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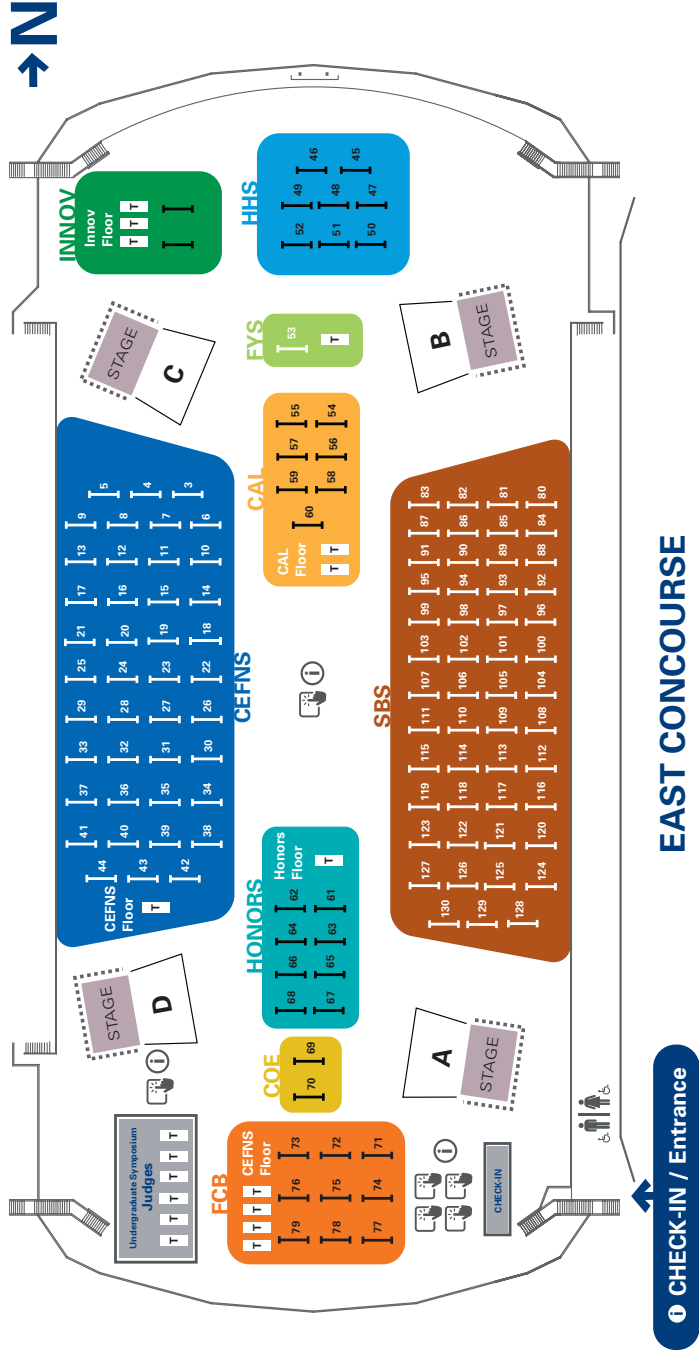
# UNDERGRADUATE SYMPOSIUM

## TO DISCOVER, CREATE, AND SHARE

FRIDAY, APRIL 27, 2018 | 9 AM – 4 PM

[nau.edu/symposium](http://nau.edu/symposium)

# DOMES FLOOR MAP



## Message from the President



Dear Students, Faculty Mentors, and Guests:

I am privileged to welcome you to NAU's tenth annual Undergraduate Symposium. The students presenting their ideas, creative endeavors, and research today will fill the Skydome and du Bois Center with the excitement of new discoveries.

The sheer scale of the symposium reflects the NAU community's commitment to research and creative work at the undergraduate level. It also represents our shared dedication to service learning and collaborative projects that connect students with opportunities to make a difference.

Our faculty, who are world-class scholars with a passion for mentorship, create opportunities

for exceptional undergraduate learning every day. Their influence, joined with the support of our donors and sponsors, creates an environment where intellectual discipline and joyful curiosity become lifelong habits for our students.

This devotion to student success pays rich dividends. NAU students are not average — they are exceptional. They are motivated self-starters who make the most of every opportunity we can give them, pursuing knowledge about the world around us and communicating their findings in imaginative ways. In doing so, they craft a brighter future for themselves and for all of us.

My congratulations to our students and everyone who contributed to this event.

Sincerely,

Rita Hartung Cheng

President

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### Thank You .....

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**Search for presenters, titles, and abstracts at the event kiosks or online at [nau.edu/symposium](http://nau.edu/symposium).**

#### Abbreviations

<b>CAL</b>	<b>College of Arts and Letters</b>
<b>CEFNS</b>	<b>College of Engineering, Forestry, and Natural Sciences</b>
<b>COE</b>	<b>College of Education</b>
<b>HHS</b>	<b>College of Health and Human Services</b>
<b>HONORS</b>	<b>Honors College</b>
<b>INNOV</b>	<b>boundaryless and Innovative Thinking</b>
<b>FCB</b>	<b>The W. A. Franke College of Business</b>
<b>SBS</b>	<b>College of Social and Behavioral Sciences</b>

**Undergraduate Expo:** A week-long showcase for research in the arts, business, education, the humanities, and the sciences April 19–29, 2018.



Join NAU students, faculty, staff, and the Flagstaff community at the 2018 Undergraduate Expo, a week-long showcase for research in the arts, business, education, the humanities, and the sciences. Several university events are offered in addition to the culminating Undergraduate Symposium. All events are free and open to the public. Learn more at [nau.edu/expo](http://nau.edu/expo).

#### Thursday, April 19, 2018

##### Educate2Act

- 12 PM – 5 PM
- Eastburn Education, Room 190, *Building 27*

#### Thursday, April 19 – Friday, April 20, 2018

##### Student Water Symposium

- Thursday: 9 AM – 5 PM
- University Union, Havasupai C, *Building 30*
- Thursday: 6:30 PM – 8:30 PM
- Cline Library, Assembly Hall, *Building 28*
- Friday: 9 AM – 5 PM
- University Union, Havasupai AB, *Building 30*
- Friday: 6:30 PM – 8:45 PM
- Cline Library, Assembly Hall, *Building 28*

#### Friday, April 20, 2018

##### Interdisciplinary Climate Change Teach-in

- 8:30 AM – 5 PM
- University Union, Kaibab Room, *Building 30*

#### Wednesday, April 25 – Sunday, April 29, 2018

##### Student Artist Series

All events held in Ashurst Hall, *Building 11* unless otherwise noted

- Wednesday, April 25:
  - A String Tuba Thing (Tuba Concert), 7:30 PM

- Thursday, April 26:
  - Julio Chavez and Michael Fine, guitar, 4:30 PM
  - Avery Jones, bass, 7:30 PM
- Friday, April 27:
  - Alice Pratt, soprano, and Jennifer Herbert, soprano, 4 PM
- Saturday, April 28:
  - Student Wind Chamber Concert, 10 AM
  - Dominic Campos, violin, and Caryn-Josephine Carpenter, violin, 12:30 PM
  - Oboe Studio Recital, 3 PM
  - Cello Studio Recital, 5:30 PM
  - Samantha Isely, mezzo-soprano, and Katherine Rosenfeld, soprano, 7:30 PM
- Sunday, April 29:
  - Kimberly Karp, flute, 1:30 PM
  - Megan Fraser, violin, and Neelee Brauner, viola, 4:30 PM
  - Tyler Neidermayer, clarinet, 7:30 PM, Ardrey Memorial Auditorium

#### Friday, April 27

##### Bachelor of Fine Arts Show Opening Reception

- 5 PM – 7 PM, Performing and Fine Arts, Beasley Gallery, *Building 37*



## Hooper Poster Presentations and Reception: Special Event by Invitation Only

The Office of Undergraduate Research and Scholarship celebrates this year's Hooper Undergraduate Research Award recipients, with special guest, Dr. Henry O. Hooper, retired NAU associate provost for academic affairs and physics professor emeritus.

**Thursday, April 26, 2018: 4:30 PM – 6:30 PM**

**Native American Cultural Center, Building 14, Gathering Room**

- Jessica Aerts: *Finding Underground Treasures: The Information Gained From Seismic Arrays* (Mentor: Ryan Porter)
- Gillian Brailsford: *The Molecular Examination of the Hybridization of Northern and Gilded Flicker* (Mentor: Russell Benford)
- Holly Buban: *A Global Map of Martian Volcanic Landforms* (Mentor: Lisa Skinner)
- Austin Dikeman: *Tracking Escherichia coli Infections of the Endangered New Mexico Meadow Jumping Mouse (Zapus hudsonius luteus)* (Mentor: Faith Walker)
- Sydney Eck: *Measuring Sarcomere Lengths during Tetanic and Twitch Stimulation* (Mentor: Kiisa Nishikawa)
- Logan Gonzales: *Longer Term Effects of Jackstrawing on Aspen Regeneration and Large Ungulate Presence on the Schultz Fire, Coconino National Forest, AZ* (Mentor: David Huffman)
- S. Emily Grams: *The Influence of Soil Depth and Grazing Practices on the Quantity and Quality of Soil Carbon in Semi-arid Rangelands* (Mentor: Nancy Johnson)
- Tristan Hess: *Project Shelter* (Mentor: Britton Shephardson)
- Shelby Hutton: *Developing a DNA-based Assay to Characterize Insecticide Resistance in the Oriental Rat Flea (Xenopsylla cheopis), an Important Plague Vector in Madagascar* (Mentor: Joseph Busch)
- Morgan Jones: *Genetic Analysis of a Chuckwalla Population on South Mountain, Arizona* (Mentor: Russell Benford)
- Janus Kozdon: *Identification of Variable Dust Depositions in Elysium Planitia, Mars* (Mentor: Christopher Edwards)
- Taylor Lambrigger: *Identifying the Unidentifiable: Using Isotopic Analysis to Develop Biological Histories in Forensic Cases from Flagstaff, Arizona* (Mentor: Corina Kellner)
- Emelia Lawrence: *Milkweeds for Monarchs* (Mentor: Richard Hofstetter)
- Jose Marmolejo: *Mapping and Structural Analysis of the Las Vegas Valley Shear Zone, Nevada* (Mentor: Paul Umhoefer)
- Evan Mee: *Characterization of Glandular Trichome Exudate on Yellow Monkeyflower (Mimulus guttatus)* (Mentor: Liza Holeski)
- Hayden Niehus: *Plato's Refutation of Empiricism: Commentary on the Grammar and Vocabulary of Theaetetus: 151e-183c* (Mentor: George Rudebusch)
- Amalee Nunnally: *Are Soils and Waterways in Flagstaff, AZ, Important Reservoirs for Clostridium difficile?* (Mentor: Paul Keim)
- Étude O'Neel-Judy: *Nanomotors Driven by Light* (Mentor: John Gibbs)
- Kacie Pajkos: *O<sub>2</sub> Depletion along Thaw Gradient using Carbon Isotope Ratios in Soil DNA* (Mentor: Egbert Schwartz)
- Vivian Phu: *Drawing Upon Cultural and Ethnic Awareness: A Visual Autobiography of a First-Generation Chinese-American* (Mentor: Pamela Stephens)
- Angela Rincon: *A Study of a North American Freshwater Sponge Living in the Rio de Flag* (Mentor: Stephen Shuster)
- Dan Rivera: *Predicting Patient Response to Treatment of Crouch Gait with a Winding Filament Muscle Model* (Mentor: Zachary Lerner)
- Tanner Rosenberg: *Computing Maximal Sorting Length of Signed Permutations in Terms of Reversals* (Mentor: Dana Ernst)
- Seth Sheer and McKenna Hedgpeeth: *Differences in Drought Tolerance of Pinus strobiformis (Southwestern white pine) from Various Provenances* (Mentor: Kristen Waring)
- Siana Turner: *Germination of Ligusticum porteri using Cold Stratification and Gibberellic Acid* (Mentor: David Huffman)
- Daniel Valencia: *"Ace in the Hole" Advanced Materials for Solar Cell Applications* (Mentor: Stephanie Hurst)
- Ziyang Wu: *Development and Update of Rainfall and Runoff Intensity-Duration-Frequency Curves for Arizona State Counties in Response to Climate Change* (Mentor: Amin Mohebbi)
- Aaron Young: *Measurement of Groundwater Recharge in the Upper Lake Mary Watershed using Repeat Microgravity and Chloride Mass Balance* (Mentor: Abe Springer)

## MORNING SESSION

### Skydome CAL Floor

9 AM - 11 AM – Exhibit

#### **Painting as a Perfectionist**

CAL, School of Art  
Makenna Vis

#### **Process of Painting**

CAL, School of Art  
Madeline Markus

#### **Live Oil Painting**

CAL, School of Art  
Hana Lipke

#### **Painting**

CAL, School of Art  
Claire Herron

### Skydome CAL Table

9 AM - 11 AM – Exhibit

#### **Drawing Upon Cultural and Ethnic Awareness: A Visual Autobiography of a First-Generation Chinese-American**

CAL, School of Art  
Vivian Phu

#### **Theatrical Design and Virtual Reality**

CAL, School of Art  
Amanda Rosas

### Skydome INNOV Floor

9 AM - 11 AM – Exhibit

#### **4P, the Pedal Powered Pollinator Patch**

Interdisciplinary, gridLESS Project

Shyla Cox, Jaime Larson, Lauren Bernas,  
Darren Bingham, Frances Alvarado, Tyler Linner

### Skydome Stage A

9 AM - 9:20 AM – Oral Presentation

#### **Food's Impact on Southwestern Culture**

HONORS, Honors College  
Hannah Hansen, Asha Hopkins, Courtney Hale

9:30 AM - 9:50 AM – Oral Presentation

#### **Is Anyone Out There? Examining Level of Engagement among the U.S. State Agencies and Citizens**

SBS, School of Communication  
Kirsten Bagshaw

10 AM - 10:55 AM – Oral Presentation

#### **Social and Political Realms of Compassionate Action and Activism**

HONORS, Honors College  
Abigail Harmon, Jackson Fisher,  
Jordan O'Brien, Andrew Potts, Leah Wilson

### Skydome Stage B

9:00 AM - 9:55 AM – Oral Presentation

#### **Degrees of Individual Choice in Expressing Compassion**

HONORS, Honors College

Lela Beer, Rylie Corrales,  
Joshua Geyer, Christopher McGuyer

10 AM - 10:55 AM – Oral Presentation

#### **Countryman, Keep On: A Full Length Non-Absurdist Play**

CAL, Theater

Hadley Singer

### Skydome Stage C

9 AM - 9:20 AM – Oral Presentation

#### **Music for Women in the Eighteenth Century: The Italian Institutions for Relinquished Children**

CAL, School of Music

Brittany Ferris

9:30 AM - 9:50 AM – Oral Presentation

#### **Islamic Sufism**

CAL, Comparative Cultural Studies

Sarah Arce

10 AM - 10:20 AM – Oral Presentation

#### **A Historical Survey of the Lost Buddha Statues of Bamiyan**

CAL, Comparative Cultural Studies

Mary Burke

10:30 AM - 10:50 AM – Oral Presentation

#### **Community Collaborations to Support Immigrant Students**

SBS, Sustainable Communities

Aaron Arrellano Harding, Danielle Austin,  
Jorge Garza, Vanessa Savel, Luna Thompson,  
Paula Moroyoqui, Riley McMahon,  
Micaiah Harris, Penny Trunzo, Olivia Odell,  
Monica Becker, Cassandra Carrasco,  
Charlie Pollard, Alexis Fleming, Karolina Pieja

