

*Learning through*  
**EXPERIENCE**

STUDENT EXPERIENTIAL LEARNING CONFERENCE  
AT VIRGINIA TECH

APRIL 13TH, 2018  
MOSS ARTS CENTER &  
SQUIRES STUDENT CENTER

## **A UNIVERSITY-WIDE COLLABORATION:**

Center for Communicating Science  
College Access Collaborative  
Division of Student Affairs  
Family + Alumni Relations: DSA  
Global Education Office  
iScholars  
Leadership Education Collaborative  
Moss Arts Center  
Music Day  
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Office of First Year Experiences  
Office of General Education  
Office of Undergraduate Research  
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## **OUR SPONSORS:**

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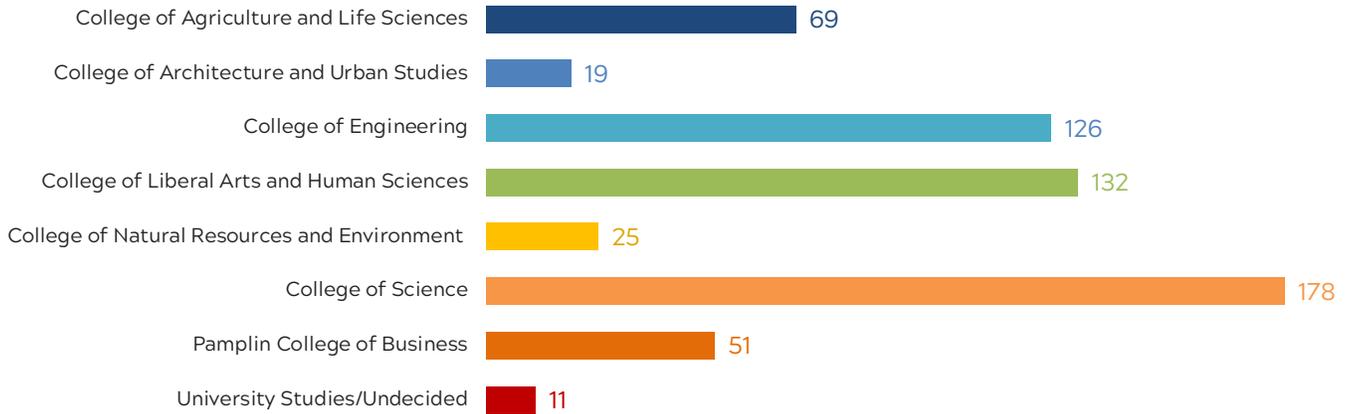
## **ABSTRACT BOOK DESIGN**

Najla Mouchrek & Jack Hartley | Undergraduate Academic Affairs

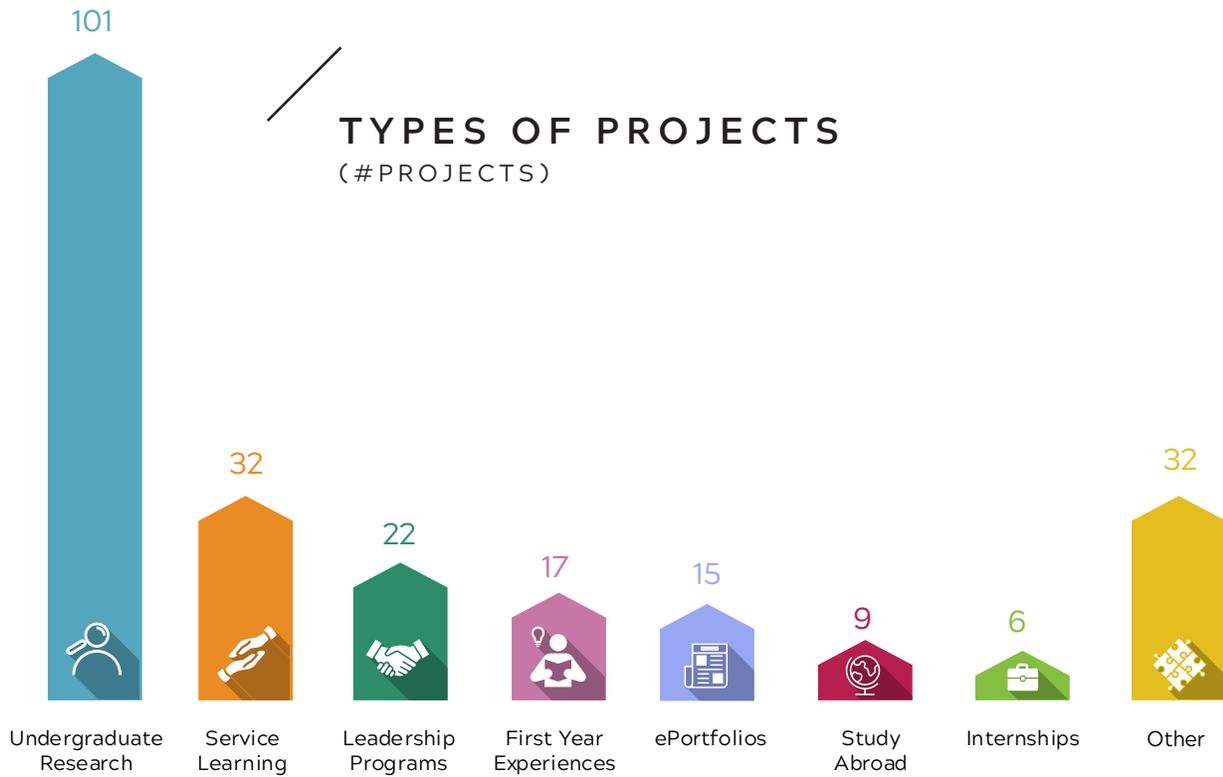


# EXPERIENTIAL LEARNING CONFERENCE

## STUDENT PARTICIPATION BY COLLEGE (#STUDENTS)



## TYPES OF PROJECTS (#PROJECTS)



Virginia Tech's commitment to teaching, research, and service is closely connected with the purpose-driven learning and engagement, disciplinary depth, and interdisciplinary capacities that define the VT-shaped model at the center of the Beyond Boundaries vision. We are setting Virginia Tech apart from our peers by creating opportunities for students to engage directly with the communities we serve in the spirit of Ut Prosim, and to build a rich experiential learning structure.

All three dimensions of VT-shaped discovery, and how they work together in the engagement and education of you, our students, is critical to achieving our goals as an institution and serving future generations of Hokies.

Depth of disciplinary commitment spans the entire spectrum of learning from arts and humanities to social and basic sciences to technology and health sciences. Providing a strong liberal education to complement specific programs of study will, as is stated in Beyond Boundaries, "place graduates on a path toward becoming global citizens in inclusive communities."

Cross-disciplinary integration and engagement affords us opportunities to develop new areas of knowledge, collaboration, and discovery that can differentiate us from our peers. We have already seen significant progress and impact in this area through our Destination Area as well as the collaborative work of our centers and institutes. These interdisciplinary efforts will continue to be the catalyst for creating new growth and learning opportunities for students and faculty.

