) can improve hamstring flexibility and hip range of motion (ROM). RNS is a treatment form that has been shown to improve an individual's hamstring flexibility and ROM. In this descriptive study, ten subjects will be given an RNS treatment at the beginning of a two week period. Baseline, post-intervention, and two weeks post treatment measurements of the toe touch, sit and reach, active knee extension, and active and passive straight leg raise will be measured using a goniometer and the iPhone Clinometer application. We hypothesize that RNS will improve hamstring flexibility and hip ROM.

Title: THE EFFECTS OF AN ACUTE BOUT OF EXERCISE ON EXECUTIVE

**FUNCTION** 

Presenter(s): Ryan Carr Faculty Sponsor: Michael Reeder

Track: 7A

Abstract: Executive Function (EF) plays an important role in everyday life - from

recalling a recipe to deciding to turn right. The Stroop Test is a reliable test that analyzes EF. The purpose of this study was to investigate EF at baseline and after a reading and exercise intervention. Methods: Ten college aged students were recruited on the CMU campus. EF was examined initially in a baseline Stroop Test where subjects were familiarized with the test. Subjects were randomly assigned a reading or exercise intervention and completed the trials in a two-week time frame. Each intervention was performed one week apart, on the same day, and at the same time as the baseline testing. Following each condition, the subjects were asked to perform the same Stroop Test that they performed during baseline testing. The exercise intervention consisted of walking on the treadmill for 30 minutes, maintaining a target HR of 50-60% of the participants individual Maximum HR. The reading intervention consisted of reading a college level book for 30 minutes. Results/Discussion: When the data were compared standardized to baseline results, significant improvements in EF were noted in both interventions (p < 0.0001) with no significant difference between

interventions (p > 0.05).

THE PERCEIVED EFFECT OF CAFFEINE ON VERTICAL JUMP

PERFORMANCE AND GROUND REACTION FORCE

Presenter(s): Serena Alvarado, Kekoa Kayser

Faculty Sponsor: Brent Alumbaugh

Track: 7A

Title:

Abstract: The purpose of this study is to determine the perception of caffeine

consumption and the effect on ground reaction force and vertical jump height while performing a countermovement jump (CMJ). Eleven healthy, active college males, ages 18-22 will participate in two conditions. The first condition will require subjects to consume a 12 oz. drink labeled '120 mg caffeine,' which will actually be a sugar-free, caffeine-free drink mix. The second, control condition, will be the same beverage but unlabeled. Subjects will be asked to avoid both caffeine and exercise the morning of and night prior to participation. Subjects will be instructed on proper form prior to participating in both conditions. Each condition, consisting of four

vertical jump tests on two AMTI force platforms, will be separated by one week. Together, they will determine if a placebo effect exists. Subjects will perform two CMJ's using the Vertec vertical jump tester and two CMJ's with hands on hips in a randomized fashion for each condition. We hypothesize that the perceived effect of caffeine consumption will increase force output during a CMJ when compared to performing the CMJ without a placebo.

# Languages. Literature and Mass Communications

Title: "FREAKS" Presenter(s): Olivia Hebrank Faculty Sponsor: Tiffany Kinney

Track:

Building from scholarship completed by Glenn (1997), Enoch (2008), Abstract: and Bizzell and Herzberg (2000), this project participates in revising the rhetorical tradition by focusing on the exclusion of sideshow performers. As most of the sideshow performers were people with disabilities, this project explicitly makes an argument for why people with disabilities should be added to the rhetorical canon. Furthermore, this research draws upon archival and historical documents that portray events and treatments of sideshow performers in order to illustrate parallels between older and contemporary views on people living with disabilities. In making these

parallels, this project compares issues experienced by those derogatorily deemed "freaks" in the past to those who are considered "different" or "special" in modern society. This research demonstrates that the voices of freak show performers are still echoed in contemporary society and with this finding offers a compelling argument as to why it is so crucial their voices are given a platform today. By illustrating the progression of differently-abled rights throughout rhetorical history, this project argues for a platform that these individuals sorely deserve.

"TÍAS" BREAKING THE PARADIGM OF THE TRADITIONAL HOME Title:

Carla Hernandez Chacon Presenter(s): Faculty Sponsor: Mayela Vallejos Ramirez

Track:

Abstract:

Mujeres de ojos grandes (1900) written by Angeles Mastretta is an interesting collection of stories that are united by the means of an extradiegetic narrator. The narrator unites the stories through the different ""aunts"" who tell their extraordinary lives. This presentation will focus on two stories that show the vicissitudes that these women go through while living in a patriarchal society that marks their daily routines and imposes their image of a "home angel,"" which they rebel against.

Note: This presentation will be given in Spanish

AQUÍ NO NO, SPANISH WITH AN "-O" Title:

Presenter(s): Maria Perez-Chavez Faculty Sponsor: Luis Silva-Villar

Track: A8

Abstract: This presentation reviews the meaning of Mock Spanish, which is a

term coined by anthropologist and linguist Jane Hill to describe the incorporation of grossly non-standard and ungrammatical utterances into an English discourse. For example the use of the "-o" inflection at the end of a word to resemble Spanish, like no problemo, and/or phrases like, hasta la vista, baby. The presentation will focus on the places where Mock Spanish is used, in what context it is used and how. This presentation is

being used to bring awareness to those who use Mock Spanish and how it can be interpreted by others and like the title states, to use it here is a no, no, as well as to show that this dilemma is universal. This presentation shows that not only English but Spanish, and other language speakers are susceptible to mocking languages as well, like "Jose can you see," from the national anthem.

Note: This presentation will be given in Spanish.

Title: BREAKING THE HYMENIAL CHAIN: EXAMINING ELIZA WHARTON IN THE COQUETTE AS AN INDIVIDUALIST THROUGH THE LENS OF

JEFFERSONIAN IDEOLOGIES IN THE NEW REPUBLIC

Presenter(s): Anna Kenney Faculty Sponsor: Randy Phillis

Track: 8B

Abstract: Since its publication in 1797, The Coquette has largely been analyzed as a cautionary tale or a proto-feminist novel in disguise. While these readings make sense, there is another lens that can be applied to the novel that

make sense, there is another lens that can be applied to the novel that fits with the historical context. Thomas Jefferson was at the height of his popularity in the 1790s and his writings would have been well known to any educated persons. Jefferson placed an emphasis on individualism and pushed back against institutions, notably the church and the monarchal government. Jefferson stood against Adams and his more traditional Whig ideology. As an educated woman of the times, Foster would have been well aware of these ideologies Jefferson promoted. In this paper, I examine Jefferson's personal letters and apply them to Eliza's character to show how she represents the new ideology coming to the new-born country. Through

Title: EXPLORING HOMOSOCIAL BONDS IN TARANTINO'S "PULP FICTION"

this examination, Eliza's independence and individuality emerge.

Presenter(s): Madyson Martinez

Faculty Sponsor: Barry Laga

Track: 8D

Abstract: Quentin Tarantino wrote and directed *Pulp Fiction* in 1994. Relationships

between males are prominently highlighted in the midst of Tarantino's multi-strand plot. For instance, mob-boss Marsellus Wallace requests that one of his hit-men, Vincent, take his wife, Mia, out for a good time although he is extremely territorial over her, sometimes even in a deadly manner. With this in mind, audiences must ask themselves critical questions in order to explore the gender power-dynamics that Tarantino's characters exhibit. For example, how is Mia's character used as a vehicle to establish a trusting bond between Marcellus and Vincent? Eve Sedgwick's theory of male homosocial bonds discussed in her book Between Men: English Literature and Male Homosocial Desire (1985) provides a means of critically analyzing the ways in which Tarantino defines masculinity within the culture of the film and how Mia Wallace is used by the male characters to maintain dominance. According to Sedgwick, male homosocial bonds are a structure for maintaining patriarchal power. This essay will use Sedgwick's theory as a scope to explore how Pulp Fiction reinforces male societal roles by using women as vehicles for a power-play for trust, control, and superiority.

Title: FRIENDS, ROMANS, COUNTRYMEN

Presenter(s): Eliajia Holliday Faculty Sponsor: T.J. Gerlach Track: 8C

Abstract: Original designed musical comedy following a Mel Brooks feature for the

theater. The production is in Latin, but we will be sending out to the visitors

an English guide for understanding.

Title: HOW SPANISH CHANGES ACROSS GEOGRAPHIC REGIONS

Presenter(s): Carla Hernandez Chacon

Faculty Sponsor: Luis Silva-Villar

Track: 8A

Abstract: In all languages there is a variation among speakers' pronunciation. From

the way people speak we often can identify where they come from. A dialect is a form of a language which is peculiar to a specific region. This applies in cases like Spanish which has more than 500 million speakers and is spoken in five continents. The extensive geographical space and obstacles Spanish occupies, such as mountains and oceans, allow the creation of multiple dialects. Some examples are the Spanish from Spain, Mexico, and River Plate, among others. The purpose of this investigation is to find out how many varieties of Spanish there are and how to distinguish them. The main tool that will be used in this presentation to distinguish the varieties of Spanish are phonological and phonetic variations of the sound of Spanish. This presentation will mention the contrasts that allow us to identify them as different and the difficulties to isolate these variations since all dialects are mutually intelligible. My work has identified about ten different dialects mainly in Spain and Latin America. The information in this presentation can be used for interpretation, international business, forensic linguistics, and many other fields.

linguistics, and many other fields

Title: OCEANS APART
Presenter(s): Jorgan Bean
Faculty Sponsor: Barry Laga

Track: 8C

Abstract: I would like to share my short story "Oceans Apart" which focuses on the

negative consequences of losing the support of a loved one during an important transition in someone's life. The short story opens with Alex, the protagonist, bidding farewell to her childhood friend Xavier who is being deployed overseas to fight in World War II. The two of them float on the Pacific Ocean in Xavier's family sailboat, avoiding the topic of him leaving as much as possible. Eventually, the time comes for the elephant on the boat to be addressed, leading to repressed emotions emerging. As this moment reaches its peak, romantic tensions emerge between them, but the two can never act on these actions or admit their feelings because of Xavier's current girlfriend Sarah. As the day slowly passes, the two return to dock, and Xavier drives Alex home. With one final goodbye, the two childhood sweethearts go their separate ways, never to see one another again. My story reworks the traditional romance narrative demonstrating the hardships of a minority group as well as criticizing

gender roles and society.

Title: PICK YOUR SUITOR: HOW EARLY AMERICAN CONDUCT LITERATURE

TRAINED WOMEN FOR THE INEVITABLE

Presenter(s): Sarah Cerrone Faculty Sponsor: Randy Phillis

Track: 8E

Abstract: This paper will explore the significance of *The Coquette* through examining

its historical context, including primary sources of Abigail Adams. By expanding on the literary criticism of Cathy N. Davidson and Linda K. Kerber's analysis of Republican Motherhood, this paper will conclude that *The Coquette* functions as an authoritative fourth branch educational tool, working to conform its female ranks in the face of patriarchal injustice. By critically examining a fictional suitor, readers could therefore project the legitimacy of their own future marital options. Furthermore, Foster's *The Coquette* works to drill the ranks of the female fourth branch on their invaluable resource of sisterhood. *The Coquette* does not educate women on how to conduct themselves to be suitable brides. Rather, the book treats

marriage as an inevitability. Foster's concern is how a woman can maintain her identity, and her dignity, when thrust into the institution of marriage. Foster is insistent to remind her readership that they could not blindly rely on their male guardians, but rather turn inward to protect their own networks of sisterhood. While Abigail Adams' appealed to her husband to "Remember The Ladies", Foster's *The Coquette* suggests women remember themselves.

Title: RACIAL EPITHETS: A UNIVERSAL PHENOMENON

Presenter(s): Sarena Wells Faculty Sponsor: Luis Silva-Villar

Track: 84

Abstract: Many people have been in situations where they are debased for their

appearance, background and other differences that are conceived by the people around them. Anything from the n-word, gringo, chink, to beaner can be used to point out differences. These kinds of words are called racial epithets. According the Merriam Webster, an epithet is a "word or phrase accompanying or occurring in place of the name of a person or thing." Though they are not always used in a negative way there are still many examples of racial epithets that are demeaning and undermine a group of individuals in a society. One modern example of this concept happened recently with the actress Yalitza Aparicio. Another Mexican actor was angry when she was nominated for the Oscars this year, calling her a "pinche india" which can have various interpretations in English, one of them being "damn Indian." The focus on her heritage and roots and not the actress herself relates directly to racial epithets. The main goal of this investigation is to determine why they are prevalent in society and where they come from. An emphasis will be placed on Spanish and English epithets.

Title: RALLYING AGAINST RACISM: ANN PETRY'S FIGHT FOR EQUALITY IN

"LIKE A WINDING SHEET"

Presenter(s): Janine Hald Faculty Sponsor: Barry Laga Track: 8D

ack. OD

Abstract: Published in 1945 after the end of World War II, "Like a Winding Sheet" is

one of Ann Petry's short stories commenting on race and racism in America. The text revolves around Johnson, a hard-working African American married man, who is confronted by racist ideology and discrimination as he goes through a typical day. At first glance, Petry's commentary on race is difficult to understand. Is she showing the damage of racism? Or is she trying to prove that African Americans need to rise above discrimination through self-control? These questions can be answered by exploring the historical context, particularly the Double V Campaign and the end of

World War II.

Title: SHOWING AND TELLING: STRATEGIES OF SELF-EXPRESSION

Presenter(s): Nicholas Jones Faculty Sponsor: Luis Silva-Villar

Track: 8C.

Tack. oc

Abstract: For his presentation, the author will read two autobiographical creative

nonfiction essays, exploring his subjects which, he discovered in the process of writing, are integral to his life: his environment and passions. Writing about them revealed for the author, cathartically, truths about himself. One is an observing essay that conveys his living space almost entirely by techniques of showing, producing in the audience a gradual, building appreciation of the author's home. The other shorter essay uses an opposing strategy of telling the audience directly how the author relates to water and fishing. Both works rely on imagery and metaphor but demonstrate different means of

expression and their effects on an audience.

Title: TABOO: THE MISCONCEPTION AND ROOTS BEHIND THE MEANING

OF IT IN LINGUISTICS

Presenter(s): Derek Mayo-Alvarez Faculty Sponsor: Rhonda Claridge

Track: 8A

Abstract: In our society we often find ourselves using the word taboo to classify

topics that are normally uncomfortable or embarrassing to talk about. What we don't know is that some of these topics are mistakenly labeled due to the lack of understanding of the word itself. The word taboo became part of the lexicon of our western culture thanks to the tribes from Polynesia. To them the word taboo was used to identify religious, sacred, or forbidden beliefs. Taboo is often misinterpreted as something that is just uncomfortable or difficult to talk about in our society. However, the impact and meaning of the word taboo in our language is profound due to the way it has shaped our social construct. Language dictates the way we understand our culture by creating powerful social boundaries among us. The idea of taboo has also helped shape our values and our understanding of morality. The misconception of the word has led people to believe that there is only a negative side to it, but there is a positive side that needs to

be examined as well.

Title: THE ANGEL THAT WEEPS

Presenter(s): Sarena Wells

Faculty Sponsor: Mayela Valleios Ramirez

Track: 8E

Abstract: "La Cámara Oscura" by Angelica Gorodischer is a short story that describes

the lives of three women that live in a patriarchal society and how each of them overcomes the norms that they are forced to observe. The idea that women are either angelic or demonic figures in the community is also a major aspect in this narrative. The main idea behind this presentation is to determine what the differences between an angel and a demon is in patriarchal societies and how Ruth, Gertrudis and Jaia present different

steps along the path to liberal feminism.

Title: THE BRONTË SISTERS: REIMAGINING THE VICTORIAN NOVEL

Presenter(s): Jorgan Bean Faculty Sponsor: Kristen Haque

Track: 8B

Abstract: During her 2009 TED Talk, author Chiamando Adichie presented on what

she refers to as the "danger of a single story," theorizing that individuals living in a society are plagued by a single understanding of a given topic or situation. Three such authors who reject these single stories are the Brontë sisters Charlotte, Anne, and Emily, who each challenge certain single expectations of society. For Emily Brontë, Wuthering Heights serves as a resistance to the single story that the home is place of refuge and safety. After watching the affects of alcohol on her brother Branwell, Anne Brontë focused her attention on exposing the actuality of social drinking by the wealthy class in The Tenant of Wildfell Hall. Finally, Charlotte Brontë found herself criticizing the characteristics of how novels should function and end in her novel Villette. By applying Adichie's theory to the Brontës, their narratives become tools in which they are able to counter the illusion placed on their society. In rejecting the false perceptions of these single stories, the Brontës help to redefine the function of a Victorian novel.

Title: THE CULTURAL IMPACT OF EUPHEMISMS

Presenter(s): Teal Leavitt Faculty Sponsor: Luis Silva-Villar

Track:

Abstract: Euphemisms are defined as indirect words and phrases that can be

> substituted for other words and phrases that are considered "too harsh." Euphemisms are a linguistic and cultural universal. Their creation and usage depends on a sense of what is modest in certain social settings. Euphemisms exist to make discussing subjects like religious matters, physical characteristics, and bodily functions less offensive to one's ears. However, while euphemisms are universal, it is important to examine how the usage of euphemisms changes the cultural outlook on sensitive subjects, as well as the specific settings in which their usage is necessary. The presenter will examine common Spanish euphemisms in various Spanish-speaking countries in order to make conclusions about what modesty is, how the definition of modesty changes based on the social context, and how euphemisms preserve this cultural sense of modesty.