### Skydome Stage D

9 AM - 9:20 AM – Oral Presentation

#### **Public Achievement Addressing Bullying at Killip Elementary**

FYS, First Year Seminar

Eva Ascencio, Breklee Tanner,  
Chandler Gaines, Jerrica Hatch, Jerel Hall

9:30 AM - 9:50 AM – Oral Presentation

#### **Being a Teacher of Color**

COE, Educational Specialties

Alexandra Duarte

9:55 AM - 10:35 AM – Oral Presentation

#### **Hijabs in the Classroom: A Problem-Based Learning Scenario**

COE, Educational Specialties

Valeria Estrella, Kyra Bennett, Kaileigh Walker,  
Victoria Tosca, Marco Rodrigo De La Torre

10:40 AM - 11 AM – Oral Presentation

#### **Snap Swap**

FCB, Computer Information Systems

Theresa Agube

## du Bois Center – Aspen A Room

8 AM - 8:20 AM – Oral Presentation  
**Rube Goldberg Machine Competition**  
*CEFNS, Mechanical Engineering*  
Riley DeHeer, Madison Lenschow,  
Ali Alenezi, Faisal Alotaibi, Kyle Kraemer

8:25 AM - 8:45 AM – Oral Presentation  
**Hydraulics Demonstrator**  
*CEFNS, Mechanical Engineering*  
Cal Skilsky, Fawaz Alenezi,  
Mosead Aljebly, Sultan Alenezi

8:50 AM - 9:10 AM – Oral Presentation  
**Thermodynamics Demo Unit**  
*CEFNS, Mechanical Engineering*  
Isaac Keene, Jeremy Tilden,  
Adam Wedell, Andrew Robinson

9:20 AM - 9:40 AM – Oral Presentation  
**MWI Labs NRL Loss Arch Redesign**  
*CEFNS, Mechanical Engineering*  
Jacob Head, Daniel Matthews,  
Mitchell Parker, Zachary McCormick

9:45 AM - 10:05 AM – Oral Presentation  
**Temperature Programed Desorption  
Secondary Ion Mass Spectrometer**  
*CEFNS, Mechanical Engineering*  
Nikki Cain, Colin Evans,  
Kirsten Larson, Dalton Stone

10:10 AM - 10:30 AM – Oral Presentation  
**Catheter Balloon Inspection Apparatus**  
*CEFNS, Mechanical Engineering*  
Shane Pooler, Kevin White,  
Ryan Stevenson, Anthony Peters

10:40 AM - 11:25 AM – Oral Presentation  
**SAE Mini Baja Competition**  
*CEFNS, Mechanical Engineering*  
Z. Rischar, M. Sliva, K. Ladao, R. Brogmus,  
B. Grivet, R. Johnson, J. Sundin, D. Woods,  
D. Cappello, R. Lonzaga, S. Hunker, J. Rankin

## du Bois Center – Aspen B Room

8 AM - 8:20 AM – Oral Presentation  
**Knee Rehabilitation and  
Goniometer Device**  
*CEFNS, Mechanical Engineering*  
Alma Palacios, Grant Borchert, Chris Kornowski,  
Jackson Reynolds, and Zihao Wang

8:25 AM - 8:45 AM – Oral Presentation  
**Equinus Exoskeleton**  
*CEFNS, Mechanical Engineering*  
Brandon Begay, Azalea Grant,  
Robert Libby, Ethan Michel, Hannah Rentschler

8:50 AM - 9:10 AM – Oral Presentation  
**Solar Air Heater**  
*CEFNS, Mechanical Engineering*  
Carl Aaker, Ahmad Abuouf, Alonzo Bizhaloni,  
Wyatt Bain, Tatum Begay, Brandon Dunn,  
Taylor McCormack, William Senseman

9:20 AM - 9:40 AM – Oral Presentation  
**Gore Bioelectric Generation**  
*CEFNS, Mechanical Engineering*  
Timothy O'Rourke, Bray Moll,  
Diego Garcia, Andrew Mullen, Ariel Autrand,  
Zaoyi Chi, Qingkun Liu, Justin Havelly

9:45 AM - 10:05 AM – Oral Presentation  
**Honeywell Reference Pressure  
Regulator**  
*CEFNS, Mechanical Engineering*  
William McGinn, Jordan Loos,  
Alexander Rustaey, Myla Azofeifa, Yitong Zhang

10:10 AM - 10:30 AM – Oral Presentation  
**Honeywell Solenoid**  
*CEFNS, Mechanical Engineering*  
Jourdan Gill, Matthew Marty,  
Regis Rumfola, Nicolas Russell

10:40 AM - 11:00 AM – Oral Presentation  
**Environmental Enclosure**  
*CEFNS, Mechanical Engineering*  
William Creagan IV, Brandon Zgurich,  
Ryan Lopez, Austin Kee

11:05 AM - 11:25 AM – Oral Presentation  
**Launch Vehicle Enclosure**  
*CEFNS, Mechanical Engineering*  
Brandon Cook, Miriam Deschine,  
Daniel Edmonds, Joshua Smith

## du Bois Center – Aspen C Room

8 AM - 8:20 AM – Oral Presentation  
**Cloud-based API Proxy for  
On-Premises Hotel**  
*CEFNS, Computer Science*  
Parth Patel, Abraham Ramirez,  
Steven Strickland, Jacob Serafin

8:25 AM - 8:45 AM – Oral Presentation  
**User Interface for  
Bio-molecular Simulator**  
*CEFNS, Computer Science*  
Charles Chatwin, Joshua Gutman,  
Matthew Burns, Tanner Brelje

8:50 AM - 9:10 AM – Oral Presentation  
**Cloud Storage Reclamation**  
*CEFNS, Computer Science*  
Itreau Bigsby, Matthew Cocchi,  
Richard Deen, Benjamin George

9:20 AM - 9:40 AM – Oral Presentation  
**Ecological Assessment Tool**  
*CEFNS, Computer Science*  
Chantz Spears, Alfonso Martinez,  
Julian Shak, John Bassler

9:45 AM - 10:05 AM – Oral Presentation  
**Ecological Information by Location**  
*CEFNS, Computer Science*  
Brenden Bernal, Chandler Hayes,  
Michael Hartzell, Anthony De La Torre

10:10 AM - 10:30 AM – Oral Presentation  
**Low-Cost Mobile Hydrology Reporting**  
*CEFNS, Computer Science*  
Luis Arroyo, Logan Brewer,  
Ryan Ladwig, Kelli Ruddy

10:40 AM - 11:00 AM – Oral Presentation  
**Mars 2020 Rover Dust Analysis for Drill**  
*CEFNS, Computer Science*  
Hunter Rainen, Alexanderia Nelson,  
Adam Paquette, Charles Beck

11:05 AM - 11:25 AM – Oral Presentation  
**Mobile CO2 Solutions**  
*CEFNS, Computer Science*  
Samuel Beals, James Beasley,  
Andrew Greene, Joseph Kelroy

## du Bois Center – Pinyon Room

8 AM - 8:20 AM – Oral Presentation  
**Micron DRAM**  
*CEFNS, Electrical Engineering*  
Abdulrahman Alqahtani, Dmetria Shepherd,  
Colby Weber, Jinming Yang, Zeyu Zhang

8:25 AM - 8:45 AM – Oral Presentation  
**Container Home**  
*CEFNS, Electrical Engineering*  
Tianyi Jiao, Shixing Shen,  
Julius Waintrub, Pengyu Zhang

8:50 AM - 9:10 AM – Oral Presentation  
**Predictive Communications**  
*CEFNS, Electrical Engineering*  
Fahad Almaraghi, Qiyuan Huang,  
Hanxiao Lu, Chaoju Wang, Yuting Zhang

9:20 AM - 9:40 AM – Oral Presentation  
**Explosive Ordinance Device Robot**  
*CEFNS, Electrical Engineering*  
Chu Huiwen, Yazhou Li, Cody Varner,  
Wen Zening, Sixian Zhang

## du Bois Center – Pinyon Room

9:45 AM - 10:05 AM – Oral Presentation

**SISU: FPGA**

*CEFNS, Electrical Engineering*

Taylor Bruce, Dillan Mills, Colt Morris,  
Ziwei Wu, Huanyu Zhou

10:10 AM - 10:30 AM – Oral Presentation

**Grid Connected Converter**

*CEFNS, Electrical Engineering*

Mohammed Abu Radhi, Fahad Alghareeb,  
Sayaf Almari, Kaiqiong Ji, Di Miao

10:40 AM - 11 AM – Oral Presentation

**Hardware One Time Pad**

*CEFNS, Electrical Engineering*

Ian Burke, Earl Judge,  
Bradley Racey, Brayden Villa

11:05 AM - 11:25 AM – Oral Presentation

**NASA Solar Array**

*CEFNS, Electrical Engineering*

Daniel Krollman, Alexander Mueller

## du Bois Center – Ballroom A

8 AM - 8:20 AM – Oral Presentation

**ASCE Concrete Canoe**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Katlynn Adams, Gina Boschetto,  
Joshua Leon, Branden Peterson,  
Zachary Radovich

8:25 AM - 8:45 AM – Oral Presentation

**ASCE Steel Bridge**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Isaac Block, Ian Connair,  
Taylor Erdmann, Matthew Parrish

8:50 AM - 9:10 AM – Oral Presentation

**PCI Big Beam Contest**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Roy Crouch, Stephen Gergal,  
Fernando Rojo, Brandy Wagoner

9:20 AM - 9:40 AM – Oral Presentation

**Insulated Cinder Blocks and Small  
Diameter Timber**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Teo Albers, Sam Carnes

9:45 AM - 10:05 AM – Oral Presentation

**Residential Garage Addition**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Melizza Herrera, Matthew Pillari,  
Taylor Poston, Jessica Sobieski

10:10 AM - 10:30 AM – Oral Presentation

**Ryan's Trail Road Redesign**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Yufei Cheng, McKenzie Moten,  
Parker Schrandt, Trevor Snipes

10:40 AM - 11 AM – Oral Presentation

**AZ Water Student Design Competition:  
Wastewater Facility Design**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Nicholas Babcock, Jed Ward,  
Maxwell Ward, Ryan Winter

11:05 AM - 11:25 AM – Oral Presentation

**Copper Age Mine Site Remediation**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Laura Garcia, Spencer Harvey,  
Carl Haskie, Sarah Reddinger

## du Bois Center – Juniper Room

8 AM - 8:20 AM – Oral Presentation

**Beyond the Slopes presents EZ-Ride, a  
Snowboarding Recreational Training Aid**

*CEFNS, Engineering*

Brett Aylward, Journard Collins, Ariana Corr

8:25 AM - 8:45 AM – Oral Presentation

**Mukava by Nissnass, a Portable  
Thermoelectric Cooler and Heater**

*CEFNS, Engineering*

Abdullah Alajmi, Kyle Appelt,  
Jessica Atkinson, Michael Elsdon

8:50 AM - 9:10 AM – Oral Presentation

**Visage Processing presents Chronos,  
a 3D Printing Post-processing Device**

*CEFNS, Engineering*

Robert Corbin, Matthew Duray,  
Michael Stoy, Gavin Wright

9:20 AM - 9:40 AM – Oral Presentation

**CrossDoc: An Improved Commenting  
System**

*CEFNS, Computer Science*

Garrison Smith, Peter Huettl,  
Kristopher Moore, Brian Saganey

9:45 AM - 10:05 AM – Oral Presentation

**Next Generation Bench Test Utilities**

*CEFNS, Computer Science*

Josh Baker, Rex Rogers, Emilio  
Sifuentes, Summer Stapleton

10:10 AM - 10:30 AM – Oral Presentation

**Smart Shopping**

*CEFNS, Computer Science*

Kalen Wood-Wardlow, Christopher Simcox,  
Kristoffer Schindele, Thomas Back

10:40 AM - 11:00 AM – Oral Presentation

**Alternative Septic System  
and Irrigation Design**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Abdullah Alkandari, Carly Akine,  
Dylan Norfleet, William Richardson

11:05 AM - 11:25 AM – Oral Presentation

**ASCE Environmental Design**

*CEFNS, Civil Engineering and  
Environmental Engineering*

Alex Anzar, Shelby Carawan,  
Paige Reilly, Cameron Rhodes

## Skydome Floor: Posters (9 AM – 11 AM)

### CAL – English

#### **Prosodic Patterns of Speech Acts for Native and Non-Native Speakers of English**

Alexander Pompa

Display board [60D]

### CAL – History

#### **Learning from the Life of Marie Sommerville**

William Fusaro

Display board [60A]

### CAL – School of Art

#### **Renewable Off-Grid Housing Project: Red Creek Ranch, Tonto National Forest**

Sabrina Rozendaal

Display board [54A]

#### **Reinventing the Market Place: Flagstaff Public Market**

Allison Mann

Display board [54B]

#### **Revolutionizing a Parkinson's Health Center**

Dalena Thuy Van Pham

Display board [54C]

#### **Modular Buildings, the Future of the 2028 Olympic Games**

Kayla Schilling

Display board [55A]

#### **Biophilia & Biomimicry in Sustainable Student Housing Design**

Cheyenne Stetson

Display board [55B]

#### **Merging Market and Restaurant Design: Creating a Cohesive Concept**

Monique Rouhani

Display board [55C]

#### **Repurposing a Restaurant Using Third Place Theory**

Caitlin Land

Display board [56A]

#### **Redesigning a Homeless Shelter**

Tristan Hess

Display board [56C]

#### **Art Therapy and Education**

Christine Owens

Display board [57B]

#### **Food History Education through Immersive and Interactive Museum Design**

Anna Horan

Display board [57C]

#### **Prospect and Refuge Theory in Restaurant Design**

Lauren Connell

Display board [58A]

#### **Incorporating Biophilia into a Creative, Mixed-Use, Historic Hollywood Renovation**

Mallory Arndt

Display board [58C]

#### **Re-purposing Multi Family Home into a Passive Co-living Home**

Natalie Birch

Display board [59A]

#### **Motor Vehicle Division Revival: Improving the User Experience**

McKenna Craig

Display board [59B]

#### **Forester Tavern–Design for the Community**

Elizabeth Barrett-Delaney

Display board [59C]

### CAL – Theater

#### **Medea: An Eastern Adaptation**

Brian Shelby

Display board [60B]

### CEFNS – Biological Sciences

#### **Large-scale Coccidioides Soil Sampling Method**

Rayna Erickson

Display board [21C]

#### **Effects of Long-Term Chlorinated Water Exposure on the Nasal Microbiome**

Oliver Kask, Shari Kyman, Irene Zhang, Keehoon Lee, Arron Shiffer, Jenny Gormley, Julia Scheid, Dierdra Bycura, J Gregory Caporaso, Jay Sutcliffe, Emily K. Cope

Display board [23D]

#### **Measuring Sarcomere Lengths during Tetanic and Twitch Stimulation**

Sydney Eck, Kiisa Nishikawa, Anthony Hessel, Beth Dennison, Aubrey Funke

Display board [24C]

#### **Relationships within the Darkling Beetle Tribe Cnodalonini (Coleoptera: Tenebrionidae)**

Mark Ecker

Display board [27A]

#### **The Effects of Temperature Change on Southwestern White Pine Seed Germination**

Alexandra Chaveste, Briana Palmiero

Display board [27B]

#### **Leaf Structure and Arthropod Abundance on Artemisia tridentata tridentata (Big Sagebrush)**

Jaimee Kaufman, Guston Cole

Display board [27C]

#### **Exploiting 2A Ribosomal Skipping to Elicit Potent Neutralizing Antibodies by the Human Cytomegalovirus Pentamer Complex**

Kyle Ghaby

Display board [28A]

#### **Evaluating Dose-Dependent Effects of Arsenic on Cellular Proliferation and Migration**

Oscar Lujan, Bronson Pinto, Catherine Propper, Robert Kellar

Display board [28C]



## CEFNS – Biological Sciences

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**Genetic Data Reveal Cryptic Movements of Cattle Ticks on Wildlife and Stray Livestock from Mexico into Texas**

Rebekah Turner, Jillian Lewis,  
Donald Thomas, Greta Buckmeier,  
Pia Olafson

Display board [28D]