The fusion of disciplinary depth and cross-disciplinary integration within the VT-shaped model is achieved through close engagement with our various communities and our contributions to those we serve. The product of this union is experiential learning, which becomes the value proposition for this model. Experiential learning and discovery enables Virginia Tech to coalesce a powerful combination of academic and research strengths, and talented people who are focused on collaborative and transformative scholarship.

The VT-shaped model for learning and discovery is already significantly impacting what each of you are creating and experiencing across our campus.

I'm excited that you are participating in this Student Experiential Learning Conference. It is a first-hand example of the power of your hard work and dedication, and Virginia Tech's commitment to showcasing your projects and collaborations that exemplify purpose-driven experiential learning.



**Cyril Clarke**

*Interim Executive Vice President  
and Provost | Virginia Tech*

**W**elcome to Virginia Tech's inaugural Student Experiential Learning Conference. Driven by the goal of showcasing and celebrating all forms of VT-shaped learning, the XL Conference provides students across campus the opportunity to discuss the products of their service learning, undergraduate research, internships, entrepreneurship, leadership, and study abroad experiences. The XL Conference builds upon the Dennis Dean Undergraduate Research Symposium and VT-Engage Service Learning Showcase to bring together an unprecedented 600 student presenters in a single event.

To those students who are presenting their work, we celebrate that you have made the most of the opportunities available to you at Virginia Tech. Whether as part of a team contributing to a semester-long project in your first year experience course, a leader of a student organization, or a senior with a capstone project that applied years of learning toward a significant world problem, you have gained valuable skills that transcend beyond your formal coursework. You have learned critical thinking, problem solving, and communication skills as well as empathy and how to work as part of diverse teams. Not only will these skills enhance your employability, but they will also position you well to be engaged citizens of a global society.

To those students who have not yet had the chance to participate in experiential learning, we hope that you will find inspiration from your peers who are presenting in this conference. Virginia Tech is committed to increasing the availability of these opportunities so that experiential learning becomes a part of a Virginia Tech education for every student.



Please reach out to your peers and the representatives of the many offices that support experiential learning to learn how you too can become involved.

To the many faculty, staff, employers, and community partners who have mentored our students, thank you! What our students have learned from working with you will be among the most memorable and valuable elements of their education.

To the parents, alumni, and other visitors to the Experiential Learning Conference, we hope that you enjoy learning from our students and sharing your own ideas, questions, and perspectives with them.

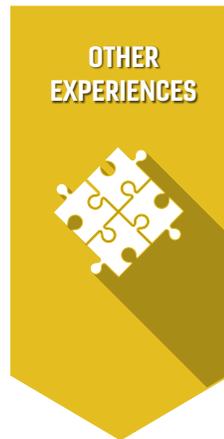
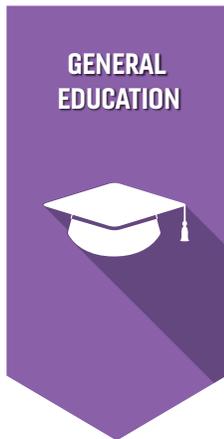
And finally, to our conference co-chairs Keri Swaby and James Harder, to the XL Committee, and to the many volunteers who have made today possible, thank you so much. You have created a signature event that is positioned to become an anticipated Hokie tradition.

***Jill Sible***

*Associate Vice Provost for Undergraduate Education,  
Virginia Tech*



**HOW DO YOU  
XL?**





# SCHEDULE OF EVENTS

Registration for presenters, outside Old Dominion Ballroom

## 8:45 - 9:45 a.m. • Poster Session 1

No Posters

## 8:45 - 9:45 a.m. • ePortfolios Session 1

Moss Arts Center, 3rd Floor

Type of Experiential Learning	Primary Author and Title of Presentation	
Service Learning, A First Year Experience, A General Education course	<b>Anna Christovich</b> <i>Academic Development Portfolio</i>	62
Service Learning, A First Year Experience, A General Education course	<b>Fofi T. Gouletas</b> <i>A Life of Service</i>	118
Research Portfolio	<b>Marybeth C. Myers</b> <i>Marybeth Myers-Portfolio</i>	193
Service Learning, A First Year Experience, Living Learning Community	<b>Nathan J. Wagner</b> <i>First Year Galileo and InVenTs Studio Experience</i>	254
Leadership Program	<b>Lauren V. Hughes</b> <i>Self-Discovery through Extended Orientation</i>	139
Research Portfolio	<b>Billy John III</b> <i>My Research Journey</i>	
Portfolio	<b>Elizabeth T. Benos</b> <i>Freshman Year</i>	41

## 8:45 a.m. - 4:00 p.m. • Installations

Moss Arts Center, 2nd Floor

Type of Experiential Learning	Primary Author and Title of Presentation	
Cultural Aesthetics	<b>Jonathan G. Holloway</b> <i>The Tracy Chapman Project</i>	137
Study Abroad	<b>Trey King</b> <i>2017 Architecture Fall Travel Program</i>	153
Side-project	<b>Ankit Malhotra</b> <i>Energy Blast Off</i>	169
	<b>Amar Mohanty</b> <i>Robotic Arm with Machine Vision</i>	184
Virginia Tech Entrepreneurship Challenge	<b>Andrew P. Stiles</b> <i>Small Scale Hydrogel Bioreactor</i>	239
	<b>Julianna L. Jones</b> <i>Today a Reader, Tomorrow a Leader</i>	159
Service Organization	<b>Julia T. Nguyen</b> <i>Virginia Tech Rescue Squad: Ut Prosim since 1969</i>	196
Leadership Program	<b>Nathan H. Walker</b> <i>EmPOWERing the next Generation</i>	256

**8:45 - 9:45 a.m. • Lab Displays****Moss 1st Floor Lobby (Pond Area)**

PAGE #

Institute for Critical Technology and Applied Science (ICTAS) lab showcase

**8:45 - 9:45 a.m. • Interactive Activities Session 1****Squires****Old Dominion Ballroom, Main Floor**

Type of Experiential Learning	Primary Author and Title of Presentation
An Internship, A General Education course, improvisational games and exercises	<b>Carrie Kroehler</b> <i>Learning to Listen and Listening to Learn</i>

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**8:45 - 9:45 a.m. • Oral Session 1****Squires****Brush Mountain A**

Time	Type of Experiential Learning	Primary Author and Title of Presentation
8:45 a.m.	Undergraduate Research	<b>Jay H. Gillenwater</b> <i>Development of molecular markers for marker assisted soybean breeding</i>
9:00 a.m.	Undergraduate Research	<b>Michelle M. Corinaldi</b> <i>Asian American Women and Non-Binary Individuals are Front and Center!</i>
9:15 a.m.	Leadership Program	<b>Anissa Z. Ashraf</b> <i>Leading Hokies Towards Leadership</i>
9:30 a.m.	Student Entrepreneurship	<b>Danielle E. Jeffers</b> <i>Student Entrepreneurship</i>

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**Squires 238**

9:00 a.m.	Undergraduate Research, Photography and Music	<b>William H. Johnson</b> <i>Life as a KIND soul</i>
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**8:45 - 9:45 a.m. • Panel and Round Table Discussions Session 1****Squires****Brush Mountain B**

Type of Experiential Learning	Primary Author and Title of Presentation
An Internship	<b>Dana J. Mouritzen</b> <i>You can do what with that major?</i>