Note: This presentation will be given in Spanish.

Title: THE IMPORTANCE OF CULTURAL COMPETENCE IN HEALTH CARE AND

THE NEED FOR HIGHER STANDARDS

Presenter(s): Macharnie Skalecki Faculty Sponsor: Thomas Acker

Track:

Abstract: The discussion of immigration has intensified in recent years due to the

continual migration from Latin American countries into the United States. in spite of the fact that immigration rates themselves have decreased in the past two decades. Along with an increased number of immigrants in the United States, comes an increased requirement for understanding the language and culture of the recent arrivals as a result of Title VI of the Civil Rights Act. In addition to language competence for interpreters and translators is the need for cultural competence in settings where diverse and minority populations are being provided services such as health care. There is an urgent demand for access to language services, availability of healthcare education, as well as professional awareness pertaining to the social and cultural issues impacting a patient's health. The presenter will be discussing the concept of cultural competence in health care while also suggesting materials and methodologies which would best accommodate

the needs of the Hispanic population in the United States.

Title: THE MINING EXPLOITATION: SACRIFICE AND POVERTY

Presenter(s): Andy Guerrero

Faculty Sponsor: Mayela Vallejos Ramirez

Track:

Abstract: El Chiflon del Diablo a story from Baldomero Lilo, a Chilean writer,

> describes the cruel experiences of the miners in Chile during the beginning of the 20th century. We will analyze certain factors that contribute to the exploitation of the human beings that were treated worse that animals, as well as the poverty the individuals suffered with this job, their families, and

the sacrifices they needed to do to survive.

Note: This presentation will be in Spanish.

Title: THE OPTIMIZATION OF SPEEDRUNNING IN SUPER MARIO BROS'

MOST STORIED LEVEL

Presenter(s): Elias Born Faculty Sponsor: Elaine Venter

Track: 8D

Abstract: The rise of video games has led to a storytelling juggernaut, one that is

not only extremely popular, but filled with rich narratives, both within the video game and within the community of players. This presentation will examine the medium of video games and their storytelling from another perspective - how does a player deal with cutting out as much of the video game as possible in order to beat it? The aim of this presentation is to look at the level 4-2 from the original Super Mario Bros video game and how both the technical and psychological aspects that speedrunners are dealt with in order to optimize times as much as possible. Specifically, how far can a speedrunner go? Every trick that has been discovered has been used throughout this level in order to shave off precious milliseconds, using frame rules, pixel and sub-pixel perfect inputs, and tool-assisted technology. Super Mario Bros and 4-2 was chosen for its complete dissection from a technical and psychological perspective, as the human limit for speedrunning has almost been met, and the computer limit has

been discovered as well.

Title: THE PRESENCE AND FUNCTION OF CODESWITCHING IN BILINGUAL

**COMMUNITIES** 

Presenter(s): Peyton Deal Faculty Sponsor: Luis Silva-Villar

Track: 8A Abstract: Coo

Codeswitching is a phenomenon that exists within bilingual communities in which speakers switch languages mid-sentence or between sentences while observing grammatical rules of both languages. The type of codeswitching that will be focused on in this presentation is specifically that which exists between bilingual speakers of English and Spanish. Codeswitching is not simply a mix of two languages, or a broken way of speaking either language, but rather functions as its own grammatically structured language that can only exist in bilingual communities where there is common understanding of all languages involved. This presentation will investigate what is and isn't code switching and explore the different ways that two languages and two sets of grammatical rules can come together to form one distinct method of communication.

Title: THE PRESENCE OF BILINGUAL EDUCATION PROGRAMS IN THE UNITED STATES AND SPAIN AND HOW VARYING SOCIAL ATTITUDES

IMPACT THEIR EFFECTIVE IMPLEMENTATION

Presenter(s): Peyton Deal Faculty Sponsor: Tyler Anderson

Track: 8F

Abstract: The implementation of bilingual education programs varies greatly by

country depending on the languages spoken and the communities that exist within that country. Bilingual education is not widely implemented in the United States and many students, despite speaking a different language in their home, are required to learn solely English. On the other hand, Spain has many widespread bilingual education programs for students to acquire both English and Spanish, but it is taking time to learn how to make these programs effective. While the implementation of these programs requires proper academic support, it is also necessary to have societal support. This presentation discusses the existence of bilingual education in the US

and Spain and how existing social attitudes, both positive and negative, can either help or hinder the effective implementation of dual-language programs in these two countries

programs in these two countries.

THE WAY MY HEART LIGHTS

Presenter(s): Hanna Starling Faculty Sponsor: Claridge, Rhonda

Track: 8C

Title:

Abstract: This collection of lyrical poetry documents a period of depression and loss

of identity and represents the creative facets of mental illness. Distinctly feminine and feminist, the poems explore a young woman's search for self, morality, and orientation in psychological darkness. In my poetry, I openly and metaphorically personify feelings like despair, loneliness, abandonment, and detachment. Playing the sounds of words like an instrument—with repetition, rhyme, and rhythm—and exploiting their

meanings, the poetry is both honest and intriguing.

#### Music

Title: "COMME UNE PRIERE" A DUET FOR CELLO AND GUITAR

Presenter(s): Aaron Frick, Jamie Van Dyke

Faculty Sponsor: Kristen Yeon-Ji Yun

Track: 9A

Abstract: Despite being lesser-known in the U.S. than one might expect, Jean-

Maurice Mourat is an internationally recognized guitarist and lutenist who has received the prestigious Andres Segovia Gold Medal in honor of his successes as performer, composer and guitar pedagogue. In his piece "Comme Une Priere", which translates from French to "As a Prayer," he pairs the guitar and cello for a duet that begins with a lamenting but sweet sound. As the piece continues, the prayer deepens and intense moments of sadness, grief and perhaps even shock are expressed and underscored by dissonant chords on the guitar. The piece undulates between these jarring moments and returns to the sweet sad melody before it ends with a Picardy cadence. This major chord at the end conveys the sense that all is well, and perhaps the prayer has been answered. We think this piece demonstrates simple but beautiful writing. It allowed us to explore new harmonies (and dissonances) that evoke a range of emotions and provide the listener with what makes all

great art great - viz., contrasts between tension and resolution.

Title: "ROUND ONE" – PRODUCING A MUSIC VIDEO PERFORMED BY THE

CMU ROWDY BRASS BAND

Presenter(s): Caleb Talkington Faculty Sponsor: Jonathan Hinkle

Track: 9E

Abstract: The music industry continues to expand quickly, and the competition for

employment in this field is fierce. Making a living as a performer can be even more difficult. For over a decade, playing trumpet and being a participant in a wide variety of music ensembles has given me great insight about the music industry as a whole, and many opportunities to meet and work with very talented people. One of these was a professor who introduced me to many facets of the recording industry. From this came a motivation to self-explore this field even more and experiment with manipulating recorded audio, including learning how to use various industry standard recording hardware and software. Putting ideas into practice, I decided to follow-through with the larger task of recording the CMU Rowdy Brass Band, playing a selection they have recently been rehearsing and presenting at

various performances, titled *Round One*. Ultimately the goal of this project was to produce an audio and video recording in a complete music video package. Among many variables, including the use of a large amount of recording hardware, complicated audio software, and many hours of mixing and mastering digital audio and video tracks, the final product encompass my efforts with putting all of these pieces together to produce the most professional-level music video possible in regards to available resources.

Title: IS MUSIC EDUCATION JUST MUSIC?

Presenter(s): Madilyn Slocomb Faculty Sponsor: Timothy Emmons

Track: 9E

Abstract: Th

The impact of music in our lives is immeasurable. According to the book, Language and Music as Cognitive Systems, music is typically an "integral component of larger contexts for social interaction that shapes and constrain participants' interpretations of music's possible meanings." As such, music education naturally lends itself to a multi-sensory experience. Daniel Levitin (2008) posited in his book "the six ways that we experience music that carry a great deal of explanatory power, through friendship, joy, comfort, knowledge, religion, and love songs." This paper examines the connection between music education and interpersonal communication skills that are integral in our society. Music education is an important part of our education in the intake of auditory, visual, and physical applications in the creation of intentional sound.

Title: MAKING ART: A MUSICAL CANVAS

Presenter(s): Brieanna Mangette Faculty Sponsor: Darin Kamstra

Track: 9A

Irack: 9A Abstract: Mu

Music and visual art are usually thought of as two distinct forms of expression, partly because of how they require different skills to create. In the piece "Making Art", I have combined these two art forms by bringing together the skill sets of two artists: my sister's and my own. My sister is a traditional artist who has been drawing and painting since she was young. One day, when we were hanging out in her room, I started playing with an unused canvas and commented on how it would sound nice as an instrument. Later that year, she gave me the painted canvas as a birthday present. I utilized that artwork to create and play a song dedicated to our relationship and the skill required for visual art. This performance piece is an energetic, rhythmic song played entirely with the canvas, two paintbrushes, and an easel.

Title: SCORING IN LIFE

Presenter(s): Alec Brown Faculty Sponsor: Arthur Houle

Track: 91

Abstract:

Going to the movies, watching television, and playing video games have become a staple across many of the world's cultures. Each of these include music, and have included it since their conception, whether it's the black and white silent films of the 1910's with a pianist playing live, or a John Williams film with a professionally recorded and spotted orchestra. Using live samples, extensive research, polls, a mini recital being performed on solo piano, and more, this project hopes to show the importance of visual media scores in today's society, and why they should be accepted into the classical canon. The presenter will explore the history and process of creating a film score by documenting his work on an upcoming horror short film. Composers explored will include the earliest film composers - Gustav Holst and Sergei Prokofiev - as well as the modern composers John Williams, Hans Zimmer, and others.

Title: SEMPRE LIBERA - OPERA ARIA PERFORMANCE AND EXPLANATION

Presenter(s): Cierra LeVan Faculty Sponsor: Graham Anduri

Track: 9/

Abstract: Music is more than just the sounds we hear. Good composers use specific

techniques and styles to convey a message through their music. Italian Romantic composer Giuseppe Verdi excelled in the subtle language of storytelling through musical setting. "Sempre libera" is an aria from his opera, La Traviata. During the aria, the story's heroine, Violetta wrestles with powerful emotions like guilt, confusion, joy, excitement, and fear as she weighs the merits of leaving her carefree life behind in pursuit of love. Verdi used the process of text painting within the melodic lines and harmonic colors to clearly illustrate what Violetta is singing about. Verdi also used specific fioritura passages to convey Violetta's surging emotions. The piece's double aria structure is indicative of the duality of the emotional conflict within. Specific choices of major and minor keys enhance the listener's connection to the emotions of the protagonist, and the piece's harmonic movement displays underlying notes of foreboding for the tragedy yet to come. This presentation will be a performance of this aria, as well as a systematic breakdown of how Verdi shares Violetta's story to her audience.

Title: VOICE TO GUITAR: ERIC WHITACRE'S A BOY AND A GIRL

Presenter(s): Aaron Frick, Calvin Lindberg

Faculty Sponsor: Eric Nohe

Track: 9B

Abstract: Eric Whitacre is a Grammy-winning modern composer who is probably best

known for his choral compositions. His works have been performed across the globe by professional and amateur musicians alike. They have been the subject of scholarly study and doctoral dissertations. When I heard Eric Whitacre's A Boy and A Girl for the first time, I was awed by the complexity and richness of his harmonies. Transcribing his works for guitar posed some challenges: First, the human voice can easily crescendo while the guitar naturally produces a loud attack that decays within a few moments. We used electric guitars with volume pedals to solve this problem. Second, this piece was originally written for choral divisi. Since we only had three guitars and one bass guitar we combined the divided parts into double-stops. Aaron Frick arranged the music and instrumentation, then adapted it with feedback from Mr. Eric Nohe, Guitar Ensemble students, and Dr. Adam Kluck. Cal Lindberg recorded the video in the CMU Solarium using a mixture of individual and ambient microphones. He used multiple cameras to capture the performance and expertly produced a beautiful video.

## PHYSICAL AND ENVIRONMENTAL SCIENCES

Title: A COMPARATIVE ANALYSIS OF GREENHOUSE GAS EMISSIONS FROM

COLORADO MESA UNIVERSITY FROM 2012 TO 2018

Presenter(s): Sydney Lyons, Delaney Robison, Max Roumph, Sarah Staats

Faculty Sponsor: Deborah Kennard

Track: 10D

Abstract: Changes in global climate patterns are primarily driven by the

anthropogenic emissions of greenhouse gasses. The primary greenhouse gasses are carbon dioxide, methane, nitrous oxide, and ozone. At Colorado Mesa University, the main source of GHG emissions are: electricity, heating and air conditioning, campus, facility vehicles, and industrial activity. The goal of our capstone project was to analyze the greenhouse gas emissions

at Colorado Mesa University, using the General Reporting Protocol

to compare our findings to emissions quantified in a 2012 study. We inventoried utility invoices from Colorado Mesa University to determine their use of natural gas, electricity, gasoline and any other sources of GHG emissions under the Kyoto Protocol. Using that data, we calculated the total for each GHG then converted it to a carbon dioxide equivalent. Through this greenhouse accounting analysis, Colorado Mesa University will have a better understanding of their impact towards climate change and how they can reduce it.

Title: A COMPREHENSIVE PLAN FOR THE POST-FIRE RESTORATION OF

SKIPPER ISLAND

Ethan Archer, Tanner Rust, Nathaniel Scully Presenter(s):

Faculty Sponsor: Deborah Kennard Track:

10D

Abstract: Skipper Island, a riparian area along the Colorado River West of Fruita.

Colorado, experienced a 220-acre fire in 2018 that burned through a mature cottonwood stand. As a result of the fire, this critical habitat area is now at risk of habitat loss, decreased soil stability, decreased water quality and noxious weed invasion. Due to historically infrequent fire occurrence in riparian areas, the scientific community has a lack of knowledge concerning their post-fire restoration. Land managers will benefit greatly from having a more in-depth understanding of the specific challenges they will face in restoring these critical ecosystems. The goal of our capstone project was to develop a comprehensive plan for the post-fire restoration of Skipper Island. To develop this plan, we assessed soil characteristics, ground water quality, and vegetation structure and composition in burned and unburned areas. We researched the best methods for promoting native species and controlling noxious weeds to improve habitat. This plan will aid Colorado Parks and Wildlife and the Bureau of Reclamation in restoring a stable, functioning ecosystem at Skipper Island via the promotion of native vegetation, eradication of noxious species, and development of habitat for upland game species.

A PLAN OF ACTION FOR ECOLOGICAL RESTORATION AND Title: COMMUNITY ENGAGEMENT AT THE CLIFTON NATURE PARK IN

CLIFTON, CO

Presenter(s): Emmett Johnson, Joy Von Guerard, Joshua Worth

management of the Clifton Nature Park.

Faculty Sponsor: Deborah Kennard

Track:

Abstract: Clifton Nature Park is a Mesa County Open Space which brings visitors into

a diverse, but degraded, riparian and wetland area along the Colorado River. In the past the site was disturbed by gravel mining operations; since the cessation of mining there have been unfunded efforts to restore the site. However, at present there are invasive species and human degradation, like litter and graffiti, in the park. Mesa County hopes to continue improving the space without using tax dollars. The goal of our capstone project was to create a no-cost habitat restoration plan for Clifton Nature Park that involves community engagement to increase positive perceptions and local stewardship of the park.? To achieve this goal, we investigated soil and water health to make recommendations on species best suited for revegetation efforts. Local vegetation was evaluated for possible no-cost sources for transplanting. To promote community awareness, recommendations for signage and educational materials were developed. Lastly, we connected with local leaders, establishing a framework for a community supported volunteer program. Bringing together all aspects of this project will assist Mesa County in sustained

Title: A REVISION OF CURRENT BEST PRACTICES FOR GRAFFITI REMOVAL

Presenter(s): Sara Clark, Savanna Peake

Faculty Sponsor: Andrew Wolff

Track: 10C

Abstract: In the nation's national parks and forests, vandalism and defacing of rock

surfaces is an ongoing concern. Graffiti markings are not easily removed from the rock faces. Current best practice is to simply cover the graffiti with rock colored paint. Unfortunately, this solution does not fix the underlying issue, as the paint remains on the rock surface. Preliminary experiments have resulted in an environmentally friendly polysaccharide solution that can resolve the vandalism issue without the damage of the rock surface that might be caused by chemicals or pressure washers. No significant damage to the face of the rock has been observed in multiple tests. The solution is effective in lifting common spray paint from porous rocks such as sandstone. A single application of the solution results in approximately 90%-95% paint removal with little or no additional intervention. The solution appears to be a superior alternative to current methods of removal or lack thereof. Application of this technology beyond the national parks, such as city or rail car graffiti removal is expected to be important

additional uses.