**Correlating Climate with the Prevalence of Relapsing Fever Pathogens in Small Mammals**

Chandler Griffith, Peter Motyka

Display board [29A]

**The Effects of Plant Species on Litter Decomposition and Insect Growth in Streams**

Rachel Mudry, Zasha Welsh,  
Alan Gruetzmacher

Display board [30A]

**Oxygen Depletion along the Permafrost Thaw Gradient Using Carbon Isotope Ratios in Soil DNA**

Kacie Pajkos

Display board [30C]

**Physical Defense Traits in the Non-native Species Yellow Monkey Flower**

Grace Rasmussen, Keizer Tumbagahan

Display board [31C]

**The Effect of DNP, a Respiratory Uncoupler, on Soil Microbial Metabolism**

Logan Milton, Jay Braun

Display board [32A]

**Fleas that Transmit Plague in Madagascar Have Pesticide Resistance Mutations**

Shelby Hutton, Adelaide Miarinjara,  
Kenneth Gage

Display board [32B]

**A Study of a North American Freshwater Sponge Living in the Rio de Flag**

Angela Rincon, James Boothroyd

Display board [32C]

**The Use of Social Media and Volunteer Satisfaction in Museum Research**

Olivia Newell-Bauer

Display board [33A]

**Disjunct Range on *S. F. Peaks* and Habitat Fragmentation Geographically of Megachilidae**

Hannah Riskas, Eva Herberg

Display board [33D]

**Prevalence of *Ixodes* spp. Ticks Coinfected with *Borrelia* spp. and *Anaplasma phagocytophilum*, Two Abundant Zoonotic Disease Agents**

Zachary Barrand

Display board [34A]

**Diabetic Glucose Conditions Influence Skin Fibroblast Health**

Dominic Dominguez, Alyssa Talbert,  
Robert Kellar

Display board [34B]

**Citizen Science Surveillance Program Captures Temporal Variation in Human Exposure to Ticks and Tick Borne Pathogens in California**

Kelsey Atkin

Display board [34C]

**A New Technique for Diagnosing Melioidosis Using MagPix Technology**

Mimi Mbegbu, Maxx Harvey, Kyle Headley,  
Austin Shannon

Display board [35A]

**Effects of Plant Defensive Compounds on a Specialist Caterpillar**

Alicia Chavez, Jazlee Crowley

Display board [35C]

**A Novel Biomaterial with Reversible Polymerization Mechanics**

Nathan Cruz

Display board [35D]

**Identifying Genetic Sources and Cryptic Movements of Recent (2014-2016) *Rhipicepalus microplus* Tick Infestations in Southern Texas**

Bryce Schmidt

Display board [36A]

**Presence of *Borrelia* spp. and *Anaplasma phagocytophilum* in Ticks Collected from Catalina Island Foxes**

Zahraa Hmood

Display board [36B]

**Characterization of Glandular Trichome Exudate on Yellow Monkeyflower (*Mimulus guttatus*)**

Evan Mee

Display board [36C]

**Evaluation of the Validity and Reliability of Non-invasive Sampling Techniques in Feral Horses**

Rebeca Stephens, Yuki Nishida,  
Kyle Ghaby, Nashelly Meneses,  
Russell Benford

Display board [37A]

## CEFNS – Chemistry and Biochemistry

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**Inorganic Syntheses of Metal Teryp Compounds**

Hannah Pigg, Meagan Wheeler,  
Julian Herring, Michael Moghadasnia,  
James Potvin, Daniel Valencia, Jacob Miller,  
Stephanie Hurst

Display board [3A]

**Qualitative Trace Metal Analysis Found in Corn Located on Navajo Nation Lands**

Gia Hoegh, Josh Froyum, Jani Ingram

Display board [4B]

**The Effects of Binge Alcohol and *B. thailandensis* Epithelial Invasion**

Caleigh Curley

Display board [37C]

**Tick Collection Method Correlation to Pathogen Prevalence**

Kelsey Pemberton, Marya McLaughlin

Display board [38A]

**The Long-Term Effects of Drought on Tree Growth in the American Southwest**

Michelle Wilson, Phiyen Nguyen,  
Michael Bangs

Display board [39A]

**Dog Breed Differences in Coccidioidomycosis Rates**

Kaitlyn Parra, Heather Mead, Daniel Kollath,  
Marcus Teixeira, Bridget Barker

Display board [40A]

**Interspecific Interaction with an Invasive Species Alters Seedling Recruitment Rates of the Native Foundation Species Fremont Cottonwoods**

Peter Rodrigues, Heather Gillette,  
Gavin Kirby, Gerard Allan

Display board [41A]

**Trace Metal Quantification in Unregulated Water Sources on the Navajo Reservation**

Jaclyn Torkelson

Display board [4C]

**Polymerization and Metal Coordination of Spirane Complexes for Material Studies**

James Potvin, Daniel Valenica,  
Julian Herring, Michael Moghadasnia,  
Hannah Pigg, Meagan Wheeler,  
E. Jacob Miller, Katie Dimpfel

Display board [5D]

## CEFNS – Chemistry and Biochemistry

### **Evaluation of Enhanced Sampling Molecular Dynamics Methods for the Creation of Solid Polymer Electrolyte Configurations**

Lauren Michelle Younger

*Display board [6B]*

### **The Effect of Excess MAI on Perovskite Solar Cell Crystal Degradation**

Patricia De Peralta, Keenan McNamara, Cassidy Ellison, Elizabeth White

*Display board [7B]*

### **Precious Metal Chemistry: Palladium and Platinum Syntheses**

Michael Moghadasnia, E. Jacob Miller, Julian Herring, Hannah Pigg, James Potvin, Meagan Wheeler, Daniel Valencia, Stephanie Hurst

*Display board [8B]*

### **Comparative Analysis of Heavy Metal Uranium Contamination in Regions of the Navajo Nation**

Jennifer Hillier

*Display board [26C]*

## CEFNS – Civil Engineering, Construction Management, and Environmental Engineering

### **Student Steel Bridge Competition**

Isaac Block

*Display board [14C]*

### **Cadmium Removal from Water with a Corn Cob Biosorbent**

Melissa Jacques

*Display board [15C]*

### **Pedestrian Behavior at Signalized Intersection Crosswalks: An Observational Study of Factors Associated with Distracted Walking, Pedestrian Volume, and Walking Speed**

Emmanuel James

*Display board [16C]*

### **Development and Update of Rainfall and Runoff Intensity-Duration-Frequency Curves for Arizona State Counties in Response to Climate Change**

Ziyan Wu

*Display board [19A]*

### **The Geomorphic Road Analysis and Inventory Package (GRAIP)**

Julia Campo, Parker Jones, AbdulRazzaq A AlQashan, Zach Kretsch

*Display board [20A]*

## CEFNS – Mathematics and Statistics

### **Simulation and Investigation of N-body Systems**

Ryan Kelly

*Display board [18D]*

### **Multinets and Deleted Multinet Structures**

Jordan Wright, Jadyne Breland, Luis Diaz

*Display board [19C]*

### **Convex Hull Achievement Games of Point Configurations on the Plane**

Peter Brosten, Brandon Samz

*Display board [23A]*

### **Generalizations of Quadratic Residue Matrix Constructions**

Ryan Wood

*Display board [24B]*

## CEFNS – Mechanical Engineering

### **Sensory Board for Marshall Classroom**

Abdullah Almutairi, Mohammad Alkatan, Yousef Alkatan, Taha Alansari

*Display board [3D]*

### **Collegiate Wind Competition Electrical Design**

Tristan Scott, Aaron DeLuca, Alexander Dahlmann, Yousef Alali, Evan Heiland, Qian Zhao, Benjamin Macleod

*Display board [5A]*

### **Collegiate Wind Competition Mechanical Design**

Devon Hardy, Dakota Sallaway, Spencer McHanon, Jacob Peterson, Kory Joe, Soud Alsahli

*Display board [5B]*

### **BDL Particulate Characterization**

Saleh Aldhufairi, Mohammad Almutairi, Kevin Logrande

*Display board [5C]*

### **Antenna Gimbal**

Kaitlyn Barr, Kalli Albright, Dustin Branges, Daniel Johnson

*Display board [6A]*

### **Team Marshall Playground–A Design for Disabilities**

Abdalaziz Alazmi, Mohammad Alsewaji, Abdullatif Alenezy, Saad Aldawsari, Khaled Alenezi

*Display board [6D]*

### **Knee Rehabilitation and Goniometer Device**

Grant Borchert, Chris Kornowski, Alma Palacios, Jackson Reynolds, Zihao Wang

*Display board [7A]*

### **Retekt**

Dylan Simon, Kyle Connelly, Abdullah Alenezi, Drew Shumway, Mohammad Almutairi

*Display board [9A]*

### **Design for Disability Simulation**

Zaid Almutairi, E Almutairi, D Alshammari, Yousef Alazmi

*Display board [9B]*

### **Renewable Energy Toolkit**

Talal Alenezi, Fahad Alsuwailam, Mohammed Jarkhi, Hamad Alsharhan, Mohammad Alsharidah

*Display board [9C]*

### **Utilizing a Rube Goldberg Machine to Prepare a Bowl of Cereal**

Madison Lenschow, Riley Deheer, Kyle Kraemer, Ali Alenezi, Faisal Alotaibi

*Display board [10A]*

### **Northern Arizona University's Department of Energy's Collegiate Wind Competition Market Team**

Anthony Cheslic, Alana Benson, Leopoldo Segura De Niz, Craig Collins, Michael Vogelsang, Mitchell Green

*Display board [10D]*

### **Identifying Faults in NAU's HVAC Consumption to Reduce Energy and Emissions**

Kylie Dykstra, Blake Hallauer, Daisy Liguori

*Display board [11A]*

### **ATI-Nuero Vascular Cast**

Naser Alosaimi, Justin McCallin, Matthew Sussman, Jalando Edison

*Display board [13B]*

## CEFNS – Mechanical Engineering

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### **3D Filament Recycler**

Micki Yasuda, Abdulaziz Abdulghafour,  
Nicole Tabac, Marc Hsu

*Display board [13C]*

### **Slingshot Game**

Abdullah Howaishel, Dhary Aldhefeeri,  
Mobarak Alsubaiee, Abdullah Alzafiri,  
Fahad Alotaibi

*Display board [14A]*

### **Hozhoni Art**

Mohammad Alajmi, Mahdi Alajmi,  
Hamad Aldhafeeri, Saud Almutairi

*Display board [17B]*

## CEFNS – Physics and Astronomy

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### **Determination of Local Dust Sinks/Reservoirs from Differential Temperatures in Elysium Planitia, Mars**

Janus Kozdon

*Display board [11C]*

### **Using Satellite Soil-Moisture Measurements to Correct Measurements of Groundwater- storage Change**

Georgia Ross

*Display board [12C]*

### **Exploring the Surface Brightness Breaks and Star Formation in Disk Galaxies**

Bradley Moldermaker

*Display board [15A]*

### **On Applying Novel Techniques to Control Active Matter Systems at the Microscale**

Étude O'Neel-Judy

*Display board [16A]*

### **Commissioning of the Flagstaff Robotic Survey Telescope**

Amanda Binkley

*Display board [17A]*

## CEFNS – School of Earth Sciences and Environmental Sustainability

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### **Measurement of Groundwater Recharge in the Upper Lake Mary Watershed using Chloride Mass Balance**

Aaron Young

*Display board [38C]*

### **American Bison on the Colorado Plateau**

Katherine Lewis, Jaclyn Torkelson,  
Sean Berry, Reyes Giron, Bobby Weiland

*Display board [39C]*

### **Toroweap on the North Rim: An Argument for Rugged Places**

Hannah Urrutia, Emily Haworth,  
Dulce Alfredo, Prestin Cooke

*Display board [40C]*

### **Reclaimed Water and the Flagstaff Community**

Kevin Graves, Aleydis Estrada,  
Jenny Quijada, Mike Bangs, Espen Yates,  
Madison Casselman

*Display board [41C]*

### **Auto-Classification of Surface Water in Northern Arizona Using Sentinel-2 Imagery**

Joseph Sweet

*Display board [42A]*

### **Quantifying Socioeconomic Values of Intact and Disturbed Ecosystems in the Southwest United States**

Nicholas Havelock, Deja Sanders,  
Trevor Yayoshi, Joelle Sawaya

*Display board [42D]*

### **Long Term Effects of Jackstraw Treatment on Aspen Regeneration and Large Ungulate Presence on the Schultz Fire, Coconino National Forest, AZ**

Logan Gonzales

*Display board [43A]*

## CEFNS – School of Forestry

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### **Germination of *Ligusticum porteri* using Cold Stratification and Gibberellic Acid**

Siana Turner, Judy Springer

*Display board [6C]*

### **Population Structure and Analysis of *Penstemon clutei* in Northern Arizona**

Elena Schaefer

*Display board [7C]*

### **The Economic Effects of Using Woody Biomass as Renewable Energy in the Southwest**

McKenna Hedgepeth

*Display board [8C]*

### **Is a Mexican Pine Species Better Adapted to the Warming Arizona Climate?**

Victoria Hess

*Display board [8D]*

### **Trait Distributions of Freshwater Benthic Macroinvertebrates: Predicting Responses to Climate Change**

Kaitlen Bieber

*Display board [43C]*

### **The Influence of Soil Depth and Grazing Practices on the Quantity and Quality of Soil Carbon in Semi-arid Regions**

Emily Grams

*Display board [44A]*

### **Mapping and Structural Analysis of the Las Vegas Valley Shear Zone, Nevada**

Jose Marmolejo

*Display board [44C]*

### **Effects of Climate Change on the Bebb Willow (*Salix bebbiana*) in Northern Arizona**

Jessica Archibald

*Display board [10B]*

### **Tracking *Escherichia coli* Infections of the Endangered New Mexico Jumping Mouse (*Zapus luteus luteus*)**

Austin Dikeman, Daniel Sanchez,  
Viacheslav Fofanov, Faith Walker,  
Carol Chambers

*Display board [12B]*

### **Did Quaking Aspen (*Populus tremuloides*) Recover Following the 2010 Schultz Fire, AZ?**

Samuel Ebright

*Display board [13A]*

## CEFNS – School of Informatics, Computing, and Cyber Systems

### **Multi-factor Analysis to Reduce False Alarms in Intensive Care Units**

Nathan Payton-McCauslin,  
Alexander Grzesiak, James Todd  
*Display board [15D]*

### **Automated Syringe Mixing for Aneurysm Treatment**

Andrew VanDenburgh, Vincent Jencks,  
Colton Smith, Handi Xi, Yunchen Zhu  
*Display board [17C]*

### **Motorized Trike Team**

James Sigler, Yu Sun, Khalid Alghamdi,  
Mohammed Allahyani  
*Display board [17D]*

### **English Proficiency Analyzer**

Joshua Shaffer, Luis Montes, Erik Strauss,  
Matt Quintana  
*Display board [18C]*

### **WordScuffle: Bringing a BrainFlexing Game to the Web**

Vincent Messenger, Anderson Moyers,  
Andy Salazar, Nathan Franklin  
*Display board [21B]*

### **Instrumented Bike Team 2**

Yifei Zhang, Yuchang Zhang, Peijie Qiu,  
Xilun Liu, Siwei Wen  
*Display board [22A]*

### **Streamlined and Automated, a New Online Video Tutoring System for a Startup Flagstaff Company**

Jesus Garcia, Alex Kahn, Tyler Mitchell,  
Taylor Walker  
*Display board [22D]*

### **Extending Network Connectivity in Rural Communities**

Kyle Krueger, Chandler Hayes  
*Display board [24A]*

### **Production of Music through Leap Motion for TBI Patients**

Paola Montoya, Cole Kaplan, John Felsch  
*Display board [25B]*

### **Standalone Power Converter**

Jason Foster, Mohammad Alrashidi,  
Lutong Ji, Nan Duan, Yu Zhou  
*Display board [25C]*