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**Squires 236**

Leadership Program	<b>Carlisle A. Martin</b> <i>Students of the Undergraduate Honor System</i>
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**9:45 - 10:00 a.m. • Break****10:00 - 11:00 a.m. • Keynote****Squires - Haymarket Theatre**Welcome: **President Tim Sands**Keynote Address: **Jack and Alley DuFour**, VT alumni and global entrepreneurs featured on Shark Tank

## 11:15 a.m. - 12:15 p.m. • Poster Session 2

## Moss Arts Center

## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
1	Undergraduate Research	<b>Andrew J. Biscardi</b> <i>Targeting platelet-mediated cancer cell extravasation using a Disabled-2-derived peptide</i>	44
2	Undergraduate Research	<b>Anna R. Clapp</b> <i>Characterization of Single Nucleotide Polymorphisms in Genes Linked to Metabolic Inflexibility</i>	64
3	Undergraduate Research	<b>Clark A. Cucinell</b> <i>Identification of Genetic Type and Infectious Agents in Laboratory Mice by Analyzing RNA-Sequence Metadata</i>	74
4	Undergraduate Research, Fralin Fellowship	<b>Kayla B. Carey</b> <i>Direct injection of CRISPR/Cas9 system into porcine zygotes does not result in off-targeting events.</i>	57
5	Undergraduate Research	<b>Katherine A. Darrah</b> <i>The Effect of Delayed Access to Feed on Intestinal Morphology and Stem Cells in Chickens</i>	85
6	Undergraduate Research	<b>Ashley C. Doyle</b> <i>What Causes People to Accept Friend Requests on Facebook: A Survey Experiment</i>	86
7	Undergraduate Research	<b>Hayley M. Edwards</b> <i>Feasibility of Buoyant Foundation Systems</i>	88
8	Undergraduate Research, An Internship	<b>Ebone D. Smith</b> <i>Observing and Analyzing Variations of Daily Precipitation: The Impact of the El Nino/Southern Oscillation on Kiritimati Island</i>	233
9	Undergraduate Research, Diplomacy Lab	<b>Thomas N. Hale</b> <i>CVE Strategies and Youth Radicalization in Universities: Pakistan</i>	127
10	Undergraduate Research, Fralin Fellowship	<b>Eric Esposito</b> <i>Codon Optimization and Noise Control in the Spindle Assembly Checkpoint</i>	94
11	Service Learning, Study Abroad, An Internship	<b>Lea M. Koehler</b> <i>Perspectives around the World</i>	152
12	Undergraduate Research	<b>Darren Felts</b> <i>Self-Motivation and Student Engagement: Factors that predict classroom participation</i>	98
13	Undergraduate Research	<b>Josh H. Foelsch</b> <i>Interdisciplinary Research on Automated Agriculture Systems</i>	102
14	Undergraduate Research, Diplomacy Lab	<b>H. Freschi</b> <i>Vibrant Civil Society and Strong Economic Growth</i>	104
15	Undergraduate Research	<b>Kaitlin M. Garretson</b> <i>Colostrum and Calf Health</i>	106

## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
16	Undergraduate Research, Diplomacy Lab	<b>Nicole M. Geis</b> <i>Diplomacy Lab - Avoiding a Gaza War</i>	109
17	Undergraduate Research, Fralin Fellowship	<b>Madison L. Gonzalez</b> <i>Growth Factors Influence Cell Cycle Progression in Equine Satellite Cells</i>	114
18	Undergraduate Research	<b>Robert C. Gonzalez</b> <i>The process of selecting an optimal solar panel system for the dynamic weather conditions in Dubai; An ICTAS-Supported Project</i>	113
19	Undergraduate Research	<b>Camilla E. Johnson</b> <i>The use of cornhusk for engineering the microstructure of cobalt to improve its magnetic hardness</i>	147
20	Undergraduate Research	<b>Sarah E. Kivimaki</b> <i>Molecular Basis Of Phosphatidylinositol 5-Phosphate By The Endosomal Adaptor Protein Tom<sup>1</sup> Evan Littleton<sup>1</sup>, Sarah Kivimaki<sup>1</sup>, Wen Xiong<sup>1</sup>, Anne Brown<sup>2</sup>, and Daniel G. S. Capelluto<sup>1</sup></i>	154
21	Study Abroad	<b>Ira Long</b> <i>Dean's Semester: A Plan to Decrease Campus Plastic Use</i>	165
22	Undergraduate Research	<b>Astrid I. Meenan</b> <i>The Physiological Role of a Putative Plant Phytase</i>	181
23	Service Learning, Capstone Class	<b>Melanie P. Feldman</b> <i>Active Minds and Bodies: Improving Community Health with Horticulture at the Hale-YMCA Community Garden</i>	97
24	Co-Op Abroad	<b>Saransh Chand</b> <i>What's it like to Co-Op in Europe twice?</i>	159

## Moss Arts Center, 3rd Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
25	Undergraduate Research	<b>Jack Reaume</b> <i>Habitat suitability model for non-timber forest products at the Hahn Farm Montgomery County, Virginia</i>	216
26		<b>Shea Ruffin</b> <i>Jawsdropping Crowd Dynamics</i>	221
27	Study Abroad	<b>Danielle D. DeCanio</b> <i>Punta Cana Study Abroad: Hospitality and Tourism Management</i>	82
28	Undergraduate Research	<b>Serena L. Emanuel</b> <i>Diversifying and enriching undergraduate experience through a hands-on environmental monitoring lab</i>	93
29	Service Learning	<b>Jessica L. Vishneski</b> <i>Finding Integrative Fulfillment at Warm Hearth Village</i>	253

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
30	Undergraduate Research	<b>James E. Taylor</b> <i>Improving Microservice Infrastructure and Operational Reliability of a High Frequency Environmental Monitoring System</i>	247
31	Service Learning, International Service Immersion	<b>Kaley D. Holloway</b> <i>VT Engage in Peru</i>	136
32	Undergraduate Research, Service Learning	<b>Chris J. Lower</b> <i>Pasture renovation and interaction with Giles County Land Lab</i>	166
33	Undergraduate Research	<b>Joseph M. Paoletti</b> <i>Irrigation Cost Benefit Analysis Tool</i>	205
34	Undergraduate Research	<b>Riya P. Nag</b> <i>Hemispheric Asymmetry through Autonomic Nervous System Responses to Visual Stimulation</i>	194
35	Study Abroad	<b>Philip Tsoi</b> <i>Business and Culture in Italy</i>	251

**11:15 a.m. - 12:15 p.m. • ePortfolios Session 2**

**Moss Arts Center**

**Moss Arts Center, 3rd Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	
Research Portfolio	<b>Colton R. Baldrige</b> <i>Research Portfolio</i>	37
Service Learning, A First Year Experience, A General Education course	<b>Caylee Cuppernull</b> <i>Caylee Cuppernull Portfolium</i>	75
A First Year Experience, A General Education course, Physical projects	<b>Madi L. Haun</b> <i>Madi Haun - First Year at Virginia Tech</i>	130
Research Portfolio	<b>Jordan N. Jenson</b> <i>Freshman Year Undergraduate Portfolio</i>	145
Undergraduate Research, A First Year Experience	<b>Alyssa Marshall</b> <i>My Portfolio</i>	172
Research Portfolio	<b>Jessica Meeks</b> <i>Jess Meeks's Presentation of Her Capabilities</i>	180
Service Learning, A General Education course, Leadership Program	<b>Ashlyn Pugh</b> <i>Ashlyn's Portfolium</i>	211
Undergraduate Research	<b>Rebecca A. McCord</b> <i>The 100th Anniversary of the United States and the Czech Republic</i>	177