Title: AIR QUALITY ANALYSIS: PUTTING THE SERIES 900 OZONE DETECTOR TO THE TEST

James Dawe, Joshua Vincent

Faculty Sponsor: James Ayers

Track: 10C

Presenter(s):

Abstract: Data was collected for approximately 13 days using a low cost \$900

sensor and an EPA certified instrument for ozone analysis. The EPA certified analyzer also collected NO, NO2, and NOx data for identifying any deviations from the expected results in ozone instrumentation. Data collection took place on the roof of Wubben Hall at Colorado Mesa University, beginning February 1, 2019. The S900 sensor collected an ozone value every minute. The certified instrument collected ozone data points every ten minutes. The two data sets were analyzed to test the accuracy and reliability of the S900 detector. Preliminary data analysis has led to a high correlation between the S900 and 49C, indicating that the low-cost

sensor may be useful for measuring ozone in air.

Title: ANALYSIS OF UNAWEEP CANYON, COLORADO FOR POSSIBLE

TRAVERTINE DEPOSITS

Presenter(s): Reno Davidson Faculty Sponsor: Richard Livaccari

Track: 10A

Abstract: Travertine is a thermal continental calcium carbonate deposit that is

precipitated out of hydrothermal fluids along active faulting systems. Travertine depositional systems can form where fluids well up at the surface, as well as within fault fractures. Travertine consists of calcite that forms a banded structure due to water resurgence. The calcite precipitation is induced by rapid degassing of CO2 bearing hydrothermal fluid. The study area for this project is Unaweep Canyon in western Colorado. The purpose of the study is to determine if there are preserved travertine deposits in Unaweep Canyon. Crystal Geyser is a well-documented travertine deposit in eastern Utah, and observations of travertine in this area will be used to evaluate the potential presence of travertine in Unaweep Canyon. The recognition of travertine in Unaweep Canyon may be important for improving our understanding of faulting and hydrothermal activity in the area.

Title: ANALYTICAL AND COMPUTATIONAL MODELS OF

**EXOPLANETARY ATMOSPHERES** 

Presenter(s): Joshua Lindsey Faculty Sponsor: Jared Workman

Track: 10E

Abstract: As observational data of exoplanets becomes more readily available, there is an

increasing interest to understand the nature of these objects. By observing the atmospheric flow patterns of exoplanets, scientists can attempt to deduce what physical properties are driving these complex structures. This research set out to analyze the global steady states of an exoplanetary atmosphere in the presence of hydrodynamic friction, magnetic diffusivity, magnetic fields, and solar irradiation. The governing equations are a set of non-linear partial differential equations that are derived from fluid dynamics and magnetohydrodynamics. These equations were analyzed analytically in one and two dimensions using a first order perturbation technique thus allowing for models of varying complexity to be analyzed for stability. In an attempt to numerically model these atmospheres, a fluid solver is currently being produced to solve the governing equations using an explicit finite-difference technique of second order accuracy. From these analytical models, a key research finding is that the wave equation predicts instabilities when solar irradiation becomes sufficiently large. If appropriate initial and boundary conditions can be determined, then these numerical atmospheric models should provide further insight into the physical

structure of exoplanetary atmosphere.

FOR RAMAN SPECTROSCOPY

Presenter(s): Abraham Selenke Faculty Sponsor: Brian Hosterman

Track: 10B

Title:

Abstract: A temperature-controlled heat stage was built for an existing micro-Raman

spectrometer from a Peltier device and Arduino. Temperature-dependent Raman spectra from materials can illustrate phase transitions. 100 Raman spectra of sulfur were acquired and analyzed from 22-120?, during which the sulfur melted. Because the melting temperature of sulfur is known to be 115?, this data was used to calibrate the temperature sensor. This temperature-controlled heating stage will be extensively used in future experiments for acquiring temperature-dependent Raman spectra from materials that demonstrate interesting behavior, such as phase transitions, in

APPLICATIONS OF A TEMPERATURE-CONTROLLED HEATING STAGE

the range of 22-120?.

Title: ASSESSING THE SUSTAINABILITY OF GREEN ROOFS IN SEMI-ARID

**ENVIRONMENTS**Jeffrey Purdy

Presenter(s): Jeffrey Purdy Faculty Sponsor: Freddy Witarsa

Track: 10D

Abstract: Green roofs that support vegetation can reduce heating and cooling needs of

buildings, but current research lacks long-term physical data from green roofs installed in semi-arid regions. The objective of this research is to study green roof's capacity to reduce energy needs of buildings in semi-arid regions. A meta-analysis of green roof technology will be conducted to determine current knowledge of green roofs, techniques for conducting a real-world experiment and evaluating energy fluxes and demand. From this research, an experiment will be designed comparing traditional asphalt shingle roofs, green roofs with soil media, and green roofs with soil media and vegetation. Temperature will be monitored to determine heat fluxes, and the possibility of adding air conditioning/heating units to evaluate electrical demand will be incorporated into the design. The goal is to provide quantifiable data that can determine if green roofs constructed in semi-arid climates are sustainable

in terms of energy and cost reduction. Favorable conclusions from this study could promote the use of green roofs in the region, creating a local market

for these structures and employment opportunities.

Title: CHARACTERIZING THE OHIO CREEK FORMATION USING GEOCHEMICAL AND GAMMA RAY SPECTROMETRY, MESA,

COLORADO, USA

Presenter(s): Laura Green Faculty Sponsor: Andres Aslan

10A

Track: Abstract:

The Ohio Creek Formation is an enigmatic conglomeratic unit of western

Colorado in which the origin and age are poorly known. Despite previous study of this unit, there is no consensus on what constitutes the Ohio Creek Formation. One interpretation of the formation is that it represents a Cretaceous-age paleosol formed in the Williams Fork Formation; associated conglomeratic beds belong to the Tertiary Wasatch Formation. Another interpretation is that the Ohio Creek is both a conglomeratic unit and a kaolinitic paleosol formed in the Paleocene. Dating using pollen

places the Ohio Creek as late Cretaceous, yet vertebrate fauna suggests a late Paleocene age. To further evaluate these hypotheses, a section was measured near Mesa, Colorado. Data collected included sedimentologic descriptions, samples for x-ray florescence, and gamma ray spectrometry. Collectively, this information will determine if a paleosol exists, and whether it belongs to the Williams Fork Formation or if is a separate unit (i.e., the Ohio Creek Formation). This will be accomplished by comparing sample chemistries to modern day laterites to determine if the weathering happened

in the tropical climate of the late Cretaceous.

Title: COMPARING PATTERNS OF PINYON PINE AND JUNIPER REGENERATION OF FIRES AND BARK-BEETLE OUTBREAKS

Presenter(s): Ethan Archer, Jeffrey Purdy, Tanner Rust, Nathaniel Scully, Amanda Seuell

Faculty Sponsor: Deborah Kennard

Track: 10D

Abstract: Increasing temperature and drought are expected to have a negative

effect on tree seed germination and seedling establishment, particularly in arid environments. In Mesa County, pinyon-juniper woodlands may be at increased risk of regeneration failures after disturbances such as fires and beetle outbreaks. The purpose of our study was to assess the regeneration of pinyon pine and juniper seedlings in two areas: one area that experienced selective pinyon pine morality after the lps beetle epidemic in the 2000s, and another area that experienced complete mortality after a stand-replacing fire in 2005. At both of these sites we measured the density of pinyon pine and juniper seedlings and saplings. At the site affected by beetle mortality, we examined if seedlings were more likely to establish near nurse plants or in areas of high beetle mortality. At the burned site, we examined seedling regeneration as a function of distance from unburned woodland edges to determine if there were edge effects on the spatial patterns of regeneration. We looked at overall seedling densities to project future forest composition to help gain insight into whether these pinyon-juniper woodlands may be shifting towards a juniper-dominated community after disturbances.

Title: COMPARISON OF CONTINUUM AND ATOMISTIC NUMERICAL SIMULATIONS OF HEAT TRANSFER AT THE SOLID-FLUID INTERFACE

Presenter(s): Jacob Bollinger Faculty Sponsor: Jarrod Schiffbauer

Track: 10C

Abstract: Solid-fluid interactions have a strong effect on solid-liquid interfacial thermal

conductivity. Here, a continuum hydrodynamics model is used to study heat transfer between hydrophilic, hydrophobic, or neutral solid-fluid interfaces.

The goal is to compare two models, one with an explicitly space-dependent solid-liquid interaction versus a model where the solid-fluid forces are implicitly parameterized. MATLAB is used to integrate a set of coupled, non-linear partial differential equations for a model fluid similar to Argon between two solid plates in a one-dimensional (1D) slab geometry. These 1D models are compared to a molecular dynamics (MD) simulation of liquid Argon between two plates of gold molecules with a tunable solid-fluid interaction. The continuum model agrees reasonably well with the MD model, reproducing the interfacial temperature jumps corresponding to hydrophilic and hydrophobic surfaces. This partially validates the continuum model, which is more computationally efficient than the MD simulation. After further testing and validation, the model will be extended to more realistic 2- or 3D cases. The results of this research will help guide the molecular-level engineering of interfacial properties for a wide range of applications such as water desalination, photothermal cancer therapy, micro-scale cooling, photocatalysis, and efficient energy conversion.

Title: CONSTRAINING FRIEDMANN-ROBERTSON-WALKER COSMOLOGY IN

**D-DIMENSIONS** 

Shawn Fox Presenter(s): Faculty Sponsor: Chad Middleton

Track: 10F Abstract: Cosmology is the study of the origin and time evolution of the Universe.

This showcase presentation investigates the Einstein field equations for a flat anisotropic Robertson-Walker metric in a higher dimensional (D = d+4) spacetime. This showcase discusses higher dimensional Friedmann-Robertson-Walker (FRW) cosmology and the D dimensional field equations. This showcase will present approximate solutions in two limiting regimes, the volume regime and the fluid regime, which are only valid when a set of strong inequalities are satisfied. These strong inequalities dictate a time dependency for the validity of each regime, which is based on several parameters. The goal of this research is to constrain the two regimes by analyzing the free parameters of the theory. Analytical and computational methods are used to determine the limitations of the parameters for each regime. By constraining the relevant parameter space, we ensure that the

model yields results consistent with observational evidence.

Title: CONTROLLED GOLD NANOPARTICLE (AUNP) AGGREGATION:

AGGREGATE TOXICITY IN D. MAGNA

Presenter(s): Christopher Vandermeer Lohse, Sam

Faculty Sponsor:

Track: 10E Abstract:

The purpose of this research is to synthesize quality mixed ligand shell gold nanoparticles (AuNPs) and study their effects on biological systems. There is currently a signi?cant e?ort to clarify the interactions of nanoparticles with molecules, cells, and tissues. These studies could provide a foundation for engineering a new generation of non-toxic nanomaterials that can function e?ectively in a variety of consumer products. We have synthesized AuNPs (1.5nm to 18nm in diameter) with a mixed monolayer of thiols: mercaptoethoxyethoxyethanol (MEEE, neutral) and mercaptopentyltrimethyl ammonium (MPTMA, positively-charged) of varying ratios. These ligand shells completely cover individual AuNPs, changing their surface chemistry and thus, how they interact with biological systems. We describe a study into how MEEE, MPTMA and mixed monolayer-AuNP aggregation influences the mortality rates of, Daphnia magna (a freshwater planktonic crustacean). When dispersed in D. magna media, MEEE AuNPs exhibit minimal aggregation, MPTMA AuNPs exhibit major aggregation effects, but the aggregation rate can be "controlled" by using mixed monolayer-AuNPs. In collaboration with Dr. Rebecca Klaper (University of Wisconsin-Milwaukee),

we have investigated D. magna mortality rates when exposed to varying concentrations of MEEE, MPTMA and mixed monolayer-AuNPs. These results indicate that these AuNPs do not significantly cause death in D. magna.

Title: DESIGNING A GREEN ROOF SYSTEM FOR THE HAMILTON RECREATION CENTER AT COLORADO MESA UNIVERSITY

Presenter(s): Zachary Blumenthal, Savana Cummings, Henry Wondolleck

Faculty Sponsor: Deborah Kennard

Track: 10D

Abstract: Green roof systems are vegetation planted in a growing media placed on

a building's roof. These systems are used to reduce the energy costs of buildings, remove pollutants from the air, increase the aesthetics of an area, and decrease storm water runoff. The goal of our capstone project was to research and design a green roof system for the Hamilton Recreation Center at Colorado Mesa University. Implementation of a green roof system will help save money by reducing energy costs used to keep the building at a constant temperature. This is accomplished by increasing the natural insulation of the building without directly using a heating or cooling system. To design the green roof, we researched the most viable plants for Western Colorado along with the best growing medium for those plants. We also calculated the potential energy savings, along with a payback period. If implemented, this green roof would promote sustainability and create a more aesthetically

pleasing environment on the CMU campus.

DESIGNING AND TESTING OF AN ALGAL TURF SCRUBBER TO REDUCE Title:

SELENIUM FROM COLORADO RIVER WATER

Presenter(s): Colton Berg, Amanda Seuell, Casey Williams Faculty Sponsor: Deborah Kennard

Track: 10D

Abstract: The Grand Valley area has an abundance of selenium in Colorado River water

> due to seepage of selenium from local Mancos Shale soils. In many areas of the valley, selenium levels are above EPA compliance levels, which is unsafe for human and aquatic life. The goal of our capstone project was to design and test an algal turf scrubber using algae collected from the Colorado River to determine if it can reduce selenium to safe levels. Algal turf scrubbers take advantage of the natural functions of algae to absorb pollutants from water. If successful, the algae may be utilized on a large scale to reduce levels of selenium in the Colorado River. To conduct our research, we designed and built algal turf scrubbers using the algae collected from the Colorado River. The scrubbers were administered different treatments of selenium in water. We harvested the algae and analyzed the selenium concentrations in the algae, the water before testing, and the water after the treatment using an ICP-AES, to determine the effectiveness of using algae to remove selenium from an aquatic system. Our research is important as few studies have been

conducted on using this technology in the Colorado River.

Title: DETERMINING PROVENANCE OF ANCIENT COLORADO RIVER SEDIMENTS USING DETRITAL SANIDINE 40AR/39AR

GEOCHRONOLOGY

Presenter(s): Alejandro Jaquez-Caro

Faculty Sponsor: Andres Aslan

Track:

Abstract: The precise ages and chemistry of sanidine grains of ancient Colorado River

deposits found around Glenwood Springs and Rifle, Colorado, are crucial to understanding the fluvial sediment history. Sanidine is a high-temperature potassium feldspar that originates from explosive volcanic eruptions and possesses unique geochemical properties that allow for its origin to be traced. We assume that the sanidine in the ancient Colorado River sediments originated as volcanic air-fall that was subsequently reworked into the river

system, and then deposited. Using 40Ar/39Ar age dating methods, sanidine is analyzed and results include potassium/calcium values. The grain ages and chemistry can be used to identify the volcanic fields that were the original source of the sanidine. Our central hypothesis is that sanidine grains collected at our sample locations will show provenance from volcanic fields located within the Colorado River watershed. Alternatively, the sanidine may be derived from the San Juan Mountains or volcanic fields in the Great Basin.

Title: DETERMINING UNDERLYING CORRELATIONS OF MULTIPLE AIR

QUALITY SENSORS WITH PYTHON

Presenter(s): Matthew Wilson Faculty Sponsor: James Ayers

Track: 10C
Abstract: Thirty-one a

Thirty-one air-quality sensors owned and maintained by members of the community are distributed throughout the Grand Valley, measuring particulate matter concentration along with temperature, humidity, and pressure every 1.5 minutes. When examining the group over a one-month period, the collection of sensors produces over 400MB of data. A Python script is implemented to programmatically look over this data for each sensor, employing various time-averaging, channel-averaging, and peak rejection techniques to create a sanitized set of data which is then related to other sensors' data through various geospatial means. The goal of these correlations is to evaluate the effectiveness of sensor placement and discover the components of a possible underlying model describing air quality as a function of position in the Grand Valley, given relatively few high-quality data inputs from EPA sensors. Sensors located within 2 kilometers of each other have a high likelihood of being very closely correlated (coefficient of determination greater than 0.85), reading the same values for all data excluding temperature. Models are constructed via superposition of fit polynomials from sensor correlations, and from neural network techniques with EPA sensor data.

Title: EARTHQUAKES IN THE RATON BASIN, COLORADO AND CONNECTIONS TO WASTEWATER INJECTION

CONNECTIONS TO WASTEWATER INJECTION

Presenter(s): Justin Humenik Faculty Sponsor: Andres Aslan

Track: 10A Abstract: The

The Raton Basin of southern Colorado and northern New Mexico is an actively producing hydrocarbon basin that has experienced increased seismicity since 2001, and many of the earthquakes are possibly related to wastewater injections. Similarly, the number of earthquakes in oil and gas producing areas of the central United States has increased dramatically over the past decade. Between 1973 to 2008, there was an average of 25 earthquakes of magnitude 3.0 or larger in the central United States. Since 2009, the average number of magnitude >3 earthquakes has jumped to 362 per year. The number peaked in 2015 with 1010 magnitude >3 earthquakes. Since 2015 the earthquake rate has declined. Most of these earthquakes are in the magnitude 3-4 range; large enough to have been felt by many people, yet small enough to rarely cause damage. The lack of any major faults in the Raton Basin suggests that the oil and gas industry is the primary cause of the induced seismicity. Plotting of historic earthquakes and injection wells in the region will be used to determine if there is a correlation between the timing of earthquakes and the volume of wastewater injection, as well as to determine what measures should.