### **Automatic Distribution and Synchronization Manager for Spice Database**

Tyler Thatcher, Kellen Ross,  
Daniel Williamson, Christopher Combs  
*Display board [25D]*

### **Augmented Mobility Project**

Kristen Shryack, Adam Douglass,  
Yutian Deng, Mengyuan Zhang,  
Mohammed Alfatouh  
*Display board [26A]*

### **Instrumented Bikes 1**

Robert Briggs, Junting Chen, Hongpan Wu,  
Hao Wang  
*Display board [29B]*

### **Bluetooth Application for Data Download and Display**

Brandon Samz, Joe Griffith,  
Robert McIntosh, Corban Stevens  
*Display board [29C]*

## COE – Educational Leadership (EDL)

### **First Generation College Students (FGCS) and the Challenges of Study Abroad**

KC Valenzuela, Robert Lloyd,  
Megan Kesel, Yulissa Aldana, Eugen Reim,  
Hannah MicKleburgh  
*Display board [69B]*

## COE – Educational Specialties (ESP)

### **2018 College of Education Student Survey**

Devon Swanson, Jordan Foster  
*Display board [70A]*

## COE – Teaching and Learning

### **The Impact of Play on Students' Long-Term Conceptual Understanding in Science**

Meghan Schmidt, Lora Lorentsen  
*Display board [69A]*

### **Culturally Relevant Pedagogy in Early Childhood on Tribal Nations**

Anna Barrett  
*Display board [70B]*

## FCB – Business Economics

### **Predicting the Gross Profit of Movies on Opening Weekend**

Ella Rogers, Xianxian He, Cody Miller,  
Bryce Clemence, Mahmood Alyahya  
*Display board [71A]*

### **International Economics - Trade Dispute Case**

Alex Lopez, Michael Benedia  
*Display board [71B]*

### **What Effects Crime Rates in the United States**

Samantha Sanchez, Adam Purtle,  
Jordan Diepstraten, Nicholas Lerschen,  
Mitchell Young  
*Display board [71C]*

### **What Impacts Violent Crime Rates?**

Dane Nardi, Travis Coutts, Jaclyn Nishihira,  
Shaye Scott  
*Display board [71D]*

### **Reducing Government in the Environment**

Lucas Dickey, Charles Kamps  
*Display board [72A]*

### **Privatizing Education**

Jacob Weyand, Raul Rodriguez,  
Daniel Goodman  
*Display board [72B]*

### **New World New Government / Balanced Budget**

Joshua Brungardt, Austin Rock  
*Display board [72C]*

## FCB – Business Economics

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### **The Effect of Universal Healthcare on Life Expectancy**

Ryan Young, Marley Quinn, Yumeng Li, Richard Fromdahl, Brooke Candelaria

*Display board [72D]*

### **Reducing the Power of the FDA**

Jaclyn Nishihira, Mitchell Berner

*Display board [73A]*

### **Regression Analysis of Median House Price in a Given City**

Lai Yan Lam, Ryan Cox, Hank Kollar, Abigail Werksman, Joshua Baxter

*Display board [73B]*

### **United States Drug Policy**

Christian Holland, Jeremy Bates, Brianna Turner

*Display board [73C]*

### **Eliminating Government Enterprise**

Ryan Cox, Jonathan Gil Salazar, Michael Benedia

*Display board [73D]*

### **Why Social Security Should Be Privatized**

Rachael McCown

*Display board [74A]*

### **Ending Government Mandates**

Kyler Mejia, Sean Lang, Malik Collins

*Display board [74B]*

### **Ticket Sales for University Football Games in the United States**

Karolyne Cesaro, Adam Zimmerman, Jacob Ranf, Jake Hannigan, Zhuomian Mao

*Display board [74C]*

### **Ending Subsidies**

Lai Yan Lam, Estevan Herrera, Suliman Alobaid

*Display board [74D]*

### **Incarceration Model**

Joshua Brungardt, Joanna Wheaton, Donggun Park, Amanda Dewitt, Sean Lang

*Display board [75D]*

### **Contributors to the State Poverty Level**

Marissa Jara, Joshua Barton, Alecsander Bucklin, Pippa Cousins, Garrett Mullins

*Display board [76B]*

## FCB – Management

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### **Meditation Monday Diversity Research**

Kennedy Mangum, Mackenzi Lozano, JP Maitta, Alex Seol

*Display board [75A]*

### **Phi Sigma Kappa**

Kay Hammack, Kenny Reedy, Jessie Chen, Logan Ochoa

*Display board [75B]*

### **Improving Business through Diversity**

Keith Stoffel, Jason Friedman, Drew Runyan, Jack Calhoun

*Display board [75C]*

### **First Year Seminar**

Andrew Gregor, Alex Sudweeks, Victor Eassa, Ryan Schuberg

*Display board [76A]*

### **Diversity Among the Doctor of Physical Therapy Program**

Morgan Sarten, Rachel Hwang, Bryson O'Grady, Xiamon Yang

*Display board [76C]*

### **Diversity in the NAU Health and Learning Center**

Brianna Sparks, Megan Harris, Michael Johnson, Anthony Ribelin

*Display board [76D]*

### **The Ethics of the Information Technology Support (ITS) at NAU**

Leo Poole, Aaron Kreidl, Jacob Oblinger, Austin Parachini

*Display board [77A]*

### **Transfer and Commuter Connections Program**

Usman Gillani, Joshua Ricken, Aaron Mayes

*Display board [77B]*

### **Childfree by Choice**

Jordan Panther, Briana Galvez

*Display board [77C]*

### **HUNGER: Food Insecurity in Northern Arizona**

Eric Nguyen, Brooke Hill, Abdullah Alajeel

*Display board [77D]*

### **Investing in Cryptocurrency**

Jonathan Dingee, Seung Jea Lee

*Display board [78B]*

### **Reducing Single-Use Plastic Consumption to Save Marine Life**

Sarah Meyer, Brittany McCrea

*Display board [78C]*

### **There Is No Beauty in Pain**

Nicole Masters, Devin Cook

*Display board [78D]*

### **Career Development Office in the FCB**

Dee Kater, Elliott Cooley, Ryan Bradish, Ethan McDonald

*Display board [78A]*

### **Sigma Nu**

Austin Neville, Jianda Wang, Morgan Andersen, Yessica Hernandez

*Display board [79B]*

### **The Gender Diversity of the NAU Pharmacy Compared to the U.S. Norms**

Nathaniel Oakes, Nicole Costlow, Dylan Bulger, Lawrence Clark

*Display board [FCB-MGT EaseI]*

## FCB – Marketing

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### **Saving Smiles, Saving Humanity - Providing Knowledge about Cleft Lip in Developing Countries**

Ryane Jerger, Gage Holcomb

*Display board [79A]*

### **Immigration: The Dreamers in the United States**

Alec Chavez

*Display board [79C]*

### **Abortion Rights: A Woman's Right to Choose**

Devan Jones, Gwynn Neal

*Display board [79D]*

### **Eat to Live, Not Live to Eat**

Naylan Makuakane, Christian Mercado, Nichole Hickey

*Display board [FCB-MKT EaseI]*

## FYS – First Year Seminar

### **Farm to School**

Pauline McClean, Darren Bingham

*Display board [53A]*

### **Hope Amid Disaster: Apocalyptic Anime**

Emily Ralston, Alyssa Suedmeyer

*Display board [53B]*

### **Comparative Cultural Practices of Tattooing Around the World**

Alex Walker, Morgan Wawrzynski

*Display board [53C/53D]*

## HHS – Communication Sciences and Disorders

### **The Effects of Aphasia on Communication and Everyday Interactions**

Natalie McDaniel, Kaitlyn Smith, Annastasia Spencer, Julie Roche

*Display board [45A]*

### **Speech Development in Children with Hearing Loss That Use Cochlear Implants**

LeaAnna Baker, Leah Janes, Sarah Severino

*Display board [45B]*

### **Public Awareness of Aphasia and the Different Types Persisting**

Shea Baxter, Sam Matteucci, Kellie Bessent, Hilaria Loza

*Display board [45C]*

### **What Causes Stuttering?**

Hayleigh Kirkham, Victoria Molloy, Chelsea Ulibarri, Seth Waldrop, Marissa White

*Display board [45D]*

### **Early Speech Development in Children with Down Syndrome: Pre-Linguistic Through Preschool Period**

Courtney Griffin, Hannah Kennedy, Hayley Petersen

*Display board [46A]*

### **Stroke: A Worldwide Concern**

Kimberly Irion, Annie Lewis, Makenzie Moore, Karen Erazo

*Display board [46B]*

### **Vocal DNA: The Future of Digitized Speech and Augmentative Communication Devices**

Kaley Schafer

*Display board [46C]*

### **“Don’t Worry! He’ll Grow Out of It!” Warning - Danger Signs and Risk Factors Associated with Chronic Stuttering**

Alyssa Azzaro, Amber Livingston, Emily Sanders, Cassidy Woods

*Display board [46D]*

### **Use of Technology to Support the Communication Skills of Children with Autism**

Alyssa Bustos, Andrea Campos, Veronica Duran, Rachel Ernle, Mary Welch

*Display board [47B]*

### **Use of Augmentative and Alternative Communication to Support Emergent Literacy**

Kaitlin Frazier, Emma Lyman, Victoria Sanchez, Emily Stice

*Display board [48A]*

### **Vocal Development and the Social Feedback Loop in Children with Autism Spectrum Disorder**

Jessica Sandri, Kasey Johnston, Julia Butts, Lauren Graves

*Display board [48B]*

## HHS – Dental Hygiene

### **Evaluating Xerostomia in Local Older Adults**

Rachel Hopp, Chance Hatfield, Lauren Hyllengren, Kit Tiernan

*Display board [47A]*

### **Nutritional Effects on Dental Decay of Children Ages 2-5**

Madalyn Halstead, Andrea Byrer, Brianne Maloney, Kristi Kack

*Display board [47C]*

### **Perception of Fluoride amongst Women, Infants, & Children (WIC) Participants**

Emily Buchanan, Hannah Hoang, Latanya Hatathli, Katie Rutledge

*Display board [48C]*

### **Periodontal Disease in Those With Physical and/or Cognitive Impairments**

Mallery Dickson, Tristen Meacham, Julie Looker, Celina Giboyeaux

*Display board [48D]*

### **We Inspire Children to Prevent Early Childhood Caries**

Taylor Kace, Wanda Farr, Alexis Dewitt, Ricardo A. Lopez Encinas

*Display board [49A]*

### **The Few, the Proud, the Underserved: Potential Dental Barriers for Flagstaff Veterans**

Norhan Youwanes, Kelsey Murray, Danicia Rohler, Hannah Johnson

*Display board [49B]*

### **Tobacco Tacklers: Educating Flagstaff Adolescents about the Dangers of Tobacco**

Alexandra Klein, Tara Walstad, Savannah McDonald

*Display board [50A]*

## HHS – Health Sciences

### **Summit High School Physical Activity Intervention**

Yasmeen Smith

*Display board [47D]*

### **Summit High School Nutrition and Gardening Intervention**

Emily Thompson, Greta Jackson, Alexa Salazar, Ashley Briese

*Display board [49C]*

### **Neonatal Neuroblastoma**

Katie Carpenter

*Display board [49D]*

### **Are Undergraduate Students Ready for Employment?**

Tiffany Grant

*Display board [50B]*

### **North Country Healthcare Chronic Disease Prevention Coalition**

Lindsay Nowakowski, Rachel Emmet, Skya Allen, Katie Carpenter, Kathryn Wickersham

*Display board [50C]*

### **The Mindfulness Matters Project**

Emerald Reay, Taylor Conklin, Max Wiedemann, Courtney Castle, Domonique Giddens

*Display board [50D]*

### **Mindfulness Intervention Program**

Wendy Tlascea, Alexander Channell, Cassidy Torres

*Display board [51B]*

## HHS – Health Sciences

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**Baseline Analysis of Nutrition Needs Assessment for Female College Athletes**

Sarah Takach

*Display board [52A]*

**Social Media and Marketing Campaign to Promote St. Mary's Summer Food Bank in Mountaineer**

Julia Richards, McKenna Duff, Brooke Donnelly, Kaitlin Harmon

*Display board [52B]*

**Baseline Wellness Testing on Collegiate Division 1 Athletes**

Sydney Herbst

*Display board [52D]*

## HHS – School of Nursing

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**Investigating Infant Development and Enhancing Safety for Substance Exposed Newborns**

Mia Ornelas

*Display board [51C]*

**Tackles and Tauopathies: Professional Football Players' Game against Chronic Traumatic Encephalopathy**

Elora Palmer

*Display board [51D]*

**Patient Education and the Emergency Department: How Discharge Teaching and Protocol Affects Patients with Traumatic Brain Injuries**

Elora Palmer

*Display board [52C]*

## HONORS – Honors College

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**Eating Away Cancer**

Morgan Clark, Arianna Strick, Maxwell Herbert

*Display board [61A]*

**Complications Associated with Nuclear Waste**

Russell Collins

*Display board [61C]*

**The Impact of Emotional Intelligence: In the Scope of Mental Illnesses and Aggression**

Genavieve Gray-Sandoval, Joseph Acosta, Alesha Hunsaker

*Display board [62A]*

**The Arts, Emotional Intelligence, and Emotional Health**

Emily Habra Fink, Marissa Thompson

*Display board [62C]*

**When Healthy Becomes Unhealthy**

Riley Irwin

*Display board [63A]*

**Western Disease and Diet**

Cameron Mathis, Deric Chappell, Megan Stoke, Kalen Jennings

*Display board [63C]*

**Influences of Emotional Intelligence**

Abigail Mellon, Alexandria Fuzzard, Chloe Staley

*Display board [64A]*

**Translational Effectiveness of Animal Testing for Cancer Research**

Shayna Kasdan, Christina Anaya

*Display board [64B]*

**Health Care Access and 21st Century Activism**

Kathryn Miller

*Display board [64C]*

**The Negative Effects of Social Media on Cyber Bullying, Eating Disorders, and Academic Performance**

Amanda Milton, Sara Clark, Marisol Loreto-Betancourt

*Display board [65A]*

**Evaluating the Effect of Human Leukocyte Antigen B-27 on Fetal Development in Response to Maternal Autoantibodies**

Rene Quinteros

*Display board [65C]*

**The Effect of School Lunches**

Samantha Salazar, Katrina Ward, Jens Niemi, Joyce Cox, Emma Winn

*Display board [66A]*

**Dietary Impacts on Cancer: Media Portrayal vs. Reality**

Janice Baldwin-Rowe, Sophia Kingsley, John Aleman

*Display board [66B]*

## SBS – Anthropology

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**The Ancient Prehistory of Food and Nutrition**

Jacob Hommel

*Display board [118C]*

**The Folklore of Vinyasa Yoga**

Gabrielle Orsini, Luke Kinnison

*Display board [118D]*

**Trophy Hunting, Ecology, and Big Game Activism**

Caleb Ware

*Display board [66C]*

**Roles of the Microbiome and Diet in Cancer**

Ariana Salazar, Nicole Bratsch

*Display board [67A]*

**Children within the Syrian Civil War**

Jordyn Upton, Madison Kaus, Abigail Olmstead

*Display board [67C]*

**Happier and Healthier Students**

Arden Paugh, Miranda Valitzski, Sergio Alba

*Display board [68A]*

**Multidimensional Emotion**

Keely Carney, Kelcy Johnson, Holly Schwake

*Display board [68B]*

**The Mind on Competitive Gaming**

Mitchell Bryant, Joseph Vargovich, Cotter McAnally

*Display board [68C]*

## SBS – Anthropology

### **Famous Lithic Raw Materials of North America and Beyond**

Ellen Nagaoka

*Display board [120A]*

### **The Prehistory of Monumental Architecture throughout Europe**

Mitchell Anderson

*Display board [120C]*

### **The Prehistory of Death and the Afterlife**

Gabriella Chiappone

*Display board [120D]*

### **Behavioral Health and Community Engagement**

Patricia Aguiniga, Sheryl Nelson,  
Brandon Reynolds

*Display board [121A]*

### **Religion in Ancient Times**

Jack Monte

*Display board [121C]*

### **The Prehistory of Art**

Alexa Meagher

*Display board [122A]*

### **The Prehistory of Art**

Skyler Penny

*Display board [122C]*

### **Hallucinogenics in Prehistoric American Religions**

Sammy Riddle

*Display board [122D]*

### **How Dreamers Boost American Economy**

Dulce Alfaro

*Display board [123A]*

### **Ur**

Ricardo Ordóñez

*Display board [123C]*

### **The Prehistory of Art**

Natalia Romo

*Display board [124A]*

### **The Prehistory of Spirituality/Religion**

Kaitlyn Menghini

*Display board [124C]*

### **Disadvantages of the Agricultural Revolution**

Hayden Duncan

*Display board [125A]*

### **The Role of Religion in African Prehistory**

Abigail Amos

*Display board [125B]*

### **Coconino County Medical Examiner's Office: A Proposal for the Implementation of an Intensive Internship Training Program**