**11:15 a.m. - 12:15 p.m. • Lab Displays**

**Moss Arts Center, 1st Floor Lobby (Pond Area)**

Institute for Critical Technology and Applied Science (ICTAS) lab showcase

## Old Dominion Ballroom, Main Floor

Type of Experiential Learning	Primary Author and Title of Presentation
	Hannah Tarr <i>Controversial Conversations in a Cross Cultural Community</i>

245

## 11:15 a.m. - 12:15 p.m. • Oral Session 2

## Squires

## Brush Mountain A

Time	Type of Experiential Learning	Primary Author and Title of Presentation
11:15 a.m.	An Internship	Hunter C. L. Bowers <i>Empowering Others to Tell Their Strengths Story</i>
11:30 a.m.	Service Learning	Ainsley K. Patrick <i>Cultural Exchange with the Maasai Community Through Construction Collaboration</i>
11:45 a.m.	Undergraduate Research, Study Abroad	Shalini Rana <i>An Aesthetic Appreciation of Copenhagen's Cycling Culture</i>
12:00 p.m.	A First Year Experience	Kira A. Riddlemoser <i>Thrive Living Learning Community</i>

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## Brush Mountain B

Time	Type of Experiential Learning	Primary Author and Title of Presentation
11:15 a.m.	Undergraduate Research, An ICTAS-Supported Project	Samantha Cornwell <i>Decision Sciences for Resilient Communities: An ICTAS-Supported Project</i>
11:30 a.m.	Undergraduate Research, An ICTAS-Supported Project	Ahmed M. Elnahas <i>An Experimental and Computational Investigation of the translational motion of bubbles "An ICTAS-Supported Project"</i>
11:45 a.m.	Undergraduate Research, Study Abroad, Capstone Experience	Brogan E. Holcombe <i>Co-Existence Ecology of Large Predators within Belize</i>
12:00 p.m.	Undergraduate Research	Abigail R. Morris <i>Development of education and agriculture in Slovenia since 1991</i>

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## 11:15 a.m. - 12:15 p.m. • Panel and Round Table Discussions Session 2

## Squires

## Squires 238

Type of Experiential Learning	Primary Author and Title of Presentation
	Justin Dailey <i>Bringing it All Together: Understanding Affordable Housing in the D.C. Metro Area through Data Analytics</i>

77

## Squires 236

Service Learning	Ayron Walker <i>Community Foodshed Lexicons from the Concepts in Community Food Systems Class</i>
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Food Truck is located in front of the Moss Arts Center.

## 1:00 - 2:00 p.m. • Poster Session 3

Moss Arts Center

## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
1	Undergraduate Research	<b>Darren Felts</b> <i>Naturalistic Observations of Participation in a Two Large Lecture Classes: Behavioral impact of class size</i>	199
2	Undergraduate Research	<b>Amanda Powers</b> <i>Metals in suspended sediment of a drinking water reservoir</i>	309
3	Service Learning	<b>Katherine Bouchard</b> <i>You Better Belize It</i>	48
4	Undergraduate Research	<b>Danny J. Purcell</b> <i>The Role of Connexin43 in TGF-Beta Induced Epithelial to Mesenchymal Transition</i>	212
5	Student organization	<b>Antoine Suhas</b> <i>Engineers Without Borders</i>	243
6	Undergraduate Research	<b>Arturo Roman</b> <i>Effect of location on wheat seed microbiomes in Virginia</i>	219
7	Independent Study	<b>James E. Taylor</b> <i>Building a Kernel in Rust for the Raspberry Pi: An Experimental Course on Operating Systems</i>	248
8	Service Learning, Leadership Program	<b>Jason W. Hadley</b> <i>Paving the way for Higher Education in the New River Valley</i>	124
9	Undergraduate Research	<b>Casey A. Boyer</b> <i>Limiting Fat Deposition in Broilers through Dietary Bioflavanoids</i>	50
10	Service Learning, Study Abroad	<b>Marjorie J. Woods</b> <i>Linking Lives: Personal and Professional Growth through Cultural Exchange and Service Learning</i>	261
11	Undergraduate Research	<b>Crandall Christie</b> <i>Effects of rearing temperature on the viscosity of hemolymph in Manduca sexta larvae</i>	61
12	Undergraduate Research	<b>Taylor E. Phelps</b> <i>Farming for the Future</i>	204
13		<b>Ross C. Cooper</b> <i>Spatial and Temporal Changes in Water Quality in the Shenandoah River Watershed</i>	68
14	Leadership Program	<b>Candace A. Hartwick</b> <i>HydroponTech</i>	29
15	Undergraduate Research	<b>Marilyn J. Steinbach</b> <i>Neurophysiological Underpinnings of Boredom</i>	237
16	Study Abroad	<b>Julia Tani</b> <i>The Overlap of Traditional and Western Medicine in Ecuador</i>	244

## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
17	Undergraduate Research	<b>Rebecca A. Good</b> <i>Kowloon Park Edge (a study of Opportunities for Public Space in Hong Kong)</i>	116
18	Undergraduate Research	<b>Dallece E. Curley</b> <i>Investigation of Astrocytic Reduction and Proliferation in Response to Mild TBI/Concussion</i>	76
19	Service Learning, A First Year Experience, Leadership Program	<b>Rachel Mawn</b> <i>Craig County Outdoor Classroom</i>	175
20	Undergraduate Research, Diplomacy Lab	<b>Robert Hodges</b> <i>Creating disengagement/defection from revolutionary/militia groups</i>	183
21	Study Abroad, An Internship	<b>Shaifali Prajapati</b> <i>Household Water Treatment and Sanitation Project in Usisya: Follow-Up Study of the SAFI Water Filter</i>	207
22	Undergraduate Research	<b>Conor Kelly</b> <i>Differences Between the Structures of Amyloidogenic and Non-amyloidogenic Islet Amyloid Polypeptide (IAPP) Variants</i>	152
23	Service Learning	<b>Bryanna J. Menefee</b> <i>Discourse on Mentorship and Literacy Outcomes in Primary Education</i>	182
24	Leadership Program	<b>Ashley M. Berry</b> <i>Boys and Girls Club Visits Virginia Tech</i>	42