Title: EFFECTS OF ALGAE ON GOLD NANOPARTICLE STABILITY

Presenter(s): Tori Catlett
Faculty Sponsor: Sam Lohse

Track: 10C

Abstract: Gold has been considered a precious metal for the past 6000 years, colloidal

gold nanoparticles have been used by artists for centuries for their vibrant colors, and more recently gold nanoparticles have shown promise in several biomedical applications. Gold nanoparticles (AuNPs) are crystals of gold that have diameter of 1-100 nm. Nanoparticles have the potential to affect humans and the environment we inhabit in many different ways. The possible benefits of engineering nanoparticles for our advantages must be weighed with the possible costs of using nanoparticles. In this study, the interactions of AuNPs with their environment are controlled primarily through the organic molecules coating particle. AuNPs were synthesized possessing different ratios of two functionalized thiols: 2-[2-(2mercaptoethoxy)ethoxy] ethanol (MEEE) and mercaptotrimethylaminopentane (MPTMA) the particles were 6nm in diameter. The AuNPs were then immersed in moderately hard river water (MHRW) and alginic acid; the stability of the particles against aggregation were studied over 48 hours using absorbance spectroscopy. By testing stability of the gold nanoparticles independently and then comparing the stability of the nanoparticles once they were introduced to the simulated biological environment will indicate if the MHRW and algae changed how the

particles interact with one another and the environment.

EFFECTS OF ASPECT, PREVAILING WIND DIRECTION, AND TIMING OF SOLAR RADIATION ON GLACIAL DYNAMICS IN THE COLORADO

**ROCKIES** 

Presenter(s): Cullen Meurer Faculty Sponsor: Larry Jones Track: 10A

Title:

Abstract: The relationship between prevailing wind direction and aspect on cirque

glaciers is not well understood. This study compares hanging valley relief, a measure of cirque glacier size, to prevailing wind direction and aspect to better understand these local influences on alpine glacial systems. Hanging valleys in the Colorado Rockies were chosen based on prevailing wind data and uniformity in the trunk valley orientation. Based on preliminary research, it is hypothesized that cirque glaciers on the leeward side of a mountain will be bigger than cirque glaciers on the windward side of a mountain. It is also hypothesized that when prevailing wind direction is not a factor, cirque glaciers with an east facing aspect will have a greater size than cirque glaciers with a west facing aspect. Determining a quantitative relationship between local topographic influences and cirque glaciers is an important step in understanding how mountain glaciers will function in a future with a changing

climate and could serve as a basis for future glacial modeling.

Title: EXPERIMENTAL VERIFICATION FOR CLASSICAL ELECTROMAGNETISM

THEORY OF OPTICAL INTENSITY

Presenter(s): Justin Endicott
Faculty Sponsor: David Collins

Track: 10B

Abstract: Classical electromagnetism theory suggests that the intensity of a beam of

light is proportional to the modulus of the electric field of the light squared. Electromagnetism theory also suggests that for multiple superimposed beams of light, the electric field of the combination of light is the sum of the electric fields of the individual light beams. This experiment aimed to check the rules for the intensity and the electric field of light via a Michelson interferometer that superimposes various light beams and measures the respective intensities. These various correlated intensities were observed in order to attempt to verify the classical electromagnetism

theory. Through this experiment, it was possible to verify that the rules for the intensity and electric field of a light beam suggested by classical electromagnetism theory are correct, as well as eliminating other possible models for superimposed light.

Title: GEOCHEMISTRY AND MINERALOGY OF OUTCROPS OF THE

NIOBRARA MEMBER OF THE MANCOS SHALE ON THE BLUFFS OF THE

COLORADO RIVER IN CLIFTON, COLORADO

Presenter(s): Brianna Trump Faculty Sponsor: Andres Aslan

Track: 10A

Abstract: For almost 100 years the Niobrara Formation in Colorado has been a

major economic producer of oil and gas. The source of these hydrocarbons originates from the Western Interior Seaway that once covered Colorado, and deposited a significant amount of marine sediments about 90 to 70 million years ago. New technologies such as horizontal drilling and hydraulic fracturing have allowed extraction of these hydrocarbons, and has ignited interest in the exploration of organic-rich-shales of the Niobrara Member of the Mancos Shale in western Colorado. Outcrop samples of the Niobrara Member of the Mancos Shale were collected from bluffs of the Colorado River in Clifton, Colorado. Chemical and mineral analysis of these samples will be completed using x-ray fluorescence, x-ray diffraction, and a calcimeter. In this study, chemostratigraphy, which is the use of chemical variations within sedimentary sequences to determine stratigraphic relationships, will be used to correlate the outcrop samples to the Fees Federal 2-6-8-101 well in Mesa County. Benefits from this study could help researchers and explorers of the Niobrara gain a better understanding of its depositional environment, stratigraphy, and economic potential.

Title: LATE QUATERNARY EVOLUTION OF THE UNCOMPAHGRE RIVER VALLEY BASED ON A NEW GEOLOGIC MAP COMPILATION

Presenter(s): Jonathon Hutson Faculty Sponsor: Andres Aslan Track: 10A

Abstract: Glaci

Glaciofluvial terraces in the Uncompangre River Valley of western Colorado record the late Quaternary history of the valley. The five terrace levels decrease in age and height with increased proximity to the modern Uncompangre River. Mapping of the terraces suggests that the river has migrated northeast down the Dakota Sandstone dipslope by eroding through the overlying Mancos Shale. Mapping also suggests that the terraces record a series of stream capture events. Previous studies of the linear to fan shaped terrace geometries suggest that the terraces correlate with late Pleistocene Bull- Lake and Pinedale glacial episodes. Gravel-clasts of the terrace deposits were derived from the San Juan Mountains and the Uncompandre Plateau. Prior mapping efforts of Uncompandre River terraces have focused on 7.5' quadrangles with an emphasis primarily on geologic hazards and resources. This study combined all existing geologic maps, including soil mapping data, to produce a comprehensive terrace map of the Uncompangre River Valley, which will serve as a basis for future geologic research.

Title: LIFE CYCLE ANALYSIS OF CANNABIS SATIVA IN MESA COUNTY

Presenter(s): Jeffrey Purdy, Dillon Rosenberg, Anthony Vanden-Plas

Faculty Sponsor: Deborah Kennard

Track: 10D

Abstract: The legalization of Cannabis sativa in 2012 introduced a high profit

crop to Mesa County. Since then, commercial production has increased exponentially but little review of the sustainability of these crops has been conducted . A life cycle assessment (LCA) for outdoor commercial cannabis

was necessary for sustainable development of Mesa County's agricultural industry. The goals of this project were to conduct an LCA of cannabis crops, compare that LCA to LCA's of other crops grown in Mesa County, and quantify the impacts of cannabis crops on the environment. Our team reached out to local growers to inventory the inputs (water, fertilizer, land, energy, etc.) and outputs created (waste, emissions, etc.) in the production of a single cannabis crop. These inputs/outputs were then used to do an impact assessment of cannabis from "cradle to gate" (planting to sales). The results from this analysis quantified the environmental impact of growing commercial cannabis and was then compared to the sustainability of other commercial crops grown in Mesa County. Finally, we compared products to determine possible ways to increase overall cannabis crop sustainability for the economic and environmental benefit of Mesa County.

Title: MAGNETIC SURVEY & GEOCHEMICAL ANALYSIS OF RYAN PARK-UNAWEEP CANYON

Presenter(s): J D. King Faculty Sponsor: Verner Johnson

Track: 108

Abstract: Po

Porphyry deposits are large, low- to medium-grade deposits in which primary, hypogene-supergene ore minerals are structurally controlled and are spatially and genetically related to felsic to intermediate porphyritic intrusions. They are distinguished from other granite-related deposits by their large size and structural control of mainly stockworks, veins, vein sets, fractures, and breccia's. Trumbo and Feil, (2015) found Cu and other minerals when testing fault breccia's in Snyder Flats. Most research indicates that an ore of 1% Cu per 1 ton of material classifies as economically profitable. Porphyry deposits typically contain hundreds of millions of tons of ore, although they range in size from tens of millions to billions of tons (Sinclair, 1979). The overall purpose of this work is to: A.) see if any relationships exist between Ryan Park-Unaweep Canyon with respect to trace minerals or valuable metals (Cu-Ag-Au), B.) Map magnetic anomalies for comparisons between Ryan Park and Snyder Flats, and C.) To further understand the fault and mineral characteristics of the two areas and evaluate the possible presence of a large, economically significant ore deposit.

Title: NEW MAPPING OF MAGNETIC ANOMALIES USING PROTON PRECISION MAGNETOMETERS WITHIN THE NORTHEASTERN PART OF

THE UNCOMPAHGRE PLATEAU

Presenter(s): Ryan Mumby Faculty Sponsor: Verner Johnson

Track: 10A

Abstract: By conducting magnetic surveys using proton precision magnetometers

in the Uncompahgre Plateau, the sources of the magnetic anomaly can be determined and possibly identified. The magnetic anomalies can be refined and later processed to understand the causes of the magnetic variations within the Uncompahgre Plateau. Three study areas within the Uncompahgre Plateau are selected for magnetic surveys, Spring Canyon, Cactus Park, and an isolated area within the Unaweep Canyon. Due to variations of magnetic anomalies within these study areas the interpretation of aeromagnetic data suggests a fault or intrusive as the cause of these variations. For post analysis of the survey data via ArcGIS samples can be taken from these anomalous locations and then processed in the lab using X-ray fluorescence for trace elements. Determining the magnetic material can provide constraints and interpretations of what is causing magnetic anomalies within the Uncompahgre Plateau, such as hydrothermal, faulting, metamorphism, and intrusive bodies.

Title: NEW TERRACE MAPPING AND CONSTRAINTS ON THE TIMING

OF GREEN RIVER INTEGRATION ACROSS THE EASTERN UINTA

MOUNTAINS

Presenter(s): Edward Martin Faculty Sponsor: Andres Aslan

Track: 10A

Abstract: Since the time of John Wesley Powell, geologists have puzzled over the

timing of the anomalous river course of the Green River through the Uinta Mountains. This study aims to constrain the age of integration of the Green River through the Uinta Mountains via the examination of Quaternary alluvium of the Green River in southern Wyoming and Browns Park. Terraces will be mapped and correlated using characteristics such as terrace height above the modern river in order to establish relative age relationships. In addition, existing luminescence, cosmogenic burial, and detrital sanidine ages will help establish the ages of these terraces, and will constrain the timing of integration of the upper and lower Green Rivers. These terrace deposits are important resources for understanding drainage history and the broader changes which have occurred within the Colorado River system.

Title: NOVEL GOLD(III) COMPLEXES FOR THE UTILIZATION OF STRONG C-H

BONDS COMPARABLE TO THOSE FOUND IN PETROLEUM Mahli Hernandez. Briana Maestas

Presenter(s): Mahli Hernandez Faculty Sponsor: David Weinberg

Track: 10C.

Abstract: Alkanes are the primary components found in natural gas and petroleum.

Although they are an abundant and inexpensive resource, they are also relatively inert. There are few practical processes for their direct conversion into more valuable chemicals and these processes tend to be unselective or energy intensive. Homogeneous, transition metal catalyzed alkane conversions have shown potential for high selectivities at relatively low temperatures. In particular, gold complexes have shown promise for use as catalysts because they can activate a variety of different C-H bonds via inner-sphere pathways. There have been many examples in which gold activates C-H bonds, but activations of strong sp3-hybridized C-H bonds are rare and tend to suffer from low yields or slow reaction rates. We have synthesized two novel gold(III) complexes in order to find conditions necessary for the efficient activation of these types of C-H bonds. These gold(III) complexes are now being tested for C-H bond breaking reactions. Eventually, routes to forming C-O and C-N bonds will be explored.

Title: NUMERICAL SOLUTION FOR THE EQUATION OF MOTION OF A PARTICLE IN A 1D POTENTIAL USING RUNGE-KUTTA 4 WITH PYTHON

Presenter(s): Trey Jiron

Faculty Sponsor: Jarrod Schiffbauer

Track: 10I

Abstract: We investigate the 1D motion of a particle subject to both a constant

external force and a random Brownian force. We are using a model potential V(x), which includes a  $\cos(x)$  term added to a linear corresponding to a constant force. To do this, we employ a Langevin-equation model or the 1D equation of motion for diffusion + drift. The Langevin equation is a second order non-linear DE that we transform into a system of first order non-linear DEs. This form is integrated by the Runge-Kutta 4 method which is implemented in Python, allowing the program to plot both position and velocity as a function of time. We compare this to approximate analytical solutions to make sure our code agrees with limiting cases. Once this is verified, we can now examine more complicated and interesting situations, allowing us to investigate physical phenomena such as charge and energy

transport in single molecules such as DNA or alkanethiols.

Title: PETROGENESIS OF THE GRAND MESA VOLCANIC FIELD

Presenter(s): Sarah Dedecker Faculty Sponsor: Andres Aslan

Track: 10A

Abstract: The petrogenesis of the Grand Mesa volcanic field (GMVF) is complex and

not well known. Recognition of a magnetic anomaly on the eastern end of Grand Mesa and new geochemical data for selected flows provides the basis for improving our understanding of Grand Mesa magmatism. The purpose of this study is to provide a deeper look at the controls on magma differentiation, with a focus on possible magma mixing. Mixing can cause unexpected geochemical variations within the magma or, evidence has shown, it may even lead to an eruption. Examination of 50 petrographic thin sections and analysis of new geochemical data of the GMVF flows will be used to test the hypothesis that the magnetic anomaly is associated with primary mafic magma, that has undergone no mixing and minor assimilation, and the high levels of K is due to the mixing of felsic and mafic magmas. Evidence of magma mixing would be represented by varying disequilibrium features, of a single thin section, such as; zoning, sieve, and crystal growth patterns, within the plagioclase, pyroxene, and olivine crystals. In summary, this study provides a greater understanding of the

petrogenesis of the GMVF.

Title: STATISTICS OF LASER LIGHT

Presenter(s): Dillon Merenich Faculty Sponsor: David Collins

Track: 10B

Abstract: Photons produce by a laser do not arrive at a detector in a deterministic

way. It is theorized that these photons arrivals are distributed according to a Poisson distribution. A photomultiplier tube allows for detection of these individual photons. A computer program is created to manage the counts generated by the photomultiplier tube over short time intervals. The frequency of the number of photons counted in the short time intervals supports the theory of the occurrences resembling a Poisson

distribution curve.

Title: SYNTHESIS AND CHARACTERIZATION OF BA\_(1-X)SR\_XTIO\_3

CERAMICS

Presenter(s): Nicholas Wright Faculty Sponsor: Brian Hosterman

Track: 10E

Abstract: Perovskite ceramics with the chemical structure Ba\_(1?x)Sr\_xTiO\_3 were

prepared using a solid-state synthesis process in increments of ?x=0.05 from x=0 to x=1. At room temperature, BaTiO3 exhibits a tetragonal structural phase and SrTiO3 exhibits a cubic phase. The phase transition between tetragonal and cubic was investigated using X-ray diffraction and Raman spectroscopy. Rietveld refinement of the X-ray diffraction pattern yields information about the c/a ratio of the unit cell as the structure transitions from tetragonal to cubic with increasing strontium content. Raman spectroscopy yields information on the vibrational modes of the crystalline lattice. The phase transition can be investigated by examining the effect of strontium content on the wavenumber, intensity, and width of normal modes.

THE CORRELATION AND ORIGIN OF ALLUVIAL TERRACES ALONG THE Title:

WESTERN AND SOUTHERN FLANKS OF THE GRAND MESA, WESTERN

**COLORADO** 

Presenter(s): Aleiandro Conde Cole. Rex Faculty Sponsor:

Track:

Abstract: Alluvial pediments and terraces are topographically flat, sloping features

that form as a complex response to climate change and tectonic uplift.

Quaternary glacial cycles in conjunction with regional uplift have

produced gravelly terraces dominated by basalt boulders along the flanks of the Grand Mesa in western Colorado. The highest terraces contain Lava Creek B ash, which suggests the lower levels are younger than 640,000 years. The younger terraces do not have accurate dates associated with them, so correlations have been made to approximate the timing of deposition and possible correlations to glacial events. Terraces along six creeks (Dry Gulch, Point, Kannah, Deer, and Larue Creeks) will be used to determine if terraces can be correlated between these locations. The presence or absence of terrace correlations will be used to explain the factors controlling the formation of the Grand Mesa terraces/pediments, as well as those located elsewhere in semi-arid, mountainous regions.