Amber Melton-Shewak, Rachel Niesen,  
Amber Treadway

*Display board [125C]*

### **Unidentified Human Skeletal Remains: A Proposal for the Organization and Analysis at the Coconino County Medical Examiner's Office**

Christopher Singer, Brea Cappello,  
Taylor Lambrigger

*Display board [125D]*

### **The Prehistory of Religion/Spirituality**

Jorge Dominguez

*Display board [126A]*

### **The Prehistory of Food and Nutrition in the Middle East**

Marina McGarry

*Display board [126C]*

### **The Technique of Sound Used by the Aboriginal Australians**

Madison Abernethy

*Display board [127A]*

### **The Prehistory of Food/Nutrition**

Mason Levinson

*Display board [127B]*

### **Archeology of Music**

Hayden Silva

*Display board [127C]*

### **The Archaeology of Written Language**

Natalie Noroian

*Display board [128A]*

### **The Archaeology of Music**

Hannah Finley

*Display board [128D]*

### **The Relationship of Recidivism in Correction Facilities and Drug Use**

Dominic Pacheco

*Display board [129A]*

### **Institutions, Ethnography, and Health: Understanding the Experiences of Jailed Populations**

Omar Gomez

*Display board [129B]*

### **Easter Island 3D Replicas**

Esme Jones, Britton Shepardson

*Display board [129C]*

### **The Prehistory of Spirituality/Religion**

Kia Fernandez

*Display board [129D]*

### **Training Program for Flagstaff Food Service**

Carter Kunkle, Haley Smith

*Display board [130B]*

### **The Prehistory of the Domestication of Animals**

Korie Kerr

*Display board [130C]*

## SBS – Applied Indigenous Studies

### **Indigenous Methodologies Applied to Alcoholism on Native Lands**

Kaitlyn Hasgood

*Display board [100A]*

### **Contaminated for Generations: The Gold King Mine Incident**

Emile Eich

*Display board [101A]*

### **American Indians and Sexual Assault**

Promise West

*Display board [101C]*

### **Passing On Our Heritage: Using Navajo Thought to Explore and Evaluate Strategies to Promote and Strengthen Parent Participation in Programs to Enable their Children to Learn and Retain the Navajo Language**

Johanna Blais

*Display board [102C]*

### **The Dakota Access Pipeline: An Issue of Environmental Justice**

Hannah Mueller

*Display board [102D]*

### **Water Rights and the Hopi Tribe**

Brylee Gnant

*Display board [103C]*

### **Indigenous Methodology for Adverse Childhood Experiences**

Kalvina Belin

*Display board [104D]*

### **Modern Duality: Alchö Silá and Navajo Female Political Leadership**

Kaitlyn Haskie

*Display board [105B]*



## SBS – Applied Indigenous Studies

### **Why Do Native American Women Still Have the Highest Rate of Violence and Sexual Assault?**

Grace Hughes

*Display board [106D]*

### **Indigenous Communities Paving the Way**

Daniela Figueroa

*Display board [107B]*

### **Utilizing Indigenous Methodologies to Combat Alcoholism on Indian Country**

Jennifer Hudson

*Display board [107D]*

### **Restorative America**

Amber Beasley

*Display board [109B]*

### **The Ancient Prehistory of Food and Nutrition**

Jacob Hommel

*Display board [118C]*

### **Disadvantages of the Agricultural Revolution**

Hayden Duncan

*Display board [125A]*

## SBS – Criminology and Criminal Justice

### **Rap and the Construction of Masculinity**

Emily Heinz, Hunter Todd,  
Jacob Hernandez, Elliot Benson,  
Glynnis Everett

*Display board [89B]*

### **Flawed Forensics**

Don Mastriona

*Display board [89C]*

### **Perceptions of E-cigarettes among College Students**

Caitlin Imholte, Alexandria Giannini,  
Zach Tamburello, Michael Bartolomei,  
Wyatt Koudelka

*Display board [90C]*

### **The Impact of Self Control on Risky Driving**

Brooke Schapiro, Colby Aldridge,  
Courtney Colby, Kevin Wallace

*Display board [90D]*

### **CCJ313: Rap and Women**

Brandon Toth, Caleb Claassen,  
Charlie Whitten, Bennett Greenbaum,  
Carlos Rascon

*Display board [92A]*

### **Campus Sexual Assault Awareness**

Taylor Porter, Nicolas Pepe, Lina Dunbar

*Display board [92C]*

### **Unintended Victims of Mass Incarceration**

Brooke Walker

*Display board [93A]*

### **Community Outreach**

Johanny Sanchez, Anthony Tantimonaco,  
Taylor Axlund, Allison Akins, Grace Aronne

*Display board [93C]*

### **Ballistics Solving Gun Violence**

Carlos Rascon, Miguel Castellanos,  
Charmayne Lane, Jennifer David

*Display board [93D]*

### **The Theory of Killing**

Esar Divinagracia, Will Wetherell

*Display board [94A]*

### **Hope Grows Bigger**

Erin Serocki, Alicia Hubert, Elizabeth Beck,  
Camryn Dryden, Josie Sheets

*Display board [94C]*

### **Wrongful Convictions through Eyewitness Misidentification**

Tessa Zaccagnio, Deseray Morales,  
Michael Smock, Alexandra Szpyrka

*Display board [95A]*

### **Junk Science in Criminal Justice**

Seth Sheer, Steven Flis, Heather Cornea,  
Ryan Jimenez, Aria Ottmueller

*Display board [95C]*

### **Rap and War on Drugs**

Nicole Erich, Natalie Mertz,  
Rachel Hammons, Sarina Salazar Lewis,  
Rikki Payne

*Display board [95D]*

### **Attitudes towards Firearms**

Keith Kramer, Thomas Sullivan,  
Grant Zonaras, Zac Cervana

*Display board [96A]*

### **Marijuana Use and a Healthy Lifestyle**

Makayla McKee, Jennifer Peterson,  
Everest Berggren, Shawn Callaway

*Display board [96D]*

### **The Influences behind Dating Violence Perpetration**

Kylie Love, Arianna Garcia, Drew Morgan,  
Kylie Warner

*Display board [97A]*

### **Rap and Appropriation**

Adriana Vosskuhler, A'njel Erves,  
Aaron Hunt, Alejandra Martinez,  
Allison Sharp

*Display board [97C]*

### **Cyber Bullying on a College Campus**

Nicholas Pettit, Alyssa Brenner,  
Anthony Estrella, Justin McElwain

*Display board [98A]*

### **Warning Signs of Sexual Assault**

Brandon Bailey-Garcia, Peter Keeley, Alex  
Lonetti, Ravin Caliva, Cassandra Coyle

*Display board [98B]*

### **Rap, Crime and the Construction of Urban Poverty**

Johanny Sanchez, Kaleigh Paplow,  
Katherine Ferrante, Karen Barraza,  
Jessica Gonzalez

*Display board [98C]*

### **Theories and Race in the Criminal Justice System**

Zachary Haglin, Kiersten Scott, Marisa Rios,  
Conlan Harvey, Justin Greenbauer

*Display board [99A]*

### **Rap and Race**

Sydni Gist, Steven Flis,  
Vanessa Felix Corona, Sultan Mohammed

*Display board [99C]*

### **We're Not Buying It**

Amber Jones, Paiton Strauss,  
Karolina Pieja, Randi Saenz

*Display board [99D]*

### **Rap and Policing**

Amanda Canzona, Austin Mason-Burrows,  
Austin Reeves, Anthony Tantimonaco,  
Ally Winterrowd

*Display board [100C]*

### **Self Control Theory and Distracted Driving Behaviors**

Keith Honore, Joseph Marquez,  
Benjamin La Pointe, Angel Gonzalez,  
Shania Swanson

*Display board [103B]*

### **Risky Driving Behaviors and Social Learning**

Samuel Suckley, Jake Mitchell,  
Jackson Loney, Travis Lively

*Display board [103D]*

### **Rap and Gangs**

Marina McGarry, Madaline Sutton,  
Miguel Castellanos, Marisa Rios,  
Marissa Ramirez

*Display board [126D]*

## SBS – Institute for Human Development

### **The Effect of the Americans with Disabilities Act on Sports, Workplace, and Education**

Bailey Bihn

*Display board [109D]*

## SBS – Politics and International Affairs

### **The Native American Sports Mascot Controversy**

Steffan Davies

*Display board [84A]*

### **Voter Participation within College Disciplines at Northern Arizona University**

Holly McDonald, Christina Meehan-Vernon, Clayton Pilcher, Maickol Nava, Anthony Rusk

*Display board [84C]*

### **Native American Identity**

Willem Chamberlain

*Display board [84D]*

### **Native Knowledge: How to Best Use Native American Styles of Governance to Mitigate Disasters**

Hannah Cook

*Display board [85C]*

### **Environmental Justice Issues within Native American Communities**

Erica Magdaleno

*Display board [86A]*

### **Healthcare Issues on Native American Reservations**

Mercedes Romero

*Display board [86B]*

### **Native American Education and the Future**

Logan Urbanek

*Display board [86C]*

### **The Effects of Social Media on Political Information**

Stephanie Arana Salguero, Gabriela Gazdzik, Benjamin La Pointe, Sara Kubisty, Hannah Macias

*Display board [86D]*

### **Sovereignty Hopi and Navajo**

Ahmad Alqallaf

*Display board [87C]*

### **Changes in Political Ideology from Freshman to Senior Year**

Jade Forbes, Dinah Kitchen, Jason Drake, Ashley Peddie, Shannon Molvin

*Display board [88A]*

### **Effect of Uranium Mining on Navajo Nations**

Jessica Olas

*Display board [88B]*

### **The American Opioid Crisis and Its Economic Implications**

Patrick Hale

*Display board [88C]*

### **The Economic, Cultural and Social Factors within the Native American Population**

Alex Hernandez

*Display board [89A]*

### **Federal Recognition Processes for Native American Tribes of the US**

Miranda Howard

*Display board [89D]*

### **Native Women: Sexual Assault and Domestic Violence**

Chloe Peterson

*Display board [90A]*

### **Native American Social Movements**

James Thornton

*Display board [90B]*

### **Challenges between Native American Law Enforcement Agencies and Outside Law Enforcement Agencies**

Nicholas Woods

*Display board [91A]*

### **Political Ideologies and Social Movements**

Emma Helfrich, Ryan Tsingine, Daja Alexander, David Melendez, Baylee Williams, Byron Evans II

*Display board [91C]*

### **Water, Sanitation and Women's Empowerment**

Rebeca Estrada-Rios

*Display board [91D]*

## SBS – Psychological Sciences

### **Parent-Child Interaction Therapy for Disruptive Behavior Disorders: A Systematic Literature Review**

Bryanna Cazares, Hannah Lillie

*Display board [80A]*

### **Hemodynamic Effects of Hypnosis and Directed Suggestions**

Joseph Mendoza

*Display board [80C]*

### **Student Made Art as a Way to Increase Learning and Empathy and Decrease Stigma in Abnormal Psychology Courses**

Nicole Hallet, Monica Beals, Suzanne Diass

*Display board [81B]*

### **Effects of High Intensity Interval Training on Physical Fitness and Working Memory**

Anna Harris, Annalee Boyle

*Display board [81C]*

### **Family Based Therapy for Anorexia Nervosa in Adolescents: A Systematic Literature Review**

Alexis Winter, Josie Sheets

*Display board [81D]*

### **Regional Differences & Self-Compassion**

Anna Harris

*Display board [82A]*

### **The Influence of Modern Language on Social Media Brand Engagement**

Jennifer Squires

*Display board [82C]*

### **Drug Use as a Predictor of Hypnotic Susceptibility**

Christiane Harris

*Display board [83A]*

### **Subjective Well-Being of Female Emerging Adults: The Role of Perceived Responsiveness from Mother, Father, and Best Friend**

Madison Schear

*Display board [83C]*

## SBS – Psychological Sciences

### **Adult Bipolar Disorder: A Systematic Literature Review**

Elizabeth Anderson, Meghan Garcia  
*Display board [83D]*

### **Survival Processing Versus Transfer Appropriate Processing**

Brent Tonaki, Clayton Vega, Joseph Mesa, Emily Winniman, Dakota Moore, Olivia Hankins, Michael Alban  
*Display board [85A]*

### **Virtual Reality Exposure Therapy for Panic Disorder/Agoraphobia: A Systematic Literature Review**

Cynthia Ortiz, Christian Sailor  
*Display board [87A]*

### **The Economic, Cultural and Social Factors within the Native American Population**

Alex Hernandez  
*Display board [89A]*

## SBS – School of Communication

### **How Family Narratives Shape College Students' Perception of Romantic Relationships**

Bayani Woodson, Sarah Begovac, Colin Montoya, Daniela Reyes  
*Display board [100D]*

### **Anger in Social Media**

Erin Calvert, Michaela Werlinger, Ryan Rutkowski, Emily Echeveste  
*Display board [104B]*

### **How Female College Students Enact Their Identity on Social Media**

Serena Helman, Robert Stewart Soto, Brittany Brouillette, Sarah Monassa  
*Display board [106B]*

### **Qualitative Research of Perceived Guilt and Subsequent Reactions**

Bayani Woodson, Colin Montoya, Grace Thorpe, Matthew Long  
*Display board [109C]*

### **Native Americans and Alcoholism**

Carson Petersen  
*Display board [110C]*

### **Fear Tactics within Communication**

Jessica Thiel, Alexis Bornstein, Christine Rogers  
*Display board [111D]*

### **The Formation of Personal Narratives Through Online Media in the LGBT+ Community**

Erin Calvert, Brianna Cajic, Anthony Violissi, Colton Quintana  
*Display board [113A]*

### **Personal Narratives of College-Age Children of Divorced Parents**

Emma Helvig, Ryan Jimenez, Brad McCormick, Matthew Jarecki  
*Display board [114A]*

## SBS – Sociology and Social Work

### **What Does Eat Mean: In Groups and Out Groups on the Topic of Government Assistance**

Angelica Sanchez  
*Display board [102A]*

### **Are Environmental Concerns Driving More People to Go Vegan?**

Tara Downhill  
*Display board [104A]*

### **Social Work Grand Challenge**

#### **Topic: Ending Homelessness**

Rebecca Osier, Gerardo Ramos, Brittany Rodriguez, Matthew Peterson, Angela O'Dea  
*Display board [104C]*

### **Media and Political Engagement**

Sara Caicedo  
*Display board [105A]*

### **Rehabilitation within Private Prisons**

Sadie Segovia, Nicole Ward, Natasha Salvini, Kaity Scott, Jessica Tenery  
*Display board [105C]*

### **Achievement of Equal**

#### **Opportunity and Justice: Ageism**

Jessica Anderson, Julio Burgos, Amy Aguirre, Lauren Baker, Kathleen Andrade  
*Display board [105D]*