## Moss Arts Center, 3rd Floor

25	Undergraduate Research	<b>Rebecca A. McCord</b> <i>Diplomacy Lab: Countering Russian Propaganda and Increasing US Appreciation in Germany</i>	176
26		<b>Shannon M. McShea</b> <i>CKVT Dry Soup Program</i>	179
27	Study Abroad	<b>Jirius S. Abdallah</b> <i>The Relationship between International Debt Finance and Natural Resource Exploitation: Ecuador</i>	29
28	Leadership Program	<b>Sam Farrokhpoor</b> <i>The Importance of Teaching Young Children Good Dental Hygiene</i>	96
29	Service Learning, Study Abroad, An Internship	<b>Katherine L. Olson</b> <i>Exploring the environmental industry in China</i>	197
30	Undergraduate Research	<b>Alexandra Gibson</b> <i>Cell Delivery Using Crosslinked Kerating Biomaterials</i>	110
31	Leadership Program	<b>Ryan J. Rosnick</b> <i>Mentoring SOAR Virginia Students at Radford High School</i>	220

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
32	Service Learning, HD 2335 Principles of Human Services 1 class	<b>Sarah A. Shaver</b> <i>Service Learning Experience with Local Elementary School</i>	228
33		<b>Julianna L. Jones</b> <i>Today a Reader, Tomorrow a Leader</i>	159
34	Undergraduate Research	<b>Nathanael B. Clark</b> <i>Change in Gene Promoter Activity in Arabidopsis as a Result of Infection With Hpa</i>	65
35	Community Project through Capstone Class	<b>Abigail D. August</b> <i>A Space to Share: A Cookbook Filled with the Recipes and Stories of International Women</i>	33
36	Undergraduate Research	<b>Molly Acord</b> <i>Mimicking fluid dynamics in human blood vessels: Adsorption of blood proteins onto confluent endothelial cell layers; An ICTAS-Supported Project</i>	30

**1:00 - 2:00 p.m. • ePortfolios Session 3**

**Moss Arts Center**

**Moss Arts Center, 3rd Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
Leadership Program	<b>Jensen Blevins</b> <i>Human Trafficking in the New River and Roanoke Valley</i>	46
Honors Portfolio Practices	<b>William L. Hom</b> <i>Will Hom- Seeking Knowledge and Adventure by Engaging with the World Around Me</i>	138
Portfolium	<b>Melissa A. Poletti</b> <i>My ePortfolio</i>	200
Research Portfolio	<b>Carly M. Porter</b> <i>Research Portfolio</i>	209
A First Year Experience, A General Education course, Other	<b>Katrina J. Schmid</b> <i>General EPortfolio Experience</i>	225
ePortfolio	<b>Jacob J. Woody</b> <i>Portfolium ePortfolio Presentation</i>	262
Leadership Program	<b>Noah M. Shorb</b> <i>Radford Culinary Arts Project</i>	229

## Old Dominion Ballroom, Main Floor

Remarks: Cyril Clarke, PhD, Interim Executive Vice President and Provost

Type of Experiential Learning	Primary Author and Title of Presentation
A First Year Experience, Peer Mentors for the Biochemistry Department who also help with the FYE course	<b>Sarah E. Sturm</b> <i>Biochemistry Peer Mentors' Learning Experiences</i>

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## Brush Mountain A

Time	Type of Experiential Learning	Primary Author and Title of Presentation
1:00 p.m.	Undergraduate Research	<b>Lucas C. Mun</b> <i>Learning about Bat Biosonar by Designing a Biomimetic Robot - Overview</i>
1:15 p.m.	Undergraduate Research	<b>Colton Beardsley</b> <i>Learning about Bat Biosonar from Designing Biomimetic Robots - Acoustics</i>
1:30 p.m.	Undergraduate Research	<b>Brandon A. Walker</b> <i>Learning about Bat Biosonar by Designing a Biomimetic Robot - Control</i>
1:45 p.m.	Undergraduate Research	<b>Sean P. Lowney</b> <i>Insights into Amyloidogenicity: Molecular Dynamics Simulations of Amyloid In Varying Environments</i>

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## Brush Mountain B

Time	Type of Experiential Learning	Primary Author and Title of Presentation
1:00 p.m.	Undergraduate Research	<b>Jessica E. Fitzpatrick</b> <i>Using Rapid Bio-assessment to Evaluate Stream Condition of the North Fork of the Roanoke River on the Hahn Farm Montgomery County, Virginia</i>
1:15 p.m.	Undergraduate Research, Research Fellowship	<b>Marissa C. Hahn</b> <i>Using camera trapping to assess distribution and diversity of Meso-mammals on the Hahn Farm Montgomery County, Virginia</i>
1:30 p.m.	Undergraduate Research	<b>Kathleen E. Huie</b> <i>Tumor Microenvironment Changes Following H-FIRE Suggest Suitable Treatment for Triple Negative Breast Cancer</i>
1:45 p.m.	Leadership Program	<b>Chelsea A. Infante</b> <i>It's On Us</i>

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**Squires 238**

Type of Experiential Learning	Primary Author and Title of Presentation
Undergraduate Research	<b>Jessica F. Dorsch</b> <i>U.S. Department of State's Diplomacy Lab</i>

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**Squires 236**

Innovate Living Learning Community	<b>Annie Karta</b> <i>Innovate Living Learning Community for Entrepreneurs</i>
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**2:00 - 2:15 p.m. • Break**

**2:15 - 3:15 p.m. • Poster Session 4**

**Moss Arts Center**

**Moss Arts Center, 1st Floor**

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation
1	Undergraduate Research	<b>Samantha M. Cornwell</b> <i>Fluency Performance Among High- and Low-Anxious Individuals Following a Stressor</i>
2	Other	<b>Michelle T. Dao</b> <i>Cooked, Wasted, &amp; Composted: A Study in Food Waste at D2 Dining Hall</i>
3	A First Year Experience, Leadership Program	<b>Reagan Bullins</b> <i>Depicting Frontal Lobe Magnetic Resonance Imaging using Laser Cutter Technology</i>
4	Undergraduate Research, Diplomacy Lab	<b>David M. Schmidt</b> <i>How to Get the Next Generation Interested in Strategic Stability and Countering Weapons of Mass Destruction</i>
5	Undergraduate Research	<b>Aaron J. Giuffre</b> <i>Manufacture of Pancreas Extracellular Matrix Gels for Islet Cell Implantation</i>
6	A First Year Experience, Leadership Program	<b>Allison Gonley</b> <i>Education beyond the Classroom: Collaborative Creation of Kidney Anatomical Model</i>
7	Undergraduate Research	<b>Colin J. Lagator</b> <i>A Meta Analysis of Censorship's Effects on Well Being</i>
8	Graduate Assistant, Office of Learning Partnerships	<b>Ritika Dokania</b> <i>Experience as a Graduate Assistant for Learning Partnerships</i>
9	Undergraduate Research	<b>Mayank Periwal</b> <i>Leadership in Construction: A quantitative analysis in leadership competencies across generations</i>
10	Service Learning	<b>Caroline E. Slocumb</b> <i>Learning How to Learn at Gilbert Linkous Elementary</i>
11	Leadership Program, RLC leadership service project	<b>Morgan Broom</b> <i>Hokies Laundry Love</i>
12	A First Year Experience, Leadership Program	<b>Tanner Dean</b> <i>Acrylic Anatomical Model of the Human Ear</i>