Title: THE FORMATION OF CAVERNOUS WEATHERING FEATURES AND

ARCHES IN RATTLESNAKE CANYON, COLORADO

Presenter(s): Tristan Bates Faculty Sponsor: Andres Aslan

Track: 10A

Abstract:

Rattlesnake Canyon is a remote valley in western Colorado that is home to one of the most impressive sets of sandstone natural arches, nine within a 0.75-mile distance, anywhere outside of Arches National Park, Utah. The origins of natural arches and cavernous weathering are not completely understood by the scientific community, and this canyon remains an ideal and untapped resource to study their formation. A likely basis for the cavernous weathering features in Rattlesnake Canyon is the unconformity present regionally between the two members (Board Beds, Slick Rock) of the Entrada Sandstone, which causes nonuniform distribution of gravity-induced stress and irregular weathering patterns. Other possible factors contributing to forming the caverns include jointing and localized fracturing of sandstone related to uplift of the Uncompangre Plateau, salt weathering, and the resurfacing of groundwater within the caverns. Measurement of surface moisture and salt content within caverns and a detailed joint analysis of the study area will be necessary to predict each factor's local importance. Determining the effects that each of these factors had on cavernous weathering and arch formation in Rattlesnake Canyon could improve our understanding of these enigmatic features around the Grand Valley and Colorado Plateau region.

## Social and Behavioral Sciences

Title A COMPETITION OF STATESMEN IN THE COLD WAR

Presenter(s): Bryan Waite Faculty Sponsor: Adam Rosenbaum

Track:

Abstract: During the forty-six years of the Cold War, the leaders of the United States

and the Soviet Union were responsible for the conflict's continuation. Furthermore, their foreign and domestic policies were the deciding factor in how hot or cold the conflict was. What were the driving forces behind

their actions? What were the political and cultural impacts of dividing the world into two camps during the Cold War? This paper will seek to answer these questions by arguing that the Cold War was ultimately based on competition between statesmen of the United States and the Soviet Union that shaped the political and cultural atmosphere of the Cold War. Utilizing the personal writings of many of the important actors like Truman and Stalin, Kennedy and Khrushchev, and Reagan and Gorbachev, this research is important to our understanding of the modern world for two reasons. First, it sheds light on how both sides were to blame for the passive-aggressive conflict that was the Cold War. Second, it shows how this competition between statesmen affected the entire world by laying the foundation for the political and cultural atmosphere of the present day.

Title: ABORTION ATTITUDES AS THEY RELATE TO CHURCH ATTENDENCE

Presenter(s): Gerald Ellis Faculty Sponsor: Stephen Merino

Track: 11C

Abstract: Does church attendance influence peoples' attitudes on abortion? My

dependent variable is whether people think abortion should be legal or not while my independent variable is church attendance. Given these factors, I hypothesize that those women and men who attend church more frequently will think it should be illegal for pregnant women to obtain a legal abortion for any reason. My data was collected through the GSS data survey program. The dependent variable asked the following question, "Please tell whether or not you think it should be possible for a pregnant women to obtain a legal abortion for any reason, "followed with five possible answers. The independent variable is church attendance, which asked the question, "how often do you attend religious services," followed

with ten possible answers.

Title: AMERICA'S TALE OF ENVIRONMENTAL RACISM: HOW MINORITIES

FACE PERIL IN URBAN SPACES
Presenter(s): Mikaela Lopez

Presenter(s): Mikaela Lopez Faculty Sponsor: Stephen Merino

Track: 11C

Abstract: America is more diverse than ever - but still segregated" (Williams and

Emamdjomen 2018). This is especially true for American cities. Given our nation's extensive history that is intertwined with racist housing policies, it is important to examine the consequences of these acts, as well as how we continue to support and uphold such policies. The physical structure of cities plays a role in continuously oppressing minorities through lack of green spaces, food deserts, and other characteristics that generate health consequences. Because environmental racism continues to plague urban environments, the topic deserves attention and discussion, as well as efforts to erode inequality that is persistent in American society.

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Title: AN EPIC STORY: FEAR, THE COLD WAR, AND POPULAR NOVELS

Presenter(s): Carson Pipher Faculty Sponsor: Adam Rosenbaum

Track: 11A

Abstract: This paper seeks to analyze best-selling novels from 1947-1991 to illustrate

the ways in which the Cold War impacted popular culture. The paper uses a variety of novels and secondary sources to show how fear, a common theme of the Cold War, worked its way into most best-selling novels of the time. Whether it be fear of the future expressed through dystopias, or fear of the "other" expressed through spy-books, it is clear that both American and Soviet society were subject to anxiety and paranoia. This is made evident through the fear expressed in the most widely read stories of the age. Novels offer numerous lenses through which we can view

history. They address the stories, the imaginations, the emotions, and the experiences of individuals. At the same time, the popularity of particular works adds to our holistic understanding of widespread attitudes towards the Cold War as well as to our understanding of the evolution of American culture and Soviet culture.

Title: DOES MORE SEX EQUAL GREATER HAPPINESS?: AN INSIGHT INTO THE RELATIONSHIP BETWEEN GENERAL HAPPINESS AND SEXUAL

FREQUENCY

Presenter(s): Jessica Jolley
Faculty Sponsor: Stephen Merino

Track: 11B

Abstract: Sexual activity is an important part of everyday life. Not only is it the means of reproduction, it is also a popular way to experience immense pleasure.

Existing research has shown that there is indeed a link between happiness.

of reproduction, it is also a popular way to experience immense pleasure. Existing research has shown that there is indeed a link between happiness and sex in a biological manner as well as an impact on an individual's general well-being. With my research, I utilize the 2014 results of the General Social Survey. To get a general sense of the happiness of the population, I focus on the variable "happy" and I use the variable "sexfreq" to gain an understanding of the sexual habits of adults in the United States. With these quantitative variables, I have conducted univariate and bivariate analyses to create a clearer understanding of how, and to what extent, happiness and sexual frequency are connected. With such a large sample, these analyses are vital to give us an insight into the strength of the relationship between sex and happiness among the population of United States adults. This research can help us better understand how our sexual practices could potentially be beneficial on our

general and emotional well-being.

Title: FOSSIL FREE CMU

Presenter(s): Meghan Cline Faculty Sponsor: Timothy Casey

Track: 11D

Abstract: Universities across the world are taking a stance on climate change through a non-traditional lens: divestment from fossil fuel industries. The fossil free

(FF) divestment campaign is not to target the university, but to target the FF industry through a university freezing, and then pulling their investments from a company. When universities pull their investments from companies, the stock prices drop affecting the company. This tactic is used to remove

power from the FF industry.

Colorado Mesa University invests in several FF industries such as Chevron. This presentation will examine the elements of a divestment campaign at CMU. The presentation will be broken down into four parts, I: History of FF divestment campaigns at universities; II: Audience analysis; III: Strategic design of a CMU divestment campaign, and; IV: Resources for, and barriers to, such a campaign.

Currently, 1029 institutions in the US have divested from fossil fuels, while hundreds of educational institutions have current divestment campaigns. CMU could be the first university in Colorado to implement a successful FF divestment campaign bringing lots of positive attention to the university.

Title: HEY DOC, WANNA SKYPE?
Presenter(s): Jamie Hall. Marisa Jahnke

Faculty Sponsor: Chelsie Hess

Track: 11B

Abstract: Have you ever been sick and unable to go to the doctor's office? Have you

ever traveled hours to see a specialist? Many people face this problem in rural areas. The present study investigated how telemedicine can bridge

the gaps of rural health care. The researchers looked at how existing health care providers are using telemedicine, how they are implementing it, the adoption or usage rates for existing telemedicine programs, and the awareness of the availability of telemedicine programs. The study also looked at the challenges and opportunities for expanded use of telemedicine in rural health care within Western Colorado and Eastern Utah and opportunities for expansion. The study identifies the reluctance of health care providers to develop telemedicine programs and identifies the reluctance of the consumers to use telemedicine programs.

Title: INVESTIGATING MATERIAL CULTURE ITEMS FOUND IN ALLEGED

CREMATED REMAINS

Presenter(s): Morgan Camp Faculty Sponsor: Melissa Connor

Track: 11F

Abstract: Colorado Mesa University's Cremains Assistance Project examined

alleged cremated remains to determine if the material was consistent with cremation. The sample consists of 118 case numbers, which were examined individually. Information regarding clothing or other items the individual may have been cremated with was obtained from the family. The cremains were weighed, evaluated for color, and sifted. The inclusions were removed with the help of a metal-detecting probe, and photographed, then examined and identified by Archaeologist, Dr. Douglas Scott. The purpose of this examination was to determine if the material was consistent with the information given. A single case of known human cremains from another funeral home was examined, and no inclusions found. The most common inclusions found were melted metal and wire, with 78% of the samples containing melted metal and 58% containing various types of wire. At least 25% of the cases contained potentially identifying inclusions, such as beads, buttons, and surgical hardware. Results were discussed with the families, including potentially identifying inclusions, and any discrepancies were documented. Sixteen percent of the cases included combustible material. These results provided families with information about whether the cremains were, in fact, that of whom they were alleged to be.

Title: KALAMAZOO RIVER OIL SPILL: A CASE STUDY ON MASS-SCALE

ENERGY TRANSPORT

Presenter(s): Brigittah Erickson Faculty Sponsor: Timothy Casey

Track: 11D

Abstract: The production and distribution of oil can generate serious risks to

the environment as accidents inevitably occur. Three months after the Deepwater Horizon blowout in the Gulf of Mexico in 2010, another discharge occurred inland in the southwest corner of Michigan. The 3,100mile (Canadian owned) Enbridge pipeline spilled over one-million gallons of heavy crude oil into the Kalamazoo River. The U.S. crude oil pipeline network spans approximately 72,000 miles, and each year thousands of oil spills occur just within U.S. borders. Though most of these spills are small in size, more than 44 spills since 1969 have discharged over 420,000 gallons of oil affecting U.S. and Canadian waters. This presentation will consider the Kalamazoo event as a case study providing an overview of the spill, and showcasing a larger spectrum of issues associated with these events. It will consider the stakeholders involved, along with evidence, conclusions, and implications of energy pipeline malfunctions. Public and private involvement, environmental management techniques surrounding the spill, and response and legal action will be assessed. The presentation concludes with a discussion of options for the continuation and evolution of energy transport across the United States

Title: OCCUPATIONAL OASIS

Presenter(s): Courtney Cross, Shannel Wilson Faculty Sponsor: Michael Delaney

Track: 11C

Abstract: Thi

This project was the result of the 2018 InsideOut Program where CMU students worked alongside inmates of the Delta Correctional Facility. Our goal was to create a new prison that placed an emphasis on reintegration into society, which in turn, prepared inmates for the changes in society and lowered recidivism rates. Occupational Oasis is for inmates who are eligible for parole within years after their enrollment. It was based on the motto "Learning how to Build Our Future" and it starts from the very basics with a whole new design of the prison. During the intake process, they are assessed on their needs and serious interests in the program. They are then screened to ensure they have the best chance to reach their full potential in the program. Occupational Oasis offers offenders education, vocational and career opportunities; it also features an agriculture program which ensures the prison is self-sustaining. Although the program offers new opportunities such as the ones listed above, there is a heavy focus on mental health and substance abuse treatment. The prison was designed to prepare its inmates

Title: OIL AND GAS DEVELOPMENT ON THE WESTERN SLOPE

Presenter(s): Troy Redding Faculty Sponsor: Timothy Casey

Track: 11F

Abstract: This is a case study about the economic and environmental implications

with the skills they need to be successful upon release.

of oil and gas production in Garfield County. The purpose of this study is to highlight different perspectives of how people should interact with the environment. By focusing on primary stakeholders, I will compare and contrast the different viewpoints and explain how these various points of view impact decision making in Garfield County. Throughout this presentation, I will demonstrate the economic benefits and drawbacks of the oil and gas industry in Colorado. I will also explain the steps taken by industry leaders and Garfield County to protect the environment throughout the development process. In contrast to the industry perspective, I will analyze the stances taken by those who oppose development in the County and attempt to explain why they are opposed. It is my goal to demonstrate that both sides of this debate have a vested interest in the well being of the environment and to propose how these opposing groups might find acceptable solutions to their environmental policy disagreements.

Title: PREHISTORIC SETTLEMENT PATTERNS OF THE GRAND MESA,

UNCOMPAHGRE, AND GUNNISON NATIONAL FORESTS

Presenter(s): Adam Grotjohn Faculty Sponsor: John Seebach

Track: 11F

Abstract: Humans have occupied the Colorado Plateau since at least 9000 BP. These prehistoric peoples and their descendants have left a rich archaeological record, and a wealth of information has been collected over the last century on their lifeways. This research project concentrates on the author's experience over the last year as an archaeological intern for the National Forest Service on lands within the Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG). The GMUG contains diverse vegetation zones, ranging between desert scrub and broad high elevation sage flats to piñon-juniper and aspen-pine forests. Each zone displays an abundant diversity of hydrology and geology, and these influenced seasonal foraging patterns throughout prehistory. A GIS analysis of site ages and types.

arrayed by elevation, vegetation community, and geographic properties such as available water, provide preliminary insights into the life patterns

of prehistoric people. Of the numerous open camps and lithic scatters recorded on the Uncompahgre Plateau, approximately 60-63% are found upon level benches within 200 meters of high bluffs or hills, providing excellent viewsheds of the surrounding environment and approaches.

Title: THE COLD WAR BEYOND THE BATTLEFIELD: CULTURAL WARFARE AND THE SPACE RACE

Presenter(s): Jack Holt

Faculty Sponsor: Adam Rosenbaum

Track: 11A

Abstract: Thi

This paper will demonstrate how the Cold War created a new system of warfare that was almost exclusively ideological in nature. This conflict, driven by a system of worldly ideals, induced world leaders and politicians to compete in the realms of policy, diplomacy, and technology. Ultimately, the Cold War was the foundation for a type of warfare that is fought at all times, where the battlefield extends far beyond the trenches, and where the everyday citizen is seen the same way as a battle-hardened soldier. In essence, the Cold War created a system of "cultural warfare" that infiltrated every aspect of society, enabling events like the Space Race to be possible. Even today, many aspects of "cultural warfare" are still in place. Consequently, this paper will seek to redefine the Cold War by illuminating how the fluidity of warfare and development of Atomic Diplomacy transformed American foreign policy, as well as to uncover why the Soviet Union and the United States chose space (of all available locations) for the next battleground of technology and ideology.

THE LINK BETWEEN CRITICAL THINKING AND PERSONALITY: INDIVIDUAL DIFFERENCES IN TRUTH-SEEKING

Presenter(s): Elias Acevedo, Sarah Douglas

Faculty Sponsor: Chelsie Hess

Track: 11B

Title:

Abstract: Critical Thinking (CT) is an empowering factor in all facets of one's life, given it provides the basis for what is reasonable for an individual to believe

and do. For almost two decades, CT has been thought to consist of skills and dispositions. CT dispositions are a network of attitudes, intellectual virtues, and habits of mind. CT dispositions influence the way individuals approach a thinking task and motivate the appropriate application of CT skills. Although factors of CT disposition are described in similar terms to personality traits, very little research has looked at the relationship between factors of CT disposition and personality. Truth-seeking, one of seven factors that comprise CT disposition, is described as eagerly seeking knowledge, courageously asking questions, and honestly pursuing evidence. Unfortunately, several studies have shown students are generally not inclined toward truth-seeking. The present study examines the prevalence of truth-seeking and its relationship with the big five factors of personality in students at Colorado Mesa University. Religious and political ideology, field of study, class rank, and other demographic information are also considered.

#### THE THIRD WAVE: AN ORAL HISTORY

All women, from all generations, experience womanhood in a unique way. Yet a common thread weaves together the women of their respective generations. They are connected by the music they listened to, the celebrities they idolized, and the art they created. Adolescent girls of the 1990s were unique in the their shared experiences. Today, those shared experiences have produced a distinct brand of feminist ideology. The young women who graduated between 1990 and 1999 have gone on to spearhead social movements, lead major modern companies, and enact progressive change through political action. Throughout a series of interviews, my colleagues and I came to recognize the importance of the voices of women who were shaped by the 1990s. Our study explores a sequence of questions aimed toward a better understanding of the personal, intimate, and feminist experiences of women who graduated high school between 1990-1999. Their love of punk rock, resistance of patriarchal structures, and thirst for artistic expressionism have all shaped what we refer to today as the third wave of feminism. By performing these interviews, transcribing our data, and analyzing our newfound knowledge, we gained new insight toward a vital piece of feminist history.