### **Ensure Healthy**

#### **Development for All Youth**

Adriana Rogers, Keelin Robinson, Mackenzie Quaid, Kylie Wright, Victoria Reyes  
*Display board [106A]*

### **Grand Challenges of Social Work**

Jami Donaldson, Brooke Tarver, Ernessa Yazzie, Molly Kovach, Virginia White  
*Display board [106C]*

### **How Does Attachment Affect**

#### **People throughout Their Lifespan?**

Chase Lawe, Nikki Lancucki, Riley Koldenhoven, Raya Klooster, Courtney Larson  
*Display board [107A]*

### **Critical View of Services Provided for Violent Relationships**

Ryan Hughes, Ashley Hutton, Nicole Gonzalez, Bailey Heath  
*Display board [108A]*

### **Stop Family Violence**

Alexis Holguin, Miranda Harris, Hannah Going, Jessica Garduno, Alyssa Dorri  
*Display board [108B]*

### **If the Legal Reaction to Driving while Under the Influence Has More Legal Implications, Will People Feel Less Inclined to Drive with a Blood Alcohol Content (BAC) at or above the Legal Limit?**

Kayla Wilson  
*Display board [108C]*

### **Grand Challenge of Social Work: Eradicating Social Isolation**

Madeline Cravens, Ashley Cain, Alexzannah Castro, Rachelle Chee, Sarah Collins  
*Display board [108D]*

### **Ensuring Healthy Development for All Youth**

Danielle Vialpando, Kayla Washom, Alexandra Ware, Lov'e Sturm, Schuyler Smith, Sara Treadway  
*Display board [109A]*

### **Grand Challenges: Stop Family Violence**

Maegan Foltz, Ariana Fierro, Alexis Garcia, Rebecca Carlson, Alycia Darlington  
*Display board [109D]*

### **The Effects of Youth Development and Juvenile Susceptibility**

Melissa Calderon, Anthony Brown, Ashley Alcantar, Damian Baum, Kiana Buenafe  
*Display board [110A]*

### **Perspectives on Poverty in America**

Shanell Yenchik  
*Display board [110B]*

### **Media Fandoms and the Sense of Community**

Neda Massalha  
*Display board [110D]*

## SBS – Sociology and Social Work

### **Situational Poverty for Northern Arizona University Students**

Yadira Medrano, Morgan Malech, Ariana Magana, Kianna Mattie, Stephanie Lawrence

*Display board [111A]*

### **Does Having a Sibling Affect Your Childhood?**

Charles Whitten

*Display board [111B]*

### **Trauma-Informed Care**

Michelle Kyliavas, Nelsina Logue, Vanessa Lishner, Dresden Lee

*Display board [111C]*

### **Influence of Sexual Content on Sexual Relationships**

Taylor Clark

*Display board [112A]*

### **Attitudes towards Ghetto Neighborhoods**

Stacy Charron

*Display board [112B]*

### **Acceptance of Tattoos in Professional Environments**

Kate Dickerson

*Display board [114B]*

## SBS – Sustainable Communities

### **Filling Your Shoes: a Step into the Real World**

Trace Langley

*Display board [116C]*

### **Civic Engagement at Willow Bend Environmental Education Center**

Cameron Rood

*Display board [117D]*

### **Water Policy and Economic Development in the Navajo Nation**

Caitlin Yates

*Display board [121B]*

## SBS – University Studies

### **Charity in Ebay Auctions**

Nathan Pollack

*Display board [113C]*

### **Monoculture**

Valencia Arvessto

*Display board [114C]*

### **Probiotics and You**

Adrienne Tennant

*Display board [115B]*

### **Homelessness and Addiction**

Sheila Cardoza

*Display board [117A]*

### **Cancer Research in the Fire Service**

Austin Houle

*Display board [118A]*

### **Intersecting Versatility and Usability for Guide Dog Users: the Integration of Guide Harnesses and Long Canes**

Isaac Taylor

*Display board [119A]*

## Luncheon for CEFNS Presenters, Faculty Mentors, and Judges Keynote Speaker: Peggy Nelson

**“Propelling a Career while Having Work-Life Balance”**

**Peggy Nelson, CFO IHF LCC**

*Executive Aerospace Consultant*

**Friday, April 27, 2018**

**11:30 AM – 1 PM**

**du Bois Ballroom**



## LUNCH

11:45 AM – 1:30 PM

**Skydome Stage B: Honors Convocation and Awards Ceremony**

# AFTERNOON SESSION

## Skydome CAL Floor

2 PM - 4 PM – Exhibit

### **Process of Painting**

CAL, School of Art  
Madeline Markus

### **Painting**

CAL, School of Art  
Claire Herron

## Skydome CEFNS Floor

2 PM - 4 PM – Exhibit

### **MWI Labs NRL Loss Arch Redesign**

CEFNS, Mechanical Engineering  
Daniel Matthews, Zachary McCormick,  
Jacob Head, Mitchell Parker

## Skydome FCB Floor

2 PM - 4 PM – Exhibit

### **Meal Prep Basics**

FCB, Hotel Restaurant Management  
Lukas Striegl, Alexander Ketchelos

## Skydome FCB Table

2 PM - 4 PM – Exhibit

### **Meal Prep Basics**

FCB, Hotel Restaurant Management  
Lukas Striegl, Alexander Ketchelos

## Skydome INNOV Floor

2 PM - 4 PM – Exhibit

### **4P, the Pedal Powered Pollinator Patch**

Interdisciplinary, gridLESS Project  
Shyla Cox, Jaime Larson, Lauren Bernas,  
Darren Bingham, Frances Alvarado, Tyler Linner

## Skydome Stage A

2 PM - 2:55 PM – Oral Presentation

**The Social Dimensions of Introversion, Extroversion, and Compassion**  
HONORS, Honors College

Hannah Beskind, Rebecca Pejak,  
Sachie Romo, Adrianna Weise

3 PM - 3:55 PM – Oral Presentation

**Limits of Compassion Resulting from Human Contrived Borders**  
HONORS, Honors College

Sandenna McMaster, Christina Dodds,  
Britni Power, Matalynn Slayton

## Skydome Stage B

2 PM - 2:30 PM – Oral Presentation

**Ebb & Flow: Perspectives of Water in the Grand Canyon Region, Pt. 1 & 2**  
SBS, Sustainable Communities

Jessica Archibald, Rachel Ellis,  
Blessings Chibambo, Cadell Anderson,  
Caitlyn Yates, Dylan Hiatt, Erica Magdaleno,  
Jillian Wagner, Julia Diaz, Lauren Swol

3 PM - 3:20 PM – Oral Presentation

**Valley Fever: a Desert Disease**  
CEFNS, Biological Sciences

Taylor Slevin, Sara Pugsley,  
Samantha Markey, Andria Embry

3:30 PM - 3:50 PM – Oral Presentation

**The Science of Communicating**  
CEFNS, Physics and Astronomy

Eric Duong

2:40 PM - 2:55 PM – Oral Presentation

**Gaming to Learn: Exploring Social & Environmental Issues through College Classroom-Based Role-Playing Game**  
FYS, First Year Seminar

Sophia Spikes, Alyssa Mata,  
Jeremiah Mercado, Tyler Wells, Andrew Legel

## Skydome Stage C

### **Dystopian Video Games & Virtual Reality**

2 PM - 2:20 PM – Oral Presentation

**Beauty and the Crip: Gender and Disability in Popular Culture**  
CAL, Comparative Culture Studies

Sally Lobel

3 PM - 3:20 PM – Oral Presentation

**Stranger Than You Can Suppose: the Life and Ideas of Terence McKenna**  
CAL, Comparative Culture Studies

Jack Bidese

2:30 PM - 2:50 PM – Oral Presentation

**The Sacred Art of Tibetan Medicine**  
CAL, Comparative Culture Studies

Rebecca Billie

3:30 PM - 3:50 PM – Oral Presentation

**The Effects of Global Warming on the Flagstaff Landscape over Time**  
HONORS, Honors College

Morgan Selbach

## Skydome Stage D

2:30 PM - 2:50 PM – Oral Presentation

### **The Extraterrestrial American Southwest**

*HONORS, Honors College*

William McMullan, James Seganti, Rachel Kays

3 PM - 3:20 PM – Oral Presentation

### **Female Gaze: Wonder Woman and Theories of Sexism and Feminism in Post-2010 Cinema**

*CAL, English*

Hannah Mickleburgh

3:30 PM - 3:50 PM – Oral Presentation

### **Music Performance- the Mechanical Engineering Degree I Didn't Sign Up For**

*CAL, School of Music*

Mary Schlanger

2 PM - 2:20 PM – Oral Presentation

### **Collegiate Wind Competition Market Team**

*CEFNS, Mechanical Engineering*

Alana Benson, Anthony Cheslic, Craig Collins, Mitchell Green, Leopoldo Segura, Michael Vogelsang

2:30 PM - 2:50 PM – Oral Presentation

### **Retekt: Climbing Hold Resurfacers**

*CEFNS, Mechanical Engineering*

Dylan Simon, Kyle Connelly, Drew Shumway, Mohammad Almutairi, Abdullah Alenezi

2:55 PM - 3:15 PM – Oral Presentation

### **Plasticity Modeling**

*CEFNS, Mechanical Engineering*

Omar AlMutairi, N. Alkhalaf, A. AlMutairi, M. Alhabashi

3:20 PM - 3:40 PM – Oral Presentation

### **Hozhoni Assistive Device**

*CEFNS, Mechanical Engineering*

Mohammad Alajmi, Mahdi Alajmi, Hamad Aldhafaifi, Saud Almutairi

## du Bois Center – Aspen A Room

1:10 PM - 1:30 PM – Oral Presentation

### **Antenna Gimbal**

*CEFNS, Mechanical Engineering*

Kalli Albright, Kaitlyn Barr, Dustin Branges, Daniel Johnson

1:35 PM - 1:55 PM – Oral Presentation

### **3D Filament Recycler**

*CEFNS, Mechanical Engineering*

Abdulaziz Abdulghafour, Marc Hsu, Nicole Tabac, Micki Yasuda

2 PM - 2:20 PM – Oral Presentation

### **SAE Aero Design Competition**

*CEFNS, Mechanical Engineering*

Lucas Veteto, Connor Rich, Michael Torres, Ahmad Almuhanha, Saood Alazmi, Alex Klausenstock

2:30 PM - 2:50 PM – Oral Presentation

### **Renewable Energy Toolkit**

*CEFNS, Mechanical Engineering*

Mohammed Jarkhi, Talal Alenezi, Hamad Alsharhan, Mohammad Alsharidah, Fahad Alsuwailem

2:55 PM - 3:15 PM – Oral Presentation

### **Mobile In-Vitro Neurovascular Cast System**

*CEFNS, Mechanical Engineering*

Nase Alosaimi, Jalando Edison, Justin McCallin, Matthew Sussman

3:20 PM - 3:40 PM – Oral Presentation

### **BDL Particulate Characterization**

*CEFNS, Mechanical Engineering*

Kevin LoGran, Saleh Aldhufairi, Mohammad Almutairi

1:10 PM - 1:30 PM – Oral Presentation

### **Bluetooth Application for Engine Data Download and Display**

*CEFNS, Computer Science*

Joe Griffith, Robert McIntosh, Brandon Samz, Corban Stevens

1:35 PM - 1:55 PM – Oral Presentation

### **Tailored Tutoring Web Portal**

*CEFNS, Computer Science*

Jesus Garcia, Tyler Mitchell, Alex Kahn, Taylor Walker

2 PM - 2:20 PM – Oral Presentation

### **Brain Boosting Web Game**

*CEFNS, Computer Science*

Vincent Messenger, Nathan Franklin, Andy Salazar, Anderson Moyers

2:30 PM - 2:50 PM – Oral Presentation

### **English Proficiency Analyzer**

*CEFNS, Computer Science*

Joshua Shaffer, Luis Montes, Erik Strauss, Matt Quintana

2:55 PM - 3:15 PM – Oral Presentation

### **Automatic SPICE Data Synchronization**

*CEFNS, Computer Science*

Christopher Combs, Kellen Ross, Tyler Thatcher, Daniel Williamson

3:20 PM - 3:40 PM – Oral Presentation

### **Multi-factor Analysis to Reduce False Alarms in Intensive Care Units**

*CEFNS, Computer Science*

Nathan Payton- McCauslin, Alexander Grzesiak, James Todd

## du Bois Center – Aspen B Room

1:10 PM - 1:30 PM – Oral Presentation

### **Collegiate Wind Competition Mechanical Team**

*CEFNS, Mechanical Engineering*

Soud Alsahli, Devon Hardy, Kory Joe, Spencer McMahan, Jacob Peterson, Dakota Sallaway

1:35 PM - 1:55 PM – Oral Presentation

### **Collegiate Wind Competition Electrical Design**

*CEFNS, Mechanical Engineering*

Yousef Alali, Alexander Dahlmann, Aaron DeLuca, Evan Heiland, Benjamin Macleod, Tristan Scott, Qian Zhao

1:10 PM - 1:30 PM – Oral Presentation

### **Instrumented Bike - Team 1**

*CEFNS, Electrical Engineering*

Robert Briggs, Junting Chen, Hao Wang, Hongpan Wu

1:35 PM - 1:55 PM – Oral Presentation

### **Instrumented Bike - Team 2**

*CEFNS, Electrical Engineering*

Xilun Liu, Peijie Qiu, Siwei Wen, Yuchang Zhang, Yifei Zhang

2 PM - 2:20 PM – Oral Presentation

### **Power Assist Bike**

*CEFNS, Electrical Engineering*

Khalid Alghamdi, Mohammed Allahyani, James Sigler, Yun Sun

2:30 PM - 2:50 PM – Oral Presentation

### **Reston's Musical Instrument**

*CEFNS, Electrical Engineering*

Cole Kaplan, John Felsch, Paola Montoya

## du Bois Center – Pinyon Room

2:55 PM - 3:15 PM – Oral Presentation

**Stand Alone Power Converter**

CEFNS, Electrical Engineering

Mohammad Alrashidi, Nan Duan,  
Jason Foster, Lutong Ji, Yu Zhou

3:20 PM - 3:40 PM – Oral Presentation

**3-Way Syringe Mixer**

CEFNS, Electrical Engineering

Vincent Jencks, Colton Smith,  
Andrew VanDenburgh, Handi Xi, Yunchen Zhu

## du Bois Center – Ballroom A

1:10 PM - 1:30 PM – Oral Presentation

**Air Quality Analysis**

CEFNS, Civil Engineering and  
Environmental Engineering

Kholood Aldahlan, Mohammad Alkandari,  
Dylan Chambal, Xiaoying Tang

1:35 PM - 1:55 PM – Oral Presentation

**USFS Geomorphic Road Analysis and  
Inventory Package (GRAIP)**

CEFNS, Civil Engineering and  
Environmental Engineering

Julia Campo, AbdulRazzaq A. AlQashan,  
Parker Jones, Zach Kretsch

2 PM - 2:20 PM – Oral Presentation

**Oak Creek Floodplain Study**

CEFNS, Civil Engineering and  
Environmental Engineering

Robert Coronado, Erin McAnally,  
Parker Smith, Ziyang Wu

2:30 PM - 2:50 PM – Oral Presentation

**Wrong Way Driving Detection System**

CEFNS, Civil Engineering and  
Environmental Engineering

Hashem Albhrani, Timothy Fisher,  
Ian Rodrigues, Zakary Jenkins

2:55 PM - 3:15 PM – Oral Presentation

**San Simon Dam Evaluation**

CEFNS, Civil Engineering and  
Environmental Engineering

Mike Gallio, Brendan Garrison,  
Jinyang Lu, Bowei Zeng

3:20 PM - 3:40 PM – Oral Presentation

**Montezuma Castle National Monument  
Traffic, and Parking Assessment and  
Re-Design**

CEFNS, Civil Engineering and  
Environmental Engineering

Fahad Alkhaldi, Brian Hernandez-Ng,  
Jacob Robinson, Cayla Washington,  
Andrew McLaughlin, Rae Johnson