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## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
13	An Internship	<b>Neddie M. Byron</b> <i>Mechanical Engineering Cooperative Education Experience</i>	55
14	Undergraduate Research	<b>Antonio B. De Cecco</b> <i>Evaluation of an In-Situ Streambank Erosion Test Device: Accuracy of Data Analysis Techniques</i>	80
15	Leadership Program	<b>Alexis A. Cheatham</b> <i>Biking to Build a Sustainable Future</i>	60
16	RLC	<b>Sierra Garrity</b> <i>Residence Hall Recycling Initiative</i>	108
17	Leadership Program	<b>Nirali M. Satasia</b> <i>Awareness of Water and Electricity Usage in Peddrew Yates Hall</i>	223
18	A First Year Experience, Leadership Program	<b>Mitchell Cassell</b> <i>Autonomous Solar Powered Terrestrial Explorer</i>	58
19	Leadership Program	<b>Nathan G. Fox</b> <i>Achieving Campus Sustainability through Active and Passive Involvement</i>	103
20	Undergraduate Research	<b>Amelia R. Hulshult</b> <i>Revitalizing Bluefield, Virginia: An Asset Based Community Design Approach</i>	117
21	Service Learning, Leadership Program	<b>David W. Gruhn</b> <i>Hokies Against Hunger</i>	121
22	Undergraduate Research	<b>Kayleigh H. McKenzie</b> <i>(re)lations; shaping the future, honoring the past</i>	178
23	Leadership Program	<b>Tabitha N. Ngo</b> <i>Drive For Dreamers</i>	195
24	Service Learning, Leadership Program	<b>Jennifer M. Hall</b> <i>Extreme Makeover: Radford Highschool Classroom Edition</i>	128

## Moss Arts Center, 3rd Floor

25	Undergraduate Research	<b>Jacob S. Slagle</b> <i>Oxidation Testing of Colloidally-Processed UHTCs</i>	130
26	Undergraduate Research	<b>Soshiant A. Raesian</b> <i>Investigating the role of connexin43 in actin cytoskeleton dynamics during epithelial-mesenchymal transition</i>	213
27	Service Learning, Leadership Program	<b>William M. Kyle</b> <i>Fundraising Mentorship for Radford Students</i>	157
28	Undergraduate Research	<b>Trevor W. Jones</b> <i>Design and Development of a Virtual Reality Application Showcasing LEWAS Environmental Monitoring Lab</i>	149
29	Service Learning, Leadership Program	<b>Casey L. Hoff</b> <i>Seeding Explorers: Expanding Educational Opportunities at the Hale-YMCA Community Garden</i>	134
30	Civic Agriculture and Food Systems Capstone Course	<b>Caylin O. Stewart</b> <i>Weedin' with Purpose: Inspiring Awareness of Ecological Practices at the Hale YMCA Community Garden</i>	238

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
31	Leadership Program	<b>Emily N. Taylor</b> <i>Adopt Don't Shop</i>	246
32	Undergraduate Research	<b>Maria-Fe S Thielman</b> <i>Movement of boats with elastic fins</i>	249
33	Service Learning, Leadership Program, Undergraduate Outreach	<b>Noah Wax</b> <i>Engaging the community in environmental education and nature appreciation</i>	258
34	Service Learning, A First Year Experience, Leadership Program	<b>Bryan P. Covell</b> <i>LDRS 1016 Breakout: Campus Kitchen Partnerships</i>	73
35	Leadership Program	<b>Gabrielle Y. Eid</b> <i>Turn Off the Lights Payne!</i>	188
36	Undergraduate Research	<b>Molly Acord</b> <i>Mimicking fluid dynamics in human blood vessels: Adsorption of blood proteins onto confluent endothelial cell layers; An ICTAS-Supported Project</i>	30

**2:15 - 3:15 p.m. • ePortfolios Session 4**

**Moss Arts Center**

**Moss Arts Center, 3rd Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
An Internship, Personal Projects	<b>Edward J. Liu</b> <i>Computer science and Android Development</i>	164
Portfolium	<b>Jakob A. Lyons</b> <i>Portfolium ePortfolio Showcase</i>	168
A First Year Experience, A General Education course	<b>Noel C. Boyle</b> <i>ePortfolio Experience</i>	51
A General Education course	<b>Joshua F. Grimshaw</b> <i>My Eportfolio</i>	120
Research Portoflio	<b>Julia S. Hill</b> <i>Julia Hill's ePortfolio</i>	132
Research Portfolio	<b>Kameron A. Mize</b> <i>Learning to Reflect and Improve</i>	183
A First Year Experience	<b>Tyler S. Spiers</b> <i>First Year Experience</i>	235
Research Portfolio	<b>Emily Parsons</b> <i>My Research Journey</i>	

## Old Dominion Ballroom, Main Floor

Type of Experiential Learning	Primary Author and Title of Presentation
Experiential Learning in general - programs and policies	<b>Najla Mouchrek</b> <i>Design thinking workshop on Student-Led Experiential Learning</i>

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## Old Dominion Ballroom Upper Floor

Type of Experiential Learning	Primary Author and Title of Presentation
Major-specific Education Course	<b>Naire L. Poole</b> <i>Act Normal: an improvisational workshop</i>

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## Brush Mountain A

Time	Type of Experiential Learning	Primary Author and Title of Presentation
2:15 p.m.	Undergraduate Research	<b>Katherine A. Wilde</b> <i>Assessing and Promoting Systems Thinking through Educational Application - An ICTAS-Supported Project</i>
2:30 p.m.	Undergraduate Research	<b>Zorian Thornton</b> <i>Modeling the Transmission Rate of Bluetongue</i>
2:45 p.m.	Undergraduate Research	<b>Deirdre A. Conroy</b> <i>Bat species composition and diversity on private property in the Ellett Valley of Montgomery County, Virginia</i>
3:00 p.m.	A First Year Experience, A collaborative study between the FYE class and Dr. Brett Jones	<b>Sarah E. Sturm</b> <i>The MUSIC Model of Motivation</i>

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## Brush Mountain B

Time	Type of Experiential Learning	Primary Author and Title of Presentation
2:15 p.m.	Undergraduate Research, Service Learning, Leadership Program	<b>Sydney M. Baxter</b> <i>The Hokie Hunger Experience</i>
2:30 p.m.	Undergraduate Research	<b>Tashi T. Gyatso</b> <i>Diplomacy Lab: Evaluating India's Role in the Budapest Convention on Cybercrime</i>
2:45 p.m.	Minor Course work	<b>Ronald G. Maniece II</b> <i>Opportunities in Understanding</i>
3:00 p.m.	A First Year Experience, Leadership Program	<b>Patience D. Parry</b> <i>Thrive Living-Learning Community</i>

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## Squires 238

Type of Experiential Learning	Primary Author and Title of Presentation
A First Year Experience, Leadership Program	<b>Gina Cintron Diaz</b> <i>Peer-to-peer mentoring as experiential learning: a four-year, four-level perspective</i>

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## Squires 236

Leadership Program	<b>Darren Small</b> <i>The Tale of Two Chairs</i>
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## 3:15 - 3:30 p.m. • Break