Title: AN INTERVIEW OF AMANDA BYNUM

Presenter(s): Kate Beagle Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF KATE CACCAVAIO

Presenter(s): Jordan Sheehan Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF MELISSA RIVEST

Presenter(s): Kristen Smith Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF NATALIE STRONG

Presenter(s): Savannah Bernal Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF RALUCA LILES

Presenter(s): Cera Hammond Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF SHELLEY SCHULZ

Presenter(s): Samuel Moreno Faculty Sponsor: Erika Jackson

Track: 11E

Title: AN INTERVIEW OF WENDY KELLY

Presenter(s): Fatima Attoumani Faculty Sponsor: Erika Jackson

Track: 11E

Title: THE SCAVENGING PATTERNS OF FERAL CATS ON HUMAN REMAINS

IN AN OUTDOOR SETTING

Presenter(s): Sara Garcia, Alexander Smith

Faculty Sponsor: Melissa Connor

Track: 11D

Abstract: Scavenging of human remains by the Felidae family is documented, but

case reports are rare. Rather than scavenge, Felids prefer to hunt. When scavenging occurs, Felids prefer to exploit fresh tissue across several days. In the only published case of bobcat scavenging found by the authors, the bobcat focused on the tissues of the arms, hips, and thighs. In the few reported cases of indoor domestic Felis catus scavenging, the target was the face, hands, and feet. The smaller size, strength, and bite force of Felis catus may prevent them from opening the human thoracic cavity, so their pattern of scavenging may differ from the pattern observed in larger cats. Two separate incidents of feral cat scavenging of human remains occurred at the Forensic Investigation Research Station (FIRS) in Whitewater, Colorado. In both cases, feral cats primarily targeted the arms and chest and secondarily the abdomen. This pattern more closely parallels the pattern of bobcat scavenging rather than the domestic Felis catus. Differences in feeding behavior between domestic and feral cat groups are reported and are most often attributed to both neophobia and the need for reflexivity in the feral

cat diet as they work to meet nutritional needs.

THE SKY'S THE LIMIT: SOVIET AND AMERICAN AVIATION DEVELOPMENT IN THE COLD WAR

Presenter(s): Taran Pennington Faculty Sponsor: Adam Rosenbaum

Track: 11A

Title:

Abstract: The Cold War was infamous for the various political, military, and social

tensions that still resonate in the minds of those who lived through it. The Space Race and the Arms Race were some of the most widely publicized and well-known aspects of the war. There was, however, another aspect that played a crucial role in the deterrence of actual war: the Air Race. At the beginning of the Cold War, aircraft were driven by propellers, and were limited in capabilities and mission sets. By the end, both countries flew supersonic, high performance jet aircraft capable of accomplishing a wide variety of missions. This was more than a reflection of overall technological development. It was the circumstances of the Cold War that motivated both the Soviet Union and the United States to create the newest and most capable of aircraft for means of deterrence. To this day, aviation technology remains a key part of military defense systems. These developments during the Cold War allowed aircraft to stay on the cutting edge of technology while adding to the continued reluctant attitude towards war that remains to this

day

Title: THE USE OF A METAL DETECTING PROBE TO EXAMINE CREMAINS

Presenter(s): Gabrielle Lopez Faculty Sponsor: Melissa Connor

Track: 11F

Abstract: In 2018, Colorado Mesa University faculty and students processed 128 sets

of cremated remains (cremains) to determine if they were, in fact, cremains. The team found metal inclusions in many of the cremains. Retrieving and identifying the inclusions may help in identification of the decedent. Three techniques were used: visual identification, a magnet, and a metal detecting probe. Large metal pieces were visually identified and separated, then a magnet was used to attract the metal. The magnets, however, did not work, as the heat destroyed the metal's magnetic properties. The probe used was the Minelab Pro-Find 25, a hand-held metal pin pointer. The detector has a very low frequency and a LED flashlight at its base near the

probe to illuminate objects. The probe also vibrates and beeps when metal is detected. When the probe "beeped" the object would be removed. The cremains were probed multiple times to ensure that all inclusions were removed. The team found the detector was much more effective than the magnet or visual identification. Metal surgical wire and metal snap buttons from hospital gowns or clothes were the most common small inclusions that were found with the probe. For smaller inclusions not immediately identifiable, the metal detector probe was most effective.

Title: TO RETURN OR TO KEEP?: VARIATIONS IN RESPONSES TO DROPPED

MONEY ON COLLEGE CAMPUS

Presenter(s): Rachel Geertgens Faculty Sponsor: Megan Henley

Track: 11B Abstract: The

The purpose of this study was to assess whether individuals engage in prosocial behavior in response to dropped money. Prosocial behavior is an area of study that looks at reasons and circumstances behind why people help others, without the expectation of receiving a reward. Research shows that social pressure, as well as relatability to those in need, influences whether individuals help others (Delameter, Myers, and Collet 2015). My research builds on this concept looking at how variables such as location, time of day, gender, and age affect prosocial behavior. I also observed whether the presence of others influences behavior. I dropped a dollar bill in different locations across Colorado Mesa University's campus including Houston Hall, Dominguez Hall, and the University Center at different times of day. I found that while location did not affect behavior, people were somewhat more likely to return the dollar bill during guiet times of the day. Interestingly, a significant number of individuals failed to notice dropped money or failed to act. The results indicate that not many students are willing to engage in prosocial behavior, which may be attributable to an increasingly distracted and individual-focused society.

Title: WATER CONSERVATION IN THE GRAND VALLEY

Presenter(s): Tyler Schwartz
Faculty Sponsor: Timothy Casey
Track: 11D

Abstract: Mai

Mark Twain once said that "whiskey is for drinking, water is for fighting over." This statement remains true today in the western United States and in Colorado's Grand Valley. Water conservation has developed out of necessity. Today, the Colorado and Gunnison Rivers supply the residents, farmers, ranchers, orchards, and recreationalists of the Grand Valley enough water to maintain an oasis-like landscape for 70,000 people. The water managers of the City of Grand Junction, Clifton Water District, and Ute Water Conservancy District have achieved this through numerous avenues. These actions affect a myriad of stakeholders, including the people of the Grand Valley, the U.S. Department of Agriculture, the Bureau of Land Management, the Bureau of Reclamation, and 36 million other people that depend on the flows of the Colorado River to live. Given the impact the Colorado River has on the West, laws and regulations constrict it much like the famous Glen Canyon and Hoover dams do. This project will detail the history and development of water conservation in the Grand Valley, the stakeholders involved in it, and the governmental/regulatory measures applied to it culminating in a policy recommendation with regards to water conservation in the Grand Valley.

Title: WEAPONIZED RELIGION AND THE COLD WAR

Presenter(s): Madeline Ancell Faculty Sponsor: Adam Rosenbaum

Track: 11A

Abstract: Throughout the entirety of the Cold War, there was a theme of good versus evil that went beyond communism and capitalism. Rather than invading one

evil that went beyond communism and capitalism. Natire trial invading one another's countries, the United States and the Soviet Union invaded each other's ideologies, painting the foe as someone who not only hated their way of life, but as someone who was immoral and malicious. This attempt at moral degradation of character on both sides was often accomplished by bringing religion into the fold. Religion has played a role in every conflict since its inception. The Cold War was no exception. Americans disagreed with the tenets of communism, but in order for them to have felt justified in dropping an atomic bomb, they had to feel that their opponent was morally and religiously bankrupt. The Soviets used religion as a way to paint their opponents as superstitious imbeciles, incapable of posing a real threat. This research will attempt to answer the following questions: How did leaders weaponize religion to further their own agendas? To what extent did leadership/citizens of the United States rely on religion to warrant their views of the Soviet Union? Were communism and atheism mutually

inclusive?

## TEACHER EDUCATION

Title: ADD, ADHD, AND MEDICATION

Presenter(s): Sasha Bizer Faculty Sponsor: Ann Gillies Track: 12A

ack: 12F

Abstract: With a forty-two percent increase in Attention Deficit Hyperactivity

Disorder (ADHD) diagnoses over the past 8 years, it is incredibly likely that our future educators will have a student who has either been diagnosed or will be diagnosed with ADHD or Attention Deficit Disorder (ADD) within their classroom. This presentation aims to inform future educators, families, and members of the community about ADD and ADHD to help spread awareness, create familiarity and comfort-ability, and to teach techniques and strategies for helping support those who experience the condition. This presentation will give a small demonstration of what a student with ADD or ADHD might experience in the classroom, give an overview on the condition, discuss controversies and misinformation surrounding the disorder, and examine different approaches that can be used to support

those who have ADD or ADHD.

Title: ANIMAL ASSISTED THERAPY IN EARLY CHILDHOOD EDUCATION

Presenter(s): Paige Burnham Faculty Sponsor: Ann Gillies

Track: 12B

Abstract: The success of a child's education is often dependent on several variables.

Teachers want to insure that they are supporting students in every way possible. Sometimes teachers need to look outside of the resources available from other professionals, and turn to our animal companions. Animals have been shown to have major benefits in both the cognitive and physical well-being of individuals. This project will look specifically at the benefits of Animal Assisted Play Therapy, Equine Assisted Therapy, and Canine Assisted Therapy for children in early childhood (birth to 8 years of age) who have exceptionalities. It will demonstrate the benefits that these animals can have, and explore the implications of having animal co-

workers in the classroom. Our animal companions can help us live a better tomorrow if we allow them to help us.

Title: AUTISM SPECTRUM DISORDER AND NUTRITION

Presenter(s): Brianna Bower, Cori Fix, Carly U-Ren

Faculty Sponsor: Ann Gillies Track: 12B

Abstract: Autism Spectrum Disorder (ASD) is a developmental disorder that affects

behavior and communication/speech. It is believed that both genetic and environmental factors may affect the development of this disorder. But what are those environmental factors? Given the limited amount of different treatment options that may improve the core symptoms of the disorder, many families affected are still at a loss on how to improve children's lives. There is substantial evidence showing that proper nutritional guidance. along with vitamin supplementation, may improve the symptoms that go along with ASD. Food components varying from gluten, casein, MSG, dairy, and even sugars, have proven to negatively affect behaviors in children who have ASD. Reviewing nutritional factors and adding in vitamin supplements can help to create more stable moods, and more importantly a happier. healthier child. The presenters' mission is to research the main cause of this growing epidemic, and to see if dietary change can significantly improve the symptoms and lives of those affected with ASD. As science continues to understand neurodevelopmental disorders such as Autism, the presenters can hopefully understand and provide more evidence for the positive effect

that nutritional changes can have on someone affected.

**Title:** DYSLEXIA
Presenter(s): Hailey Knight
Faculty Sponsor: Ann Gillies

Track:

Abstract: This poster presentation will go in depth about all of the different forms

of dyslexia. It will mention a student that the presenter observed in a classroom who has a form of dyslexia. The poster will also include the evaluation of dyslexia and what teachers can do to help their students with dyslexia. Along with the poster, there will be an activity that shows how hard it is to read a paragraph if you have a form of dyslexia. This poster is designed to help inform people about dyslexia and how it affects the

people who have it.

Title: EFFECTIVE TEACHING FOR DIVERSE LEARNERS

Presenter(s): Sasha Bizer, Chris Cole, Payton Dearboarn, Allie Dilldine, Morgan

Hoffmeister, Jill Hook, Hailey Knight, Angela Koch Ortiz, Leighanne Matson, McKenna Morgan, Lauren Popp, Katie Remmers, Amber Sanborn, Kellen

Shaw, Christopher Sorensen, Wesleigh Williams

Faculty Sponsor: Ann Gillies

Track: 12D

Abstract: This exhibit is a hand-made collection of Structured Tasks, Adapted Books,

and Manipulatives to use with diverse students in the inclusive elementary classroom. These learning materials were created by the 16 Center for Teacher Education students studying Elementary Education in EDUC 374 this Spring semester, 2019. Materials on display appeal to learners with all varieties of learning preferences and are appropriate for learners with and without disabilities. These materials are adaptable, highly visual, have clear organization and structure, and are engaging. These materials promote learning that is directly aligned with Colorado Academic Standards/Common Core State Standards, and materials are accessible for all learners.

Title: EFFECTIVE TEACHING STRATEGIES FOR CHILDREN WITH ADHD

Presenter(s): Morgan Hoffmeister

Faculty Sponsor: Ann Gillies Track: 12C

Abstract: This poster presentation will introduce the audience to Attention Deficit

> Hyperactivity Disorder (ADHD). The presenter will first conduct an activity that gives the audience a similar experience to the struggles that people with ADHD have. The poster will explain that there are different forms of ADHD and how the disorder varies in each student. Next, the presenter will talk about a student she observed who has ADHD. Following that discussion, the presenter will share some effective teaching strategies and tips for teachers. The poster is designed to help inform people about ADHD, its effects, and how to best help and accommodate students.

Title: HEALTH LITERACY AND DISCHARGE PLANNING

Jamie Hyatt, Rachel Kotris, Callie Rubalcaba, Cassie Rubalcaba Presenter(s):

Faculty Sponsor: Erin Donovan

Track: 12C

Abstract: Low health literacy of patients led to poor patient outcomes and hospital

> readmissions. This evidence-based project was not an extensive literature review, but was completed for a class project, to determine in hospitalized adults with acute and chronic illness, what the effect of screening for health literacy was on discharge planning. The Iowa Model of Evidence-Based Practice was utilized to guide literature analysis in order to identify potential nursing recommendations to improve practice. Study findings illustrated the importance of a patient-centered care approach to engage and empower patients. A patient-centered care approach improved the individualization of discharge planning through the use of in-depth surveys and questionnaires to assess health literacy. The benefits of using screening tools were evident in the literature. Assessing health literacy prior to discharge led to decreased hospital revisits after discharge. Therefore, discharge interventions should be utilized according to the literacy level of the patient to improve patient understanding and compliance. Future research should be conducted to determine the most effective methods of assessing health literacy to develop standardized protocols to improve patient understanding and potentially decrease

hospital readmissions.

HYDROTHERAPY: BENEFITS FOR YOUNG AND DEVELOPING Title:

CHILDREN

Presenter(s): Noelle Berg, Bailey Rogers, Julia Simmons

Faculty Sponsor: Ann Gillies Track:

12A

Abstract: There are many ways various therapies are beneficial for young children

> that truly lets them use all of their abilities. What is one element that enables anyone of any age free range of movement and is therapeutic? Water. Young children who have cerebral palsy have many pains, but water therapy is one therapeutic way to relieve some stress and build their strength. Hydrotherapy is a fantastic way for young children to learn to love the water and be able to float with many devices designed to hold up

their heads.

Title: INCLUSION

Presenter(s): Gemini Fernandez, Alexys Sanchez, Sarah Solinger

Faculty Sponsor: Vail Shoultz-McCole

Track: 12A

Abstract: Inclusive teaching practices are essential to child development yet not all

classrooms embrace this view. Research supports the idea that children learn better when working with their peers. Inclusion is successful in most classrooms, but it comes with challenges. Although teachers may express positive views about inclusive practices in the classroom, oftentimes, the practices are being poorly implemented or are not being implemented at all. As a group, the presenters will be comparing three different classrooms regarding inclusion. This will include but not be limited to; inclusion in all of its forms, what inclusion means to teachers and how they wish to implement inclusive practices, and various teaching strategies that have benefited or hindered inclusion. All in all, inclusion should be embraced throughout, and we want to showcase best teaching practices regarding inclusion supported by research and real-life experiences. What does inclusion mean to you, and more importantly what does it mean to children?

Title: LET THEM PLAY!
Presenter(s): Jessica Pike

Faculty Sponsor: Vail Shoultz-McCole

Track: 12C

Abstract:

In preschool classrooms across the nation, parents often ask teachers, 'What did my child do today besides play?'. There is a misunderstanding in our nation of the importance of play in the learning process. As a teacher it is important to be able to explain the benefits of play-based learning in the early years and into elementary school. Through investigation, the presenter will see firsthand if children have better retention when they have opportunities to learn through different experiences that they are passionate about. It is believed that children will be able to focus during class if they are given more breaks and chances for physical activity. There is increasing pressure on teachers to get a student to meet expectations that may be beyond what is developmentally appropriate for that child. This pressure has caused some to believe that there isn't enough time for play. By adding play into learning, teachers will become more effective and increase student performance. Children have amazing potential when they are given the freedom to be kids!

Title: MICROSOFT ADAPTIVE CONTROLLER

Presenter(s): Cara Giancaterino, Halle Harrison, Mackenzie King, Paige Luke

Faculty Sponsor: Ann Gillies

Track: 12C

Abstract: If one could positively change the way children who have disabilities feel

in their community, and among children their age wouldn't one do it? That is what the Microsoft Adaptive Controller does. Four presenters will be sharing information on the Microsoft Adaptive Controller. The goal of this study is to learn more about the adaptive controller and spread knowledge about this new technology. The presenters are researching how the

adaptive controller works, how the designers came up with this model, and

for whom the controller is made.

Title: OPPOSITIONAL DEFIANT DISORDER

Presenter(s): Amber Sanborn Faculty Sponsor: Ann Gillies Track: 12B

Abstract: The presenter will provide two real-life scenarios, based on outbursts

from children diagnosed with Oppositional Defiance Disorder (ODD). The audience will be instructed to discuss their scenario and come up with an appropriate solution. These solutions will then be discussed before leading into the presentation. The presenter will then go on to define ODD, the common signs and symptoms, four possible treatments, tips for teachers on how to handle outbursts, and how to involve parents of children with ODD in the classroom environment. The presenter will then provide information about the child observed for this presentation such as the signs that lead to a diagnosis, behaviors, and the goals that have been set to create a

better academic environment for everyone involved. There will be facts and additional information throughout the presentation, as well as a works cited page for the audience to reference in their independent research.