## du Bois Center – Juniper Room

1:10 PM - 1:30 PM – Oral Presentation

**The Wonder Factory: Spirograph**

CEFNS, Mechanical Engineering

Faisal Alanezi, Yousef Almutairi,  
Saad Albarazi, Barjas Albarazi,  
Khaled Alhusainan

1:35 PM - 1:55 PM – Oral Presentation

**The Wonder Factory: Slingshot**

CEFNS, Mechanical Engineering

Abdullah Howaishel, Abdullah Alzafiri,  
Dhary Aldhefeeri, Fahad Alotaibi,  
Mobarak Alsubiee

2 PM - 2:20 PM – Oral Presentation

**Design for Disability Simulation**

CEFNS, Mechanical Engineering

Zaid Almutairi, E. Almutairi,  
D. Alshammari, Yousef Alazmiu

2:30 PM - 2:50 PM – Oral Presentation

**Augmented Mobility Project**

CEFNS, School of Informatics, Computing,  
and Cyber Systems

Mohammed Alfatouh, Yutian Deng,  
Adam Douglass, Kristen Shryack,  
Mengyuan Zhang

## du Bois Center – Juniper Room

2:55 PM - 3:15 PM – Oral Presentation

**Marshall Classroom (Sensory Board)**

CEFNS, Mechanical Engineering

Abdullah Almutairi, Mohammad Alkatan,  
Yousef Alkatan, Taha Alansari, Abdullah Almutairi

3:20 PM - 3:40 PM – Oral Presentation

**Marshall Playground Interactive Device**

CEFNS, Mechanical Engineering

Mohammad Alsewaji, Abdalaziz Alazmi,  
Khaled Alenezi, Abdullatif Alenezy,  
Saad Aldawsari

## Skydome Floor: Posters (2 PM – 4 PM)

### CAL – Comparative Cultural Studies

#### **The Enneagram**

Emily Atkinson

Display board [55D]

#### **Aggression towards Women through Lady Murasaki in Ancient Japan**

Samantha Sanchez

Display board [60C]

### CAL – English

#### **Desert Mirrors: Minority and Majority Relationships in Southern Israel and the Southwest United States**

Dustin Rector

Display board [57A]

#### **Acquisition of Inflectional Morphology through Artificial Languages**

Maren Greve, Vedran Dronjic, Daniel Keller

Display board [60D]

### CAL – Interior Design

#### **Versatile Space: The Art of Multi-Use**

Samantha Staring

Display board [56D]

### CAL – Philosophy

#### **Plato's Refutation of Empiricism: Commentary on the Grammar and Vocabulary of Theaetetus: 151e-183c**

Hayden Niehus

Display board [57D]

### CAL – School of Art

#### **One of a Kind Experience for All Kinds of Travellers**

Eszter Giuriani

Display board [54D]

#### **Reexamining Senior Living Communities - Exploring Modern Solutions for an Aging Population**

Selena Arandia

Display board [56B]

### CAL – School of Art

#### **Big Park Perspectives: Integrated Senior Living**

Josie Kohlan

Display board [58B]

#### **Exploring Multi-sensory Environments as Therapy for Children**

Phuong Nguyen

Display board [58D]

### CAL – School of Art

#### **Universal Design: Design for Every Body**

Cela Janiec

Display board [59D]

#### **Project Shelter**

Tristan Hess, Elena Scheafer, Mckenna Craig, Miguel Sotelo, Britton Shepardson

Display board [CAL Ease!]

### CEFNS – Biological Sciences

#### **Determination of Phosphorous Content in Eriophorum vaginatum**

Abbie Parra

Display board [22B]

#### **Species Distribution Modeling as a Citizen Science Tool**

Atticus Wolf

Display board [28B]

#### **Can Phytochemistry of an Invasive Species be Predicted by Novel Weapons or the Enemy Release Hypotheses?**

Kelly Fulbright

Display board [22C]

#### **Isotopic Analysis of Freshwater Food Webs**

Hannah Pigg

Display board [30D]

#### **Antimicrobial Effects of Essential Oils against Burkholderia spp**

Jonathan De Leo, Erika Petro-Turnquist

Display board [23C]

#### **Ionic Liquids Demonstrate Antimicrobial Activity and Cellular Compatibility**

Tatum Bardsley

Display board [31B]

#### **Are Soil and Water Important Reservoirs for Clostridiodes Difficile Disease in Flagstaff, Arizona?**

Amalee Nunnally

Display board [23B]

#### **Genetic Analysis of the Common Chuckwalla in Central Arizona**

Morgan Jones

Display board [31D]

#### **Long Hair, Don't Care: Does Elevation Affect Hair Lengths on Flies?**

Holly Hanson

Display board [25A]

#### **Development of a Multiplex Serodiagnostic Assay by Down Selecting Antigen Targets to Provide a More Accurate Melioidosis Diagnosis**

Kyle Headley, Austin Shannon,

Maxx Harvey, Mimi Mbegbu

Display board [32D]

#### **Phylogenomics of the Tok-Tokkie beetles (Tenebrionidae: Pimeliinae: Sepidiini): Adaptive Radiations of the Genus Psammodes**

Kali Swichtenberg

Display board [26B]

#### **Revisiting Wombat Hair: Molecularly Tracking a Burrowing Marsupial through Time**

Jordyn Upton, Colin Sobek,

Matthew Gaughwin, Faith Walker

Display board [33B]

#### **Easing Veteran Reintegration One Paw at a Time**

Gabrielle Orsini, Christina Anaya

Display board [27D]

#### **Visitation Does Not Equal Pollination**

Brett Sayre

Display board [33C]



## CEFNS – Biological Sciences

### **Sexual Dimorphism and the Sex Difference in the Opportunity for Selection in Three Mammalian Species**

Victoria Allison, Stephen Shuster

Display board [34A]

### **Growth, Physiological, and Molecular Traits Associated with Salinity Tolerance in Rice**

Kristina Khan, Esther Nsende

Display board [34D]

### **As Forests Go, Do Forest Bees?**

Jason Lower

Display board [35B]

### **Anaerobic Soils Manipulated to Aerobic Soils and Their Metabolic Processes Using Isotopologue Pairs of Position Specific <sup>13</sup>C-labeled Glucose and Pyruvate**

Alex DeRusha

Display board [36D]

### **Characterization of *E. coli* from Clinical UTIs**

Alden Miller

Display board [37B]

### **Integration of Monoclonal Antibodies with FKBP12 Binding Protein to Inhibit Additional Bone Tissue Growth Causing Fibrodysplasia Ossificans Progressiva**

Lyndsey Dorough

Display board [37D]

### **Abundance of Ammonia Oxidizing Archaea at Varying Soil Depths at Toolik Lake, Alaska**

John Condno

Display board [38B]

### **Heat Treatment to Inactive Risk Group 3 *Coccidioides* spp.**

Austin Blackmon

Display board [38D]

### **Molecular Hybridization of Northern and Gilded Flickers**

Gillian Brailsford

Display board [39B]

### **Kinematics of the Burying Behavior in the Pacific Staghorn Sculpin**

Nicholas Anable

Display board [40B]

### **The Comparison and Quantification of Microbial Abundances in Ponderosa Pine Forest and Mixed Conifer Ecosystems in Northern Arizona**

Shavindi Ediriarachchi, Alicia Purcell

Display board [41B]

### **The Evaluation of Antibiotic Potency of Alkylacetylphosphonates against *E. coli* and *S. typhimurium***

Yasmeen Smith

Display board [4C]

### **“Ace in the Hole” Advanced Materials for Solar Cell**

Daniel Valencia, James Potvin, Julian Herring, Stephanie Hurst

Display board [7D]

### **Cost-Effective Synthesis of Methylammonium Iodide from Ammonium Iodide and Formaldehyde**

Nicholas Lopez

Display board [9D]

### **Benchtop Deposition of Pentacene Organic Semiconductor Thin Films**

Alexis Sheffield, Ramon Mendoza

Display board [10C]

### **A Three-dimensional Model for Renal Cell Carcinoma for Testing Natural Killer Cell Mediated Cytotoxicity**

Olivia Bertram, William Gibson, Aubrey Funke, Archana Varadaraj, Narendiran Rajasekaran

Display board [11B]

### **Synthesis of Uniform Copper(II) Oxide Nanoparticles with Controlled Size and Shape**

Caitlan Patcher

Display board [13D]

### **Does Mutton Stew Increase Your Calcium Intake?**

Tasha Nez

Display board [16B]

### **Design and Assembly of a Functioning Time of Flight Secondary Ion Mass Spectrometer**

Jennifer Hillier, Victoria Vincent

Display board [26D]

### **Inorganic Synthesis of Metal Terpy Compounds**

Meagan Wheeler, Hannah Pigg, Julian Herring, Michael Moghadasnia, James Potvin, Danny Valencia, Jacob Miller, Stephanie K. Hurst

Display board [29D]

### **Synthesis of Polymer Electrolytes For Use in Supercapacitors**

Dale Cummings

Display board [30B]

### **Incorporation of Choline Geranate into Electrospun Scaffolds to Resist Biofouling**

Charlotte Evans, Tatum Bardsley, Robert S. Kellar, Andrew T. Koppisch

Display board [31A]

## CEFNS – Chemistry and Biochemistry

### **NK Cells Exhibit Reduced Cytotoxicity in Hypoxic Conditions**

Cortney Collins, Narendiran Rajasekaran

Display board [3B]

### **Precious Metal Chemistry: Palladium and Platinum Syntheses**

Edwin Miller, Michael Moghadasnia, Julian Herring, Hannah Pigg, James Potvin, Daniel Valencia, Meagan Wheeler, Stephanie Hurst

Display board [4A]

## CEFNS – Civil Engineering, Construction Management, and Environmental Engineering

### **NAU Concrete Canoe**

Katlynn Adams, Gina Boschetto, Joshua Leon, Branden Peterson, Zachary Radovich

Display board [15C]

### **PCI Big Beam Competition**

Roy Crouch, Stephen Gergal, Fernando Rojo, Brandy Wagoner

Display board [16C]

### **ASCE Environmental Design**

Cameron Rhodes, Alex Anzar, Shelby Carawan, Paige Reilly

Display board [18A]

### **Ryan’s Trail Road Redesign**

McKenzie Moten, Parker Schrandt, Trevor Snipes, Yufei Cheng

Display board [18D]

## CEFNS – Civil Engineering, Construction Management, and Environmental Engineering

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### **Copper Age Mine Site: Preliminary Assessment and Site Investigation**

Spencer Harvey, Carl Haskie, Laura Garcia, Sarah Reddinger

*Display board [19A]*

## CEFNS – Mathematics and Statistics

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### **Prime Vertex Labelings for Perfect Ternary Trees**

Riley Waechter, Justin Sima

*Display board [14B]*

### **Comparing Function Estimation Techniques: A Simulation Study**

Jaxon Quillen, Kody Gelvin

*Display board [14D]*

### **A Paley-Type Construction of Complex Hadamard Matrices**

Mason Sargent, Kaitlyn Lee

*Display board [15B]*

### **Computing Maximal Reversal Distance of Signed Permutations**

Tanner Rosenberg

*Display board [16D]*

### **Structure of Braid Graphs for Coxeter Groups of Type A and B**

Nur Emalina Binti Bidari, Brandon Samz

*Display board [18B]*

### **The Othello Distribution**

Matthew Daunt

*Display board [19B]*

### **Infinite Trees of Primitive Pythagorean Quadruples**

Marcela Gutierrez, Viola McCarty

*Display board [20B]*

### **A Multiplayer Rating System**

Jordan Wright, Michael Rozinski

*Display board [20C]*

### **Salt River Project Solar Air Heater**

Tatum Begay, Taylor McCormack, William Senseman, Wyatt Bain, Brandon Dunn, Alonzo Bizahaloni, Carl Aaker, Ahmad Abuouf

*Display board [5A]*

### **Temperature Programmed Desorption Secondary Ion Mass Spectrometer**

Dalton Stone, Kirsten Larson, Nikki Cain, Colin Evans

*Display board [6A]*

### **Honeywell Reference Pressure Regulator**

Alexander Rustaey, William McGinn, Myla Azofeifa, Jordan Loos, Yitong Zhang

*Display board [6D]*

### **Honeywell Solenoid**

Jourdan Gill, Matthew Marty, Nicolas Russell, Regis Rumpfola

*Display board [7A]*

### **Normal Stress Developing in Magnetorheological (MR) Fluid**

Nikki Cain

*Display board [8A]*

### **Development of an Ankle Exoskeleton for Children with Equinus**

Hannah Rentschler, Brandon Begay, Azalea Grant, Robert Libby, Ethan Michel

*Display board [9A]*

### **Catheter Balloon Inspection Device**

Ryan Stevenson, Kevin White, Shane Pooler, Anthony Peters

*Display board [9B]*

### **W.L. Gore Bio-Electric Generation System**

Timothy ORourke, Bray Moll, Diego Garcia, Justin Havelly, Ariel Autrand, Andrew Mullen, Zaoyi Chi, Qingkun Liu

*Display board [9C]*

### **Orbital ATK Rocket Enclosure**

William Creagan IV, Austin Kee, Ryan Lopez, Brandon Zgurich

*Display board [10A]*

### **Winding Filaments and Walking Models: the Biology, Mathematics, and Simulation of Human Movement**

Dan Rivera

*Display board [10D]*

### **Design and Fabrication of a Robotic Knee Exoskeleton**

Hannah Rentschler

*Display board [11A]*

### **Uncertainty Quantification using Computational Fluid Dynamics in Prediction of Residential-scale Wind Power Production**

Bray Moll

*Display board [12A]*

### **Hydraulics Demonstrator**

Cal Skilsky, Sultan Alenezi, Fawaz Alenezi, Mosaed Aljebly

*Display board [13B]*

### **Orbital ATK Launch Vehicle Enclosure**

Joshua Smith, Brandon Cook, Miriam Deschine, Daniel Edmonds

*Display board [14A]*

## CEFNS – Mechanical Engineering

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### **Mechanical Spirograph**

Yousef Almutairi, Faisal Alanezi, Saad Albarazi, Khaled Alhusainan, Barjas Albarazi

*Display board [3A]*

### **Society of Automotive Engineers Mini Baja Collegiate Competition**

Zachary Rischar, Koalii Ladao, Marco Sliva, Rhyann Brogmus, Dylan Cappello, Brooks Grivet, John Rankin, Reid Johnson, Richie Lonzaga, David Woods, Samuel Hunker, Jordan Sundin

*Display board [3D]*

## CEFNS – Physics and Astronomy

### **Understanding Chlorine Salt Spectra through Computational Methods with Implications for Martian Geochemistry**

Rachel Huchmala

*Display board [11D]*

### **Planet Formation around Binary and Multiple Star Systems**

Kyle Lindstrom

*Display board [12D]*

## CEFNS – School of Earth Sciences and Environmental Sustainability

### **How Long Can Desert Tortoises, *Gopherus agassizii*, Hide in Their Burrows from Climate Change?**

Jenna Norris

*Display board [39D]*

### **School Pollinator Garden Initiative**

Kaileigh Walker, Melody Inthyvong, Zoe Jordan, Shonie Hardeen

*Display board [40D]*

### **Soil Crust Conservation, Management, and Education**

Courtney Newman, Casee Scott, Rafael Ramirez, Logan Schluter, Erika Magdaleno, Cameron Rood