## 3:30 - 4:30 p.m. • Poster Session 5

## Moss Arts Center

## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation
1	Undergraduate Research, Fralin Fellowship	<b>John Connock</b> <i>Evaluation of a new technology for studying an aquatic giant salamander (C. a. alleghaniensis)</i>
2	Leadership Program	<b>Jacob D. Steffey</b> <i>Go Green!</i>
3	A First Year Experience, Leadership Program	<b>Joseph Barker</b> <i>Rock-It Project: Collaborative Construction of a Functional Rocket</i>
4	Undergraduate Research, Independent Study	<b>Emma J. Rhodes</b> <i>Tweeting an Epidemic: The Spanish Flu in 140 Characters</i>
5	Undergraduate Research, Diplomacy Lab	<b>Andrew C. Bacso</b> <i>The Small Arms/Light Weapons and Conventional Munition Threat in the African Great Lakes Region</i>
6	A First Year Experience, Leadership Program	<b>Cale Bigelow</b> <i>Assisting Blind Dogs Through the Use of Prosthetics</i>
7	Undergraduate Research	<b>Neil Feste</b> <i>Parental Perspectives on Single and Combination Vaccine Formulations: A Pilot Study</i>
8	Undergraduate Research	<b>Thomas N. Hale</b> <i>United States Af-Pak Strategy: Implications for Indo-Pakistani Conflict &amp; Regional Stability</i>
9	Service Learning	<b>Jessica A. Boehling</b> <i>Eastern Montgomery Elementary School Experience</i>
10	Undergraduate Research	<b>Maria-Fe S. Thielman</b> <i>Conservation of Momentum and Elastic Fins - Movement in a Fluid</i>
11	Undergraduate Research	<b>Leila Kamareddine</b> <i>Limb Symmetry in Control and ACL Reconstruction Subjects</i>

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## Moss Arts Center, 1st Floor

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	
12	A First Year Experience, Leadership Program	<b>Lillian Bleicken</b> <i>Acrylic Laser Cut Image of Brain Injury</i>	45
13	Undergraduate Research	<b>Lauren A. Frye</b> <i>The Binding of Ubiquitin to Phafin2 and its Role in Autophagy</i>	105
14	Service Learning, CAFS Minor Course	<b>Meghan E. Garrity</b> <i>Sprouting Independent Volunteers: Building capacity of volunteers at the Hale YMCA Community Garden</i>	107
15	A General Education course, Leadership Program	<b>Michael P. Orcutt</b> <i>BASIS (Bond and Securities Investing by Students)</i>	198
16	Service Learning	<b>Lindsey S. Windhausen</b> <i>CDCLR: Experiential Learning</i>	260
17	Undergraduate Research	<b>Nash A. Hemrajani</b> <i>Payback of Sustainable Technologies Utilized in FutureHAUS Dubai, An ICTAS-Supported Project</i>	131
18	A First Year Experience, Leadership Program	<b>Melodie Ashley</b> <i>Learning Out of This World</i>	31
19	Undergraduate Research	<b>Niccolo S. Marucchi</b> <i>An investigation into online videos as a source of safety hazard reports</i>	174
20	Undergraduate Research	<b>Aubrey N. Phares</b> <i>Restrictive and Repetitive Behavior Endorsement Number as a Predictor of Behavior Severity</i>	203
21	Undergraduate Research	<b>Douglas W. Murray</b> <i>Interrogating mechanisms of connexin43 translation through alteration of ribosomal protein expression using CRISPR/Cas9 technology.</i>	192
22	Service Learning	<b>Michaela L. Gosting</b> <i>Service Learning: Head Start Program</i>	117
23	Undergraduate Research	<b>Vincent V. Le</b> <i>OMNI-NGS-Simulator: A web-based suite of tools to simulate NGS data</i>	162
24	Undergraduate Research	<b>Hisyam Bin Mohsin</b> <i>Proactive Potable Water Corrosion Control Investigation in Santa Cruz, California</i>	185

## Moss Arts Center, 3rd Floor

25	Undergraduate Research	<b>Yejin Seo</b> <i>Disabled-2's Role in Inhibiting Tumor Cell Extravasation by Competitive Binding with Sulfatides</i>	221
26	Undergraduate Research, Fralin Fellowship	<b>Starla Y. Couso</b> <i>Understanding the Successes of the Collaborative Forest Landscape Restoration Program (CFLRP): A Study of Appeals and Litigation</i>	72
27	Service Learning	<b>Abigail E. England</b> <i>Service Learning Experience in the Dominican Republic</i>	93

Poster #	Type of Experiential Learning	Primary Author and Title of Presentation	PAGE #
28	Undergraduate Research	<b>Nicholas C. Falls</b> <i>Design and Development of a Cost-Effective Power Monitoring System for a Real-Time Water and Weather Monitoring System</i>	95
29	Undergraduate Research, Service Learning, Study Abroad	<b>Madelyn R. Dynes</b> <i>Community-Based Initiatives Fighting Food Insecurity in Southwest Virginia</i>	87
30	Undergraduate Research	<b>Ahmed M. Elnahhas</b> <i>Passive metamaterial-based acoustic holograms in ultrasound energy transfer systems</i>	96
31	Undergraduate Research	<b>Sarah E. Morgan</b> <i>Influence of Tectonic Deformation on Active Volcanism in Central America</i>	186
32	Study Tour	<b>Kathleen E. Pierce</b> <i>Residential Environments Spring Housing Study Tour</i>	205
33	Undergraduate Research	<b>Jong Won Lee</b> <i>Right hemisphere specific stress recovery and sex differences</i>	163

**3:30 - 4:30 p.m. • ePortfolios Session 5**

**Moss Arts Center**

**Moss Arts Center, 3rd Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	
Research Portfolio	<b>Madeline R. Hadank</b> <i>High School and Undergraduate Research Portfolio</i>	123
Portfolium Portfolio	<b>Sydney N. Jones</b> <i>My Portfolio</i>	148
Portfolium Portfolio	<b>Jordan C. Law</b> <i>My Portfolium</i>	161
Service Learning, A General Education course, Leadership Program	<b>Grace E. Schaeffler</b> <i>Grace Schaeffler Portfolium</i>	224
Research Portfolio	<b>Jonathan D. Stroud</b> <i>Research Portfolio</i>	240

**3:30 - 4:30 p.m. • Interactive Activities Session 5**

**Squires**

**Old Dominion Ballroom, Main Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	
Leadership Program	<b>Madeleine Caceres</b> <i>Courageous Leadership: Beyond the Abstract</i>	50

**Old Dominion Ballroom Upper Floor**

Type of Experiential Learning	Primary Author and Title of Presentation	
Undergraduate Research, A First Year Experience, A General Education course	<b>Elysia A. Budu</b> <i>Bomb the Cathedral</i>	53

**Brush Mountain A**

Time	Type of Experiential Learning	Primary Author and Title of Presentation
3:30 p.m.	An Entrepreneurial Class	<b>Angela Dominique S. Rara</b> <i>The Wood Enterprise Institute-Beer Flights</i>
3:45 p.m.	Employment	<b>Tyler J. Morris</b> <i>Experiences with the Virginia Tech Athletics Grounds Crew</i>
4:00 p.m.	Diplomacy Lab	<b>Jessica F. Dorsch</b> <i>Diplomacy Lab: Vory z Zakone in Georgian Prisons: Development and Adaptation</i>
4:15 p.m.		<b>Grace Baggett</b> <i>Preserving VT History through the Power of Narrative</i>

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**Brush Mountain B**

Time	Type of Experiential Learning	Primary Author and Title of Presentation
3:30 p.m.	Leadership Program	<b>Dhanya M. Babu</b> <i>Learning and Service Through Pritchard Hall Council</i>
3:45 p.m.	Service Learning	<b>Chung T. Jason</b> <i>Social Outreach to Youth in Giles County Focused on Positive Development</i>
4:00 p.m.	Service Learning, Leadership Program	<b>Matthew J. Salerno</b> <i>Outreach to Youth in Giles County</i>
4:15 p.m.	Study Abroad, Leadership Program	<b>Abel Z. Solomon</b> <i>WWII: From VT Classroom to the Battlefield</i>

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**Squires 236**

Time	Type of Experiential Learning	Primary Author and Title of Presentation
3:30 p.m.	Undergraduate Research	<b>Sean Malloy</b> <i>Investigation of Water Withdrawal and Glacial Isostatic Adjustment on Land Subsidence in the Hampton Roads Region</i>

170

**Squires 238**

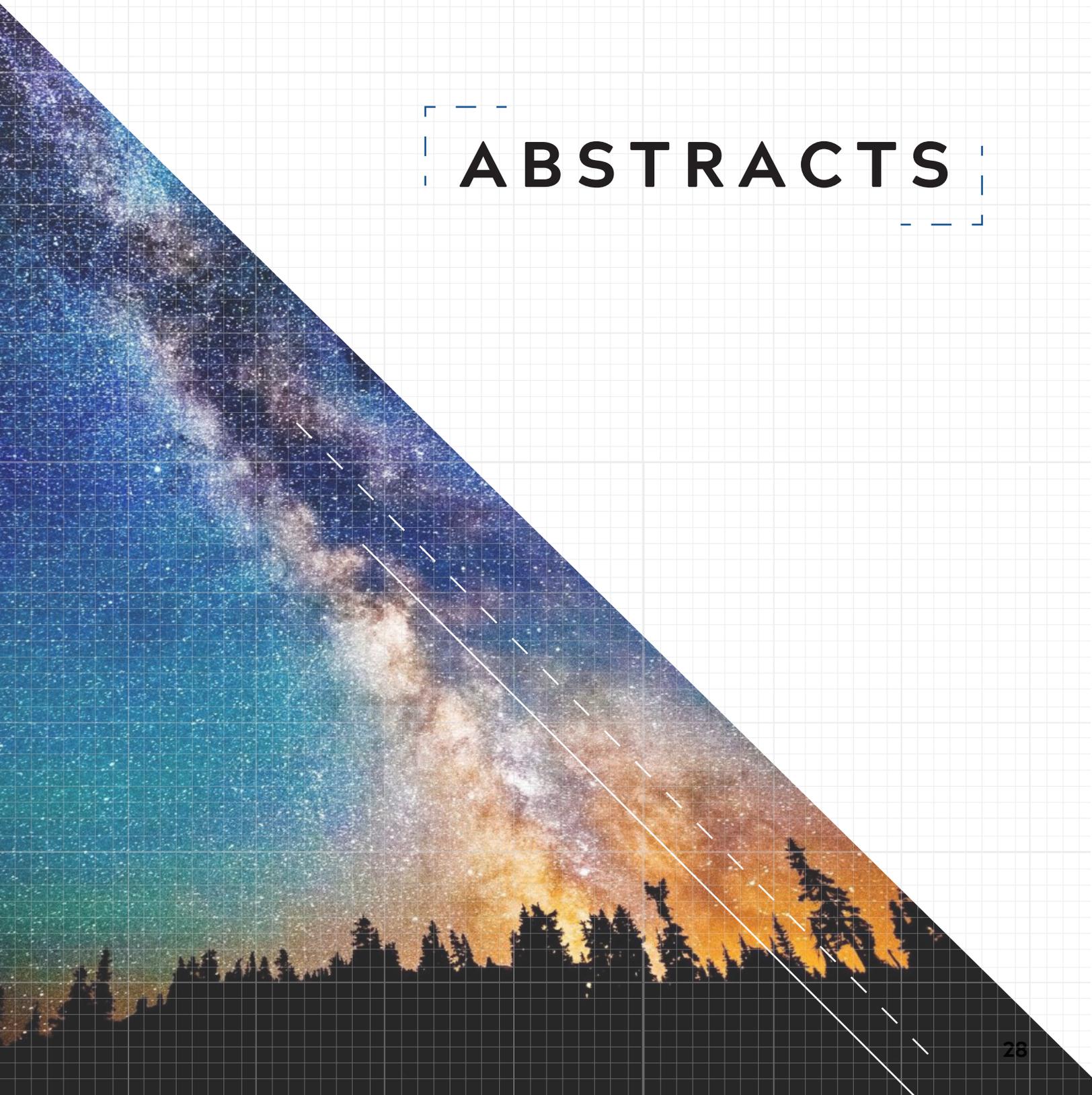
Type of Experiential Learning	Primary Author and Title of Presentation
The Lens of First Generation Students	<b>Sarah Umbarger-Wells</b> <i>Being First-Generation</i>

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**Squires 236**

An Internship	<b>Alex Jones</b> <i>Hokies on the Hill Undergraduate Internship Programs</i>
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# ABSTRACTS



**JIRIUS S. ABDALLAH**

ENVIRONMENTAL SCIENCE

**LUKE P. FEENEY**

ENVIRONMENTAL SCIENCE

**MATT R. HARRELL**

ENVIRONMENTAL SCIENCE

### ***The Relationship between International Debt Finance and Natural Resource Exploitation: Ecuador***

The goal of this presentation is to understand the complexity of Ecuador's decisions to progress their economic viability while conserving their vital ecological resources. The purpose of this presentation is to highlight and describe the various factors that led to Ecuador's decision making regarding natural resource exploitation and how it relates to international finance in developing countries. Using our experience from the trip abroad as well as research into Ecuador's decision making, we will suggest possible actions that can be taken to alleviate Ecuador's current situation and applied to other developing nations. We hope to develop an informative report on the intricate interplay between natural resources and national and international financial interests.

*Mentor(s): Matt Eick (College of Crop and Soil Environmental Science); Renee Eaton (Human Nutrition, Foods, and Exercise).*

**MOLLY ACORD**

BIOMEDICAL ENGINEERING AND MECHANICS

**SAMANTHA STUTZ**

CHEMICAL ENGINEERING

**ALEXANDRA MARNOT**

CHEMICAL ENGINEERING, SUSTAINABLE BIOMATERIALS

**GABRIELLA CALCAVECCHIO**

SUSTAINABLE BIOMATERIALS

**CAILEAN PRITCHARD**

CHEMICAL ENGINEERING

**WEI LIU**

SUSTAINABLE BIOMATERIALS

**APRATIM JASH**

SUSTAINABLE BIOMATERIALS

**MICHAEL BORTNER** CHEMICAL ENGINEERING**YONG WOO LEE** BIOMEDICAL ENGINEERING AND MECHANICS**MAREN ROMAN** SUSTAINABLE BIOMATERIALS***Mimicking fluid dynamics in human blood vessels: Adsorption of