Title: SENSORY SIDEWALKS

Presenter(s): Samantha Johnson

Faculty Sponsor: Lisa Friel Track: 12C

Abstract: Incorporating movement into education is a flourishing idea in the

teacher education world. Many educators are realizing the importance of moving while learning. Some teachers are trying eagerly to incorporate movement into their everyday routines. Perhaps the most innovative way to do so is by taking advantage of the movement during transitions. This idea, originally from Don't Walk in the Hallway, ensures that students are getting a movement break while going from class to class. Students are in transition multiple times a day, from going to specials or the cafeteria. A local school in Grand Junction has adopted a similar idea to help students during transitions. Because this school doesn't have hallways, this idea was implemented by painting sensory paths on the sidewalk to help students transition from building to building. The sensory paths help give students structure and give them an opportunity for a movement break. There has been an increase in student engagement and achievement because of the sensory pathways. It's amazing how something so simple as adding paint

on sidewalk can improve the overall learning environment!

Title: SEVERE NEEDS BEHAVIOR

Presenter(s): Julie Boano, Lindsay Carpenter Faculty Sponsor: Ann Gillies

Track: 12B

Abstract: For this presentation, two presenters will be discussing the topic of

Severe Needs Behavior (SNB). SNB is commonly found in children with Autism Spectrum Disorder (ASD), but not exclusively. Severe Needs Behavior can be seen through physical acts including physical aggression, property destruction, lack of listening to instruction, inappropriate social interactions and more. These behaviors can include spitting, hitting, biting, throwing, no verbal dialogue more than 2-3 words, rarely initiates play with other students inside/outside of classroom, repetition of words, etc. Signs of SNB can vary from child to child; different children show signs in different ways depending on the child's upbringing and family dynamics, their everyday environment and surroundings, and sometimes just their outlook on life or lack of a role model. For some children, sensory processing disorder can also fall under the Severe Needs Behavior category. This presentation will discuss in more depth the behaviors and signs of SNB. It will also include a simulation to demonstrate feelings of aggression and frustration. The presenters will then offer alternative techniques to assist in the deescalating process of a child with SNB.

Title: SUPPORTING ENGLISH LANGUAGE LEARNING THROUGH LITERATURE

Presenter(s): Mikayla Redd-Bennett, Anna Woodfield

Faculty Sponsor: Ann Gillies

Track: 12A

Abstract: In this presentation, the presenter will explore how to support children

who are learning English as a second language through the use of literature in the classroom. The presenter will use experience from her own work as well as peer-reviewed research in her explanation of different strategies that will prove effective in the education of students learning English. Included in this presentation is an example of literature to use with children who are learning English, as well as the chance to practice using

this literature in an effective way.

Title: THE IMPACT OF EARLY SPEECH INTERVENTION

Presenter(s): Amanda Charles, Heather Wilczek

Faculty Sponsor: Ann Gillies Track: 12A

Abstract: A child's foundation begins at birth. If they do not have a sturdy

foundation, nothing can be built upon it. This sturdy foundation consists of many building blocks, one of these crucial building blocks is language and communication. Many caregivers wait to get their children early intervention. By not providing early intervention, children miss out on many crucial learning and developmental periods. By providing early intervention in language and communication, assistance can be provided to help these students achieve these milestones and create this foundation. The presentation team will be researching the impacts of early intervention in both ways that families and students can receive this assistance; public school and private sector. Research will consist of how early intervention is achieved in educational settings, the results early intervention can achieve, and what could happen if a child who needs this service doesn't receive it.

Title: THE IMPACTS OF SENSORY OBJECTS IN THE CLASSROOM

Presenter(s): Morgan Bond, Kaylie Williams
Faculty Sponsor: Vail Shoultz-McCole

Faculty Sponsor: Vail Track: 12B

Abstract: The number of diagnoses for Attention Deficit Disorder or Attention Deficit

Hyperactivity Disorder is increasing for children under the age of 8. Early childhood teachers must recognize how impactful early identification is regarding helping children to succeed in school. Through action research, the presenters will be exploring the different ways that teachers are using materials in the classroom to increase attention during guided learning activities and in social/emotional development. Some of the objects analyzed will include sensory bottles, stress balls, play-dough, and other items used to assist children in focusing. The presenters will observe in at least 2 different classrooms to compare and contrast the impact that these materials have on learning as well as social and emotional development. Having these types of objects in the class cozy corner may increase the use of self-calming techniques. Some of the questions the presenters would like to answer by the end of the study are: Will sensory materials used during learning time increase attention? What additional types of techniques work best for planned learning times? What materials and techniques will work

best for guiding social/emotional control?

Title: USING STEM TO ENRICH A DEFICIT IN LEARNING

Presenter(s): Lynnette Reddin Faculty Sponsor: Ann Gillies Track: 12B

Abstract: At some point in life, everyone experiences the challenges of solving

problems. However, some people require more opportunity of time and focused skill development to find ways to solving the problems. Students who are identified with a specific learning disability in math have access to explicit, systematic instruction. However, this can also come across as "drill and kill" methods. When the perspective of the goal and instruction are changed, focus can be placed to enrich the deficit. Research shows engagement of integrated STEM (science, technology, engineering, math) projects will increase critical thinking, working memory, and 21st century technology skills. If teachers had a method to improve cognitive thinking, why would one not engage a STEM based method for instruction to enrich a specific learning disability in the area of math? Students need to develop critical thinking skills to problem solve and thus leads to motivation in post-secondary education and specific job skill training.

Title: WHY S.T.E.A.M LEARNING AND WHAT IS IT?

Presenter(s): Michelle Moore, Jennifer Romo

Faculty Sponsor: Vail Shoultz-McCole

Track: 12A

Abstract: As educators, part of the job is to stay up-to-date on current learning

standards, and to prepare young students to be engaged members of society. STEAM is an acronym for Science, Technology, Engineering, Art, and Math, and is a major educational avenue used by educators and school districts nationwide. What does it really mean though? How does it pertain to early childhood learners and teachers? STEAM is a growing framework guiding teachers as they provide supporting learning styles for students developing critical thinking, practicing problem solving, and work to expand their creativity. When educating through a STEAM learning process teachers are able to engage all learners by bringing together different educational disciplines into one learning experience. STEAM engages both sides of the brain at once as well as a variety of different learning centers in the brain. STEAM education promotes additional learning outcomes that extend beyond the classroom and into the world. The presenters will be exploring the following questions: What is STEAM's relationship to learning standards? How does it pertain to Early Childhood

teachers and students?

## THEATRE ARTS

A CHOREOGRAPHER'S PROCESS: A STUDY IN HEALTHY LEADERSHIP Title:

Presenter(s): Carly Nugent Faculty Sponsor: Amanda Benzin

13F Track:

Abstract: What qualities does a "healthy leader" who works with theatre students

possess? This presentation will focus on a specific case study surrounding the students of Pine Creek High School's theatre department who have been left in confusion and disarray after major faculty turnover in the last year. These students are in desperate need of healthy and balanced leadership to show them how to work professionally as well as have fun and be creative in the process. This presentation will focus on the impact of a choreographer's process working on this High School's spring musical to demonstrate the mentorship and modeling of healthy leadership in a

structured and focused, yet fun loving and creative way.

Title: A SCENE FROM: THE IMPORTANCE OF BEING EARNEST

Presenter(s): Jordan Gray, Ryland Mahre

Faculty Sponsor: Ben Reigel

Track: 13A

Abstract: The Importance of Being Earnest was first performed at the St. James

Theatre in London. While Oscar Wilde was primarily a short story writer, he found fame in this now 3-act play due to its light-heartedness, an unusual, and often disregarded genre for the theatre in which it premiered. Now, The Importance of Being Earnest is widely accepted as a classic and was even nominated for three Tony awards for its 2011 run on Broadway. Our intended audience is those who are looking for a light introduction to high comedy with a deeper meaning. Indeed our goal is that the audience understand what highly stylized comedy from the late 19th century to the early 20th century looks like. For us, Oscar Wilde's play The Importance of Being Earnest has resonated because it was one of our earliest introductions to the professional theatre. We specifically wanted to do

this scene because it contains the two characters that we consider to be "dream roles". We hope that by playing them in this brief scene we can gain an understanding of what it would take for us to play these roles for a full-length showing in the future.

Title: AGORAPHOBIA

Presenter(s): Collin Hood, Peter Kisiel, Shandon Rushton

Faculty Sponsor: Maurice LaMee

Track: 13A

Abstract: The artist has composed an original script that aims to speak on behalf of people that tend to isolate themselves, especially due to mental illness, or anyone who has ever felt alone. Agoraphobia is a 10 minute play taking

place in a Soviet apartment after the fall of the USSR. The apartment is mostly untouched since then, until a rebellious, yet lonely youth happens upon it. The actors perform a staged reading, they will be using a few

props, while reading from the most recent draft of the script.

Title: ALL DRESSED UP AND NOBODY TO BE

Presenter(s): Alyssa Gose Faculty Sponsor: Jeremy Franklin

Track: 13C

Abstract: All Dressed Up and Nobody to Be is a cabaret written and performed by

Alyssa Gose. As a theatrical performer, the artist is required to become other people. In this piece, the artist explores the reasoning behind their need to hide behind characters in order to define themselves. The artist chose to explore the effect this constant transformation has on their psyche. In this cabaret, different "characters" or aspects of their personality are examined individually. By the end, it becomes hard to tell who the artist actually is due to the imposed division between each aspect. This work is intended to be seen by other artists or people who know artists that are struggling with their own identity issues. This segment of the piece details the pitfalls of discovering confidence in sexuality, and the insecurities that often arise when this is first discovered. The two songs being presented are A Call from the Vatican from Nine by Maury Yeston, and Perfect from Edges

by Benj Pasek & Justin Paul.

Title: AMAZED, THEN CURIOUS, BELIGERENT THEN HEARTBROKEN

Presenter(s): Blake Hood, Kyra Young

Faculty Sponsor: Ben Reigel Track: 13A

Abstract: These excerpts from two auto-biographical one-man shows is a nuanced

look at the complications of modern dating and a realistic look at the chemistry between two people and how it affects professional, academic and personal relationships. This project stems from a passion project between the two involved individuals in coping with the past, present and future of their relationship and using art as a lens in which to observe that relationship from an outside perspective. These scenes are part of one half of both individuals separate shows that take their point-of-views in a "Bathroom Mirror/Vanity Confessional" perspective, putting the audience in the reflection as the individual talks to "himself" about his day and what he's going through. This humorous, dramatic performance outlines what connection people are chasing in a modern dating setting, in a new and unknown dating landscape. This piece should create questions of morality and meaning and make the dating battlefield into more of a playground and encourage people not to take life so seriously when matters of the heart are involved. Young adults that have a taste for humor and uproarious behavior are the intended audience of the project.

Title: AND LAST BUT CERTAINLY NOT LAST

Presenter(s): Kyra Young Faculty Sponsor: Jeremy Franklin

Track: 13C

Abstract: And Last But Certainly Not Last is a demonstration of a young lady finding

herself through the struggles and highs of musical theatre. She starts her journey passionate about what she does eager to be the best performer. And soon realized how very difficult that dream really was. So she faces the hardest lesson of learning how to let go and find a new path. Through the musical number "Always Remember Us This Way" from the recent movie A Star is Born. Through this piece she finds peace in learning how to let go and find a new path! But is this new path the best path? She takes these new found feelings and decides to take for a spin "Out Tonight" from the

musical Rent.

Title: ART AS MEDICINE

Presenter(s): Hope Brown Faculty Sponsor: Paula Casey

Track: 13D

Abstract: Imagine that you or someone you love is diagnosed with a life-threatening

disease. This disease will require extensive medical care and oftentimes be accompanied by uncomfortable side effects. What if there was an alternative option? Art therapy is another possibility that is innovative, cost-effective, and manageable. Even though it is not a magical cure-all, art therapy is an alternative to traditional medicine that is effective in treating certain symptoms of disease and aiding in the management of side effects of clinical care. In this presentation, I will describe some of the types of art therapy, show how art promotes social and individual change, and use a specific disease to illustrate the power of art in healing.

Title: BANGS CANYON THROUGH DANCERS' EYES

Presenter(s): Laura Huwa, Linnaea Zaenger

Faculty Sponsor: Amanda Benzin

Track: 13F

Abstract: Since I was a young child, exploring the environment has always been

an important part of my life. I have also always been passionate about dancing and sharing that passion with others. This presentation will highlight the combination of those two parts of my life with a site-specific dance-for-camera piece in Bangs Canyon. The project is a collaboration between myself and Laura Huwa and is set to an original composition by Danielle Huwa. The video that will be shown during this presentation features dancers using improvisational scores that focus on conscious and careful exploration as well as an appreciation of the environment around

them.

Title: COMMUNICATION COLLABORATION CREATION

Presenter(s): Ashlee Arline Faculty Sponsor: Amanda Benzin

Track: 13B

Abstract: How we adapt, move, and create is influenced by our sources of inspiration

and is communicated through multiple modalities. This performance presentation focuses on what happens when two diverse choreographers are given the same source of inspiration, a poem, from which to adapt, move, and create. I will incorporate their personal interpretations of the poem, as well as use spoken text I create. This collaborative creation highlights the importance of utilizing multiple forms of communication (written, verbal, and non-verbal) to fully express the many ways artists

adapt, move, and create.

Title: CREATING EVIL SPECIES: THE POWER OF CHILDREN'S MEDIA

Presenter(s): Collbren Lang Faculty Sponsor: Paula Casey

Track: 13D

Abstract: For decades, many different animal species have been depicted in popular

children's films and literature. Characters portrayed as animals inevitably feed a child's desire for curiosity and wonder. However, why do certain species of animals such as vultures, rats, and hyenas conjure strong abhorrence among not only children, but adults? Even the mention of a culturally undesirable animal can make one become disgusted or fearful. The negative portrayal of such species in popular children's media allots select species with an intrinsic nature of evilness, which inevitably alters the way in which a particular species is perceived. This speech examines some common negative and positive biases that are held among certain species in association with children's media, as well as the repercussions for viewing animals in a biased way. The concepts of anthropomorphism and speciesism help to identify the different perceptions of animals that children will carry

on with them into adulthood.

Title: DANCE AND AUTISM

Presenter(s): Olivia Crochet Faculty Sponsor: Benzin, Amanda

Track: 13F

Abstract: The resources available to children (6-12 years old) who have Autism are

limited in small cities, and Grand Junction is no different. The research I have done in the realm of Dance Therapy has shown the numerous benefits that dance can have on children with Autism. Dance can help improve social, behavioral, and communication skills that are often a struggle for people with Autism. In this oral presentation I will address the benefits dance can provide as well as lay out a foundation for a program that I am

going to bring to children in the Grand Valley.

**Title: DEW DROP** Presenter(s): Emily Predovich

Faculty Sponsor: Jill VanBrussel
Track: 13F

rack: 13

Abstract:

According to the book of Ezekiel, those whose hearts are "estranged" from God are, in some cases, given a direct answer from Him to questions in which they are lost. Such is the case of Emily Predovich. When Emily was sixteen-years-old, she went through an experience that literally cut her off from any relationship with her father. As someone whose childhood hero began to play the part of a villain, Emily came to college in search of something to fill the void his absence left in her heart. In the end, she was given the choice between destroying what, in Tolkien terms, came to represent her Ring of Power or the choice of, in Tolstoy terms, jumping in front of the same train that destroyed Anna Karenina. Through a collage of various literary and theatrical symbols, Emily has put together an audio visual representation of proof that Jesus Christ delivered her from what

turned her father into a monster.

Title: DIGITAL AUDIO IMAGINATION

Presenter(s): Daniel Davidek Faculty Sponsor: Michael Legate

Track: 13F

Abstract: Sound design in theatre is a unique path that allows one to accentuate

newly created worlds with the atmosphere and sounds you hear in

otherwise would have led her on the same path of self-destruction that

everyday life. Designers use a plethora of tools to achieve these goals. This presentation focuses on the advent of Digital Audio Workstations (DAWs)

and how they allow the designer to freely create new worlds, and new characters, from everyday life. Focusing on a particular DAW, FL Studio, this presentation will demonstrate how a designer can take a basic voice or sound effect recording, and transform it into something that fits the cohesive design of a professional theatrical production, and to create a whole new world.

Title: EXCERPT FROM HIDING

Presenter(s): Jonathon Botello Faculty Sponsor: Jeremy Franklin

Track: 13C

Abstract: Hiding, is a cabaret written and performed by Jonathon Ramos (Botello).

The show focuses on the struggles of dealing and coping with depression, anxiety, and the biggest beast of all, yourself. When the performer constantly masks his pain to maintain his own version of happiness, he soon realizes that he is unable to hide anymore; for his life has gone dark and he is left with his own thoughts. This excerpt will outline the fall of the performer when he realizes there is nothing left to hide behind. In addition, 2 songs from the cabaret will featured: "Breathe" from In The Heights by Lin-Manuel Miranda, and "I Miss The Mountains" from Next To

Normal by Brian Yorkey & Tom Kitt.

Title: GRAPHIC DESIGN – THE NEW LANGUAGE OF MOLECULAR BIOLOGY

Presenter(s): Nicole Castle Faculty Sponsor: Nicole Grider

Track: 13E

Abstract: If a picture is worth a thousand words, then clearly visual communication

is an essential part of communication. Graphic designers are often responsible for creating visual communication and serve many fields, including molecular biology. It is their accurate and attractive visuals of molecular biology that help engage and educate, worldwide. Molecular-level biology is complex and multi-layered, rendering it a difficult subject to portray meaningfully and comprehensibly. Thus, this informative presentation illustrates the crucial role graphic designers play in creating accurate artistic portrayals of molecular level biological subject matter – especially for collegiate-level learners – as well as the integral role accurate graphic design plays in the biotechnology industry, for scientists and general audiences alike. Results of this study indicate that, ultimately, as the field of molecular biology expands, the need for individuals who are trained in both molecular biology and graphic design will continue to grow

as well.

Title: HELLO, MY NAME IS...

Presenter(s): Lauren Valdez Faculty Sponsor: Jeremy Franklin

Track: 130

Abstract: Hello, My Name Is... is an original cabaret written and performed by

Lauren Valdez with piano accompaniment by Douglas Morrow and guitar accompaniment by Kris Karns. The cabaret is told through the perspective of the many different emotions that occupy Lauren's mind. Each emotion has been thoroughly developed and personified to become active characters within her artistic and personal life. This excerpt from the complete work will include "I'm Not Good Enough" by Jeremy Jordan and "Calm" from Ordinary Days by Adam Gwon. This section of the cabaret focuses on the perspective of Self-Doubt and Anxiety, two of the main characters that play a large role within the performer's life.

HOW THE EYES SEE Title: Presenter(s): Quiana McElrov

Faculty Sponsor: Amanda Benzin Track: 13R

What is musicality, and how do we "visualize" it? The human body can Abstract:

> express more than just movement; I am presenting a soundscape, or visual representation of music. The soundscape will be performed live because I find that music and dance is best experienced in person. The dancers will be experimenting with different movement and various genres of music. I invite the audience to witness each piece of the composition through movement. Music is more than the songs on our devices. It is all around us. I want to broaden the perspectives of the viewers by giving them the tools

to see and witness music and dance in new ways.

Title: HOW VIDEO GAME DEVELOPERS USE NONVERBAL COMMUNICATION

CUES TO CREATE UNTRUSTWORTHY CHARACTERS

Presenter(s): Victoria Riggs Faculty Sponsor: Nicole Grider

Track: 13F

Abstract:

Many narratives utilize unreliable or untrustworthy character lies and betrayals to forward the plot. Video games also rely on this trope, with a large focus on deceptions to reveal plot twists or introduce storylines. After careful observation regarding how some video games rely on direct verbal information to deceive the player, a research question emerged: What nonverbal communication cues are used to visually telegraph that a character is lying to the player? As such, this informative research in-progress will, through the lens of Bueller and Burgoon's (1996) Interpersonal Deception Theory, determine which nonverbal cues game developers use to promote or encourage player deception. Additional tools this mini-content analysis is utilizing includes VERITAS, an educational video game that teaches players to recognize if a pre-recorded actor is lying or not, and four video games, though only two will be presented: Resident Evil 7 and Doki Doki Literature Club. Anticipated results may demonstrate how game developers rely on nonverbal cues related to body posture and physical attributes, such as hair and clothing, rather than facial expressions and hand gestures to yield more subtle deception cues.

I DON'T KNOW, SO STOP ASKING Title:

Presenter(s): Anna Dworkin Jeremy Franklin Faculty Sponsor:

Track:

Abstract: Everyone at some point in their life gets asked, "What are you going to

do when you graduate?" which rarely people know the answer to. I Don't Know, So Stop Asking is an original Cabaret performed by Anna Dworkin and accompanied by Doug Morrow. The cabaret explores the impossible question of the future and what it entails for each individual. The presenter performs "Breaking Down" from Falsettos, written by William Finn and

"Therapy" by Mary J. Blige.

Title: LEGALLY BLACK Presenter(s): Heidi Snider Faculty Sponsor: Jeremy Franklin

Track:

Abstract: Legally Black is an original cabaret written and performed by Heidi Carann

Snider, featuring piano accompaniment by Douglas Morrow. The cabaret follows the life of the artist and her journey to self- acceptance as she overcomes bullying, ridicule, and racism. Adopted into a Caucasian family she was uniformed of her rich heritage, and only began to notice when a boy in the first grade asked why her parents had painted her brown. The

artist presents the first two songs from the show: "When Will My Life Begin?" by Alan Menken from the animated film Tangled and "I'm Not Afraid of Anything" from the song cycle Songs for a New World by Jason Robert Brown.

Title: MUSIC AS THE ROOT OF COMMUNICATION AND CONNECTIONS

Presenter(s): Christie Thammavong

Faculty Sponsor: Grider, Nicole

Track: 13F

Abstract: Henry Wadsworth Longfellow stated, "music is the universal language of

mankind." Lyrical and melodic structures capture the interwoven human experience to demonstrate how we influence the music that influences us. According to Daniel J. Levitin (2008), any song may be sorted into one of six categories: friendship, joy, comfort, knowledge, religion, or love. Thus, this research paper accepted the challenge to analyze and classify the interpersonal nature and connective effects of four lyrical selections: (a) Christmas Carols (in a minor key); (b) Friday On My Mind (The Easybeats); (c)?Back in the Highlife Again (Steve Winwood), and (d) Book of Rules (The Heptones). The results of this mini-content analysis indicated that our ability to understand meaning emerges through collective experiences with music, regardless of culture, language, sympathies, empathies, or lack of emotions. Shared music contributes to our connections and relationships as well as our ability to define human nature.

Title: OUTSIDE THE LINES

Presenter(s): Annie Imes Faculty Sponsor: Jeremy Franklin

Track: 13C

Abstract: Outside the Lines is a solo cabaret about the artist's journey to figuring

out who she is. It is written by Annie Imes with piano accompaniment by Douglas Morrow. As a visual artist one of Annie's goals in life is to have her drawings in a children's book. For her cabaret, she decided to combine the musical theatre performance training she has received from Colorado Mesa University with her visual arts background. Annie has created a coloring comic book that highlights experiences in her life that have shaped who she today. The two songs featured today are "My Top Secret Personal Beeswax" by Zina Goldrich and Marcy Heisler and "If I Only a

Had a Brain" by Harold Arlen.

Title: PUZZLE PIECES

Presenter(s): Katelyn Craig Faculty Sponsor: Jeremy Franklin

Track:

Abstract: Puzzle Pieces is a fully realized solo performance written by Katelyn Craig

> and accompanied by Douglas Morrow telling the story of the artist's coming into faith. The story of losing one's self in order to find one's self is told through spoken word and songs in various styles—musical comedy, Golden Age, and contemporary musical theatre as well as contemporary commercial music styles. The work expresses all that it is to be human—it is humorous, light-hearted, and at times, heavy. But it is an expression of who the artist is. A short segment of the full show will be performed featuring "Waitin' for My Dearie" from Lerner and Loewe's Brigadoon and "Safer" from the musical First Date interwoven with anecdotes that shaped

the artist as a person.

Title: SELF-RELIANCE Presenter(s): Dana Liesegang

Faculty Sponsor: Scott Andrews

Track: 13D

Abstract: Everyone suffers setbacks, moments in life that test what you're made of

and that change our lives completely, for better or worse. The question in these moments is, Are you going react from a position of fear or love? Will your Self grow or wither? The reality of experience is that until you get "stuck in the mud," forced to take responsibility for your actions, you may never know the strength and capacities you hold within. When no one is around to help, life has a way of teaching us what Dr. Wayne Dyer believes:

"People who truly understand what is meant by self-reliance know they must live their lives by ethics rather than rules."

In this talk, one survivor tells a harrowing tale of a second survival—a story of endurance and ingenuity from the middle of nowhere, of a dead Blackberry, crawling through mud, coyotes, bears, supernatural beings, and an outhouse. It's a night that redefined for her "independence" and beyond that, "complete self-reliance." It's in moments like these one has to "dig deep," must turn within, draw on higher powers (both inside and above), and learn from experience. Above all, you don't have to be "stuck in the mud."

in the mua.

Title: THE EMBODIMENT OF A PERFORMER: ONE CHOREOGRAPHER'S

STORY THROUGH MOVEMENT

Presenter(s): Alana Koch Faculty Sponsor: Amanda Benzin

Track: 13B

Abstract: As human beings, we all experience emotions. We are affected by

circumstances in our lives that spark ideas or messages that we wish to convey to others. There are certain situations however, in which words are not the best medium of communication for those messages. Dance offers a powerful portrayal of non-verbal communication that is expressed through the body. As a performer, it is my passion to bring those emotions, messages, and ideas to life through movement. Conveying meaning without words is the beauty, and also responsibility of a performer. It is my task to convey a choreographer's story so that others may relate it back to their own lives. This is why my efforts as a performer are so crucial to the perception of the dance as a whole. This dance performance will show a certain choreographer's story, and how it is expressed through movement

in my own body.

Title: THE TAMING OF THE SHREW
Presenter(s): Ashli Alderman, Peter Kisiel

Faculty Sponsor: Ben Reigel Track: 13A

Abstract: Ashli Alderman and Peter Kisiel will be performing a scene from William

Shakespeare's *The Taming of the Shrew*. Ashli will be playing Kate, an abrasive, ill-tempered woman who must be married off before her younger sister can choose a suitor, and Peter will be Petruchio, the only man brave and cunning enough to take Kate on. Throughout the scene, Petruchio and Kate have a duel with words; Petruchio tries relentlessly to charm Kate, while she deflects his advances with insults. In the end, Petruchio resolves to marry Kate, and make a good wife out her, despite

Kate's vehement opposition. The performers chose this piece because Shakespeare is often shoved into public consciousness by being taught in English classes in grade school, which makes it seem dry and boring. They would like to show that Shakespeare's plays are not just confusing old stories, but they can be easily understood and funny. They have learned to rely on body language, vocal inflection, and staging to better bring alive the Shakespearean experience. They would like the audience to learn that Shakespeare's plays are relevant, worthwhile, and should not be discredited because the language "does not make sense."

Title: WAITING FOR GODOT

Presenter(s): Thomas Jacobs, Justin Whittenburg

Faculty Sponsor: Ben Reigel Track: 13A

Abstract: In this performance, two actors will perform a scene from Waiting for

Godot by Samuel Beckett. Beckett was an Irish novelist and playwright known for tragic-comic works regarding human existence.

The play also lends itself to many interpretations for the viewers to ponder over due to the minimalistic approach and many kinds of social, political, and religious influences. This is a fantastic piece to show in a Showcase as it is not like anything produced today and is a quintessential piece of writing that's holds historical weight to the theatre community, and thus needs to be performed.

Waiting for Godot is a play in which two characters, Vladimir and Estragon, wait in vain for the arrival of a man named Godot. Why do they wait? Who is Godot? Why don't they leave? These are questions that the characters and the audience struggle with in this frustrating, hysterical, and hugely influential work. We chose this as it is a challenging piece to act in, yet equally rewarding if done correctly. We hope to bring Beckett's work to life through our performance, and to showcase one of Beckett's most prolific works.

## WESTERN COLORADO COMMUNITY COLLEGE - EXHIBIT

Title: 2X72 INCH BELT GRINDER FOR KNIFE MAKING

Presenter(s): Wade Young
Faculty Sponsor: Michael Carlton

Track: 14A

Abstract: As part of the Machining and Manufacturing program at WCCC, I want to

submit my personal project in hopes of inspiring the students of tomorrow. The project is a machine designed to grind and sharpen and shape custom knife designs, but also has many other uses associated with both metal and wood manufacturing. It is commonly referred to as a belt grinder to those familiar with the art of knife making. It consists of three balanced wheels, 2 of which are crowned in the center for guiding the belt and one large rubber coated wheel known as a contact wheel. The contact wheel is used to grind a concave profile in the knife stock called hollow grinding. The machine runs on a 2 horsepower electric motor that is connected to a variable frequency drive or VFD. This is how the speed of the motor is controlled without loss of torque. A 2 inch by 72 inch sanding belt rides on the wheels to do all the work. The sanding belt grit can range from 24 grit to 2000 grit.

Title: ELEVATOR FUN

Presenter(s): Andrew Bennett, Chris Urbanski

Faculty Sponsor: John McLaughlin

Track: 14A

Abstract: This project will demonstrate my knowledge of plc ladder logic

programming. It will involve a multiple floor elevator controlled by the plc

program.

Title: GO-KART SUPERCHARGER PROJECT

Presenter(s): Marco Bravo, Allen Cochran, Edward Dry, Gretchen Kowalczyk,

Joel Woodward

Faculty Sponsor: Michael Carlton

Track: 14A

Abstract: Anyone who has a passion for muscle cars knows that a supercharger is one

of the best way to add additional air to an engine, in turn allowing you to add more fuel and more power per combustion stroke of an engine. The basic principle of a supercharger is based on the fact that there are 3 main elements to combustion, air, fuel, and spark. By adding the additional fuel and air, the spark creates a more efficient and powerful combustion cycle. As a group, we decided that the best way was to send our thoughts over to a group of engineers to aid in the design and assembly of a supercharger, since you cannot buy one for a small engine. They created the Solidworks files for us to use and made a few designs to choose from. We decided on a three flute roots style design. With their Solidworks files and a 3D printed model that they used to demonstrate the functionality of the supercharger, we imported the files into a FeatureCAM program to run on a CNC machine. The supercharger will be mounted to a small engine powered a

go-kart.

Title: HYDRAULIC ACTUATED ROBOTIC ARM

Presenter(s): Joshua Chaffee, Joseph Penkaty, Christopher Roche, Bradly Schiesser,

Brandon Wilson, Wade Young

Faculty Sponsor: Michael Carlton

Track: 14A

Abstract: The Western Colorado Community College Machining Program, in

collaboration with Eureka! McConnell Science Museum, came together to build a robotic arm. The robotic arm will be used to teach the youth the concept of hydraulics. The arm is comprised of machined aluminum parts assembled on a steel base. It has the ability to grab, pick up and move objects, such as empty soda cans or tennis balls, with the use of hydraulic actuators. The arm's movement is manipulated by pushing or pulling different actuator pistons. Product development involved planning, design, material gathering, and machining of parts. The teamwork and communication used in this project are a demonstration of a production process that is used in industry. This process begins with drawings by the engineer, to the physical machining and assembly, down to the trial and error of functionality. The end goal of this project is to spark interest in the

minds of the youth about engineering, machining, and robotics.

Title: ROOM TEMPERATURE AND LIGHT DETECTION ROBOT

Presenter(s): Nicholas Howland Faculty Sponsor: Steve McGraw

Track: 14B

Abstract: My student showcase is a rolling robot that will sense if walls or

obstructions are present and maneuver around the obstacles that impede the robots ability to move forward or navigate through the terrain. The robot will also be able to sense room temperature and amount of ambient light present. This sensor data would be presented in the form of text on an LCD screen that would be attached to the robot and would appear

when the robot exits the room that it was obtaining data from.

# PLANNING COMMITTEE

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Theatre

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#### Deb Parman,

Business

#### Jared Workman,

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#### Bill Wright,

Languages, Literature and Mass Communications

#### Kristen Yeon-Ji Yun,

Music

## SESSION FACILITATORS

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**Cathy Bonan-Hamada** Lily Cain

Paula Casey Dee Chambers

Tim Casey

Shiang-Lih Chen -McCain Rhonda Claridge Michael Delaney Erin Donovan Casey Dry Ann Gillies **Justin Gollob** 

Eli Hall Paul Hampton Tim Hatten Christy Hein

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Physical and Environmental Sciences

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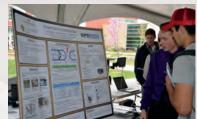
**Biological Sciences** 

# ★ STUDENT SHOWCASE

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# \* Student Showcase

NOTES:						
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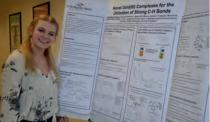
## **ACADEMIC AFFAIRS**

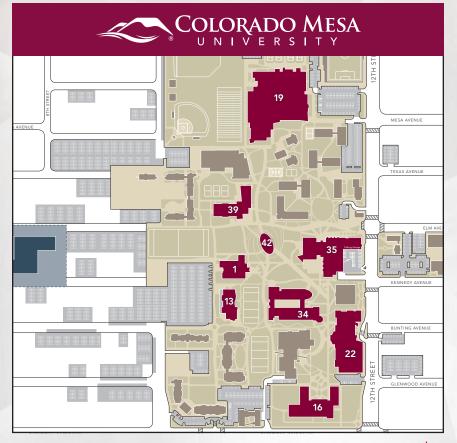
coloradomesa.edu/showcase

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## STUDENT SHOWCASE

Maverick Center (MC) ...... 19

Kinesiology



the following locations across the CMU Main Campi				
Dominguez Hall (DH) 1  • Business  • Teacher Education	Moss Performing Arts Center (MPAC) 2.  • Judges Check-In  • Kick-Off Event, Love Recital Hall, 1:15pm  • Music			
• Languages, Literature and	Theatre Arts			
Mass Communications  Theatre Arts	Plaza (tent)			
Western Colorado Community College	Western Colorado Community College			
Fine Arts Building (FA)	University Center (UC)			
Social and Behavioral Sciences	Wubben Hall & Science Center (WS) 36  • Biological Sciences  • Computer Science, Mathematics			

and Statistics

• Physical and Environmental Sciences