*Display board [41D]*

### **Assessing Campus Light Pollution and Preserving the Dark Skies of Northern Arizona**

Sarah Holditch, Riley Forbis

*Display board [42B]*

### **Public Education through Film: Uranium Mining and Public Land Order 7877**

Ingrid French, Tasha Nez, Liv Ward, Matthew Yazzie

*Display board [42C]*

### **Mountain Lion Fire Interactions**

Logan Gonzales, Matthew Ruiz

*Display board [43B]*

### **A Global Map of Martian Volcanic Landforms**

Holly Buban

*Display board [43D]*

### **Flagstaff Population Growth**

David Todirita, Jessica Iverson, Josh Norton, Sam Como, Alexandrina Eggie

*Display board [44B]*

### **The Information Gained From Temporary Seismic Arrays**

Jessica Aerts

*Display board [44D]*

## CEFNS – School of Forestry

### **The Music of Bark Beetles**

Maxwell Herbert

*Display board [6C]*

### **Ancient Mud: Using Genetics to Uncover Past Communities in Alaskan Lakes**

Samantha Hershauer, Colin Sobek, Viacheslav Fofanov, Darrell Kaufman, Scott Anderson, Faith Walker

*Display board [7C]*

## CEFNS – School of Forestry

### **Arizona Milkweeds for Monarchs**

Emelia Lawrence

*Display board [8C]*

### **My Nest is Best: Genetically Analyzing Nest Composition of the New Mexico Jumping Mouse (*Zapus luteus luteus*)**

Jacque Lyman, Daniel Sanchez, Faith Walker, Carol Chambers

*Display board [8D]*

### **Differences in Drought Tolerance of *Pinus strobiformis* from Various Provenances**

Seth Sheer, McKenna Hedgepeth, Ethan Bucholz, Kristen Waring, Jessica DaBell, Amy Whipple, Jason Begay

*Display board [10B]*

### **Energy, Water, and Greenhouse Emissions**

Colin Towne

*Display board [12B]*

## CEFNS – School of Informatics, Computing, and Cyber Systems

### **Culturing and Sequencing Causative Agents of Early Childhood Caries**

Daryn Erickson, Jill Cocking, Ryan Lancione, Tara Furstenau, Crystal Hepp, Viacheslav Fofanov

*Display board [13A]*

### **NASA LISA-T Deployment and Articulation System**

Alexander Mueller, Daniel Krollman

*Display board [13C]*

### **User Interface for Biomolecular Simulator**

Charles Chatwin, Matthew Burns, Tanner Brelje, Joshua Gutman

*Display board [14C]*

### **Next Generation Bench Test Utilities Proof of Concept**

Summer Stapleton, Josh Baker, Rex Rogers, Emilio Sifuentes

*Display board [15D]*

### **Tracing Lineages of *Staphylococcus aureus* Using Minority Variant Approaches**

Ryan Lancione, Jill Hager, Viacheslav Fofanov, Tara Furstenau

*Display board [17B]*

### **Large Scale DRAM Array Model**

Colby Weber, Demetria Shepherd, Abdulrahman Alqahtani, Jinming Yang, Zeyu Zhang

*Display board [17C]*

### **Low-Cost Mobile Hydrology Reporting**

Kelli Ruddy, Luis Arroyo, Logan Brewer, Ryan Ladwig

*Display board [17D]*

### **Ecological Information by Location**

Brenden Bernal, Chandler Hayes, Michael Hartzell, Anthony De La Torre

*Display board [18C]*

### **Network Activity Classification for Automated IT Support**

Tyler Thatcher, Joseph Remy

*Display board [19D]*

### **Mapping Devices to Users for an Automated Approach to IT Support at the Edge**

Daniel Williamson, Tanner Massahos

*Display board [20D]*

### **Off-Grid Container Home Energy Performance and Requirements in Diverse Climates**

Julius Waintrub-St John, Shixing Shen, Pengyu Zhang, Tianyi Jiao

*Display board [21A]*

## CEFNS – School of Informatics, Computing, and Cyber Systems

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### **CO2 Flux: A Mobile Application for Ecological Data Collection**

James Beasley, Andrew Greene, Samuel Beals, Joseph Kelroy

*Display board [21B]*

### **Hardware One Time Pad**

Brayden Villa, Ian Burke, Bradley Racey, Earl Judge

*Display board [21C]*

### **Microarchitecture for Internet of Things Applications**

Taylor Bruce, Dillan Mills, Colt Morris, Ziwei Wu, Huanyu Zhou

*Display board [21D]*

### **Mars 2020 Rover Dust Analysis for Drill**

Hunter Rainen, Adam Paquette, Alexanderia Nelson, Charles Beck

*Display board [22A]*

### **Grid Connected Converter**

Mohammed Abu Radhi, Sayaf Almari, Fahad Alghareeb, Di Miao, Kaiqiong Ji

*Display board [22D]*

### **Cloud Storage Reclamation**

Benjamin George, Itraeu Bigsby, Matthew Cocchi, Richard Deen

*Display board [24A]*

### **Cloud-based Device Proxy for On-Premises Hotel Technology**

Parth Patel, Abraham Ramirez, Steven Strickland, Jacob Serafin

*Display board [24D]*

## COE – Educational Psychology

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### **Adults' Beliefs and Decisions about Children's Gender Expression**

Charly LaSon

*Display board [69A]*

### **ITCrowd: An Integration between Experts and Customers for IT Management**

Luis Arroyo, Tyler Boice

*Display board [25B]*

### **Predictive Routing for Wireless Networks: Robotics-Based Test and Evaluation Platform**

Fahad Almaraghi, Chaoju Wang, Yuting Zhang, Hanxiao Lu, Qiyuan Huang

*Display board [25C]*

### **Crowd Intelligence Grocery Shopping Mobile App**

Kalen Wood-Wardlow, Christopher Simcox, Kristoffer Schindele, Thomas Back

*Display board [25D]*

### **CrossDoc: An Improved Comment Management System**

Peter Huettl, Garrison Smith, Kristopher Moore, Brian Saganey

*Display board [26A]*

### **Ecological Assessment Tool**

Chantz Spears, Julian Shak, Alfonso Martinez, John Bassler

*Display board [29B]*

### **Body Control Explosive Ordnance Disposal (EOD) Robot**

Cody Varner, Sixian Zhang, Zening Wen, Huiwen Chu, Yazhou Li

*Display board [29C]*

## COE – Educational Specialties

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### **SOARR Initiative**

Makayla Owens

*Display board [69B]*

## COE – Teaching and Learning

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### **An Examination of the Relationship between Kindergarten Readiness and Third Grade Testing Outcomes**

Jessica Eaton, Jade Heffern, Ramona Mellott, Robert Hagstrom

*Display board [69C]*

### **Striding for More Research at NAU**

Jaciana Fimbres, Jody Bartz

*Display board [69D]*

### **Delving into Data Literacy**

Amanda King, Jennifer Luzader

*Display board [70C]*

### **Promise of Public Education: Is It Living up to Its Ideals?**

Kevin Alvarez, Kyra Bennett, Audrey McPherron, Aeryn McIvor, Cierra Brown

*Display board [70D]*

## FYS – First Year Seminar

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### **Kinsey Public Achievement Rad Squad**

Caitlin Marsa, Mekenzie Young, Kamri Robinson, Guadalupe Hernandez, Reneé Hanneken, Autumn Edgar

*Display board [53A]*

### **Task Force Transforms Parent Involvement at Kinsey Elementary**

Riley Redwine, Kamryn Feeser, Miracle Williams, Ilyana Hernandez, Kaelea Johnson, Roberto Lagunes Hilario

*Display board [53B]*

### **Killip Public Achievement for Stars**

Brittany Wiley, Mark Zielsdorf, Nick Zonderhar, Tre Davis, Shannon Supaer

*Display board [53C]*

## HONORS – Honors College

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### **Herbal Medicine Combating Western Values**

Jordyn Williamson, Leah Brown, Jacob Lippert, Olivia Nichols

*Display board [61B]*

### **The Crackland Merry-Go-Round: Cycles of Addiction in Brazilian Children**

Victoria DuCharme, Kailea Allen, Emi Krueger

*Display board [61D]*

### **Depolarizing Leaders**

Devyn Strickland, Julianne Updike, Alex Risley, Ryan Harrop

*Display board [62B]*

### **Hypercalcemia Secondary to Breast Cancer and Multiple Myeloma**

Skylar Weber, Nicole Fornabaio

*Display board [62D]*

## HONORS – Honors College

### ***The Impact of Sex Trade and Sex Trafficking on Children in Third and First World Countries***

Amanda Smith, Rebeca Stephens, Baylie Heaps

*Display board [63B]*

### ***The Poverty and Mutilation of Street Children in India***

Annika Smith, Allison Cutler, Kensi Wixon, Gianna Zola

*Display board [63D]*

### ***Eating in the East***

Karly Moyers, Daniel Hargis, Rene Quinteros

*Display board [64D]*

### ***Juvenile Leukemia: Cellular Mechanisms and Gauging Response to Childhood Cancer***

Austin Dikeman, Rayna Castillo, Keyla Falcon

*Display board [65B]*

### ***Chinese Medicine***

Keira Hurt, Haley Hastings, Alexa Bailey, Abby Chua

*Display board [65D]*

### ***Teaching Empathy and Impulse Control***

Kaitlynn Cooper, Justin Loeb, Kathryn McKnight

*Display board [66B]*

### ***How Mindfulness and Impulse Control Increase Individual Emotional Intelligence and Successful Parenting***

Kyra Cowgill, Brynn Bierer, Claire Richmond-Tucker, Chinelo Adi

*Display board [66D]*

### ***Brain Function and Physical Activity***

Christian Arnold, Breann Drago, Micah Griffin, Madison Kays

*Display board [67B]*

### ***The Silver Springs Monkey Case***

Laura Barton

*Display board [67D]*

### ***Dissociations Resolved through Meditation***

Racquel Carpenter, Brooklyn Sanchez, Brenda Padilla

*Display board [68B]*

### ***Carcinogenic Levels in Burnt Foods***

Shannon Connor, Amy Haines

*Display board [68D]*

## INNOV – boundaryless

### ***The Effects of Academic Advising on Student Retention***

Jake Hannigan

*Display board [1A]*

### ***Gun Violence Awareness Education Campaign***

Monique King, Tyrone Santiago, Tacira Vega

*Display board [1B]*

### ***Factory of Meanings: Passionate Talks***

Matvei Kain

*Display board [1C]*

### ***NAU100 Life Skills Curriculum***

Marcos Hernandez, Ryan Immel

*Display board [1D]*

### ***Making Something Out of Nothing***

Isaac Ritschel, Noah Curry

*Display board [2A]*

### ***BeWell Box***

Abby Bryant, Sidney Crouch, Andrew Munoz

*Display board [2B]*

## SBS – Anthropology

### ***Prehistory of Food/Nutrition***

Armando Padilla

*Display board [103C]*

### ***What Once Was Lost, Now Is Found: Investigating the Role of Lower Dover in the Socio-political Landscape of the Belize River Valley***

Renee Collins, Stanislava Romih

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Scott Wolbert, Daniel Cruz, Carson Ventura, Nick Necochea

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Nikola Williams, Kelsey Garden, Taylor Lambrigger, Patricia Aguiniga, Omar Gomez, Barbara Arriaga Espinoza, Amanda Ekdahl

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### ***The Archaeology of Written Systems***

Joshua Dingman

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### ***Identifying the Unidentifiable: Using Isotopic Analysis to Develop Biological Histories in Forensic Cases from Flagstaff, Arizona***

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### ***Repeal Coalition***

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### ***Folklore in the East: Comparing Traditional Yoga to Contemporary Practices***

Jillian Wagner

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### ***Stewardship: Cultivating Community through Cultural Heritage***

Michael Ring, America Freeman, Kayleigh Payne, Daniel Richardson, Anthony D’Avolio

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### ***Research on the Folklore of Chinese Lunar New Year - Comparative Studies of Contemporary Regional Celebrations for Chinese New Year***

Tianchen Guo

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### ***The Prehistory of Art***

Lauren Ely

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### ***The Prehistory of Hydro-technology***

Matthew Saunders

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### ***Folklore of Sorority Culture***

Brandyn Burke, Julia Osborn, Haley Hodsdon

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### ***Human Nutrition throughout History***

Mackenzie Hughes

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### ***Introduction to Latinx Student Union***

Spencer Sawottke, Ryan Stevens

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### ***The Prehistory of Monumental Architecture***

Joshua Leon

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### ***The Prehistory of Food and Nutrition***

Hannah Park

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### **How Weapons and War Shaped**

#### **Prehistoric Africa**

Noah Usquiano

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### **The Prehistory of Death and the Afterlife**

Jordana Siegel

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Hannah Skalleberg, Shelby Sorensen

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Caroline Goodfriend

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Jacob Adam

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Braylen Drew, Grace Davis, Cameron Aitken, Elin Rosberg, Brittany Van Horn, Bridgett Moore, Bryce Pimsner

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### **The Prehistory of Food and Nutrition in South America**

Evelyn Smith

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### **Prehistorical Art and Its Beauty**

Joseph Cabungcal

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### **Is Indigenous Education Planned with or for Indigenous People: An Examination of Indigenous Research in Latin America**

Shania Valentine

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Adrian Lerma

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Darien Fuller

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### **Using Indigenous Methodologies to Investigate Health Impacts of Uranium Mining on Navajo Nation**

Janice Baldwin-Rowe

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### **Climate Change Adaptation, Mitigation Education Outreach to Hopi Nation Communities**

Darrien Benally

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### **Influences of Infidelity in a College Atmosphere**

Stephanie Rhea, Brooklyn Rincones, Brandon Miles, Jason Linden, Emma Baird

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### **Authoritarian Parenting Leads to College Delinquency**

Daniela Arriaga Espinoza, Katharine Fisher, Natasha Crook, Samantha Manygoats

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### **To Pimp a Butterfly**

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### **The Forgotten Victims: Sexual Assault and Preventative Measures**

Victoria Weissinger, Unique Graves, Aaron Hunt, Fritzen Ramsey, Devyn Mclees

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Elle Stanley, Elaina Rovenstine, Desiree Valenzuela-Marquez, Destinie Gee, Edward Brown

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### **Online Piracy**

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Samuel Langs, Kinzie Reddington, Curtis Sharp

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Cassidy Wallace, Chris Morton, Matthew Stutte, Kaley Mulligan

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Natalie Snyder, Jake Menzter, Holly Atkinson

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Jacob Monroe, Fallon O'Neil, Breanna Krasovich, Octavio Castaneda

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Sofia Ramcke

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Jeffrey Wilcox

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Noel Schad, Sidney Colwell

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Christiane Harris, Joseph Mendoza,  
Mark Gauthier-Braham, Tyler Danner,  
Amber Killgore, Porter DeFazio,  
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Sidney Colwell, Anastasia White,  
Noel Schad, Bethany Warter

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Alyssa Weedon, Lacey Astgen

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Macall Maryhew, Ben Whitefield

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Cassie Miller, Elyse Moreno,  
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Kelly Leathers, Abigail Kelley,  
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Laronda Lee, Lydia Wischmeier

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Avory Lent

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Jill Lasater

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Jessie Durnez

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Courtney Rogers

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- Restrooms: on Concourse level and field level, both all gender and single stall.

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# Thank You

We wish to thank the faculty, staff, graduate students, judges, volunteers, moderators, and student ambassadors, without whom this event would not have been possible.

A special thanks goes to the Organizing Committee, especially Colin Bailey, Kerry Bennett, Becky Butcher, Bryan Sherwood, Heather Tate, and Tina Zecher, and to all the faculty mentors, individuals, companies, organizations, and grant programs that assisted students in the completion of their internships or their research, creative, and design projects.

## 2018 Judges

We gratefully acknowledge the following faculty, staff, alumni, and friends who volunteered to judge for CEFNS, HHS, SBS, and Cline Library. Thanks, also, to the volunteers who signed up after the program print deadline and could not be acknowledged.

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Carin Anderson	Eric Fields	Monika Keindl	Dany Rochimi
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James Buccellato	Rob Goodman	Linda Tichivsky	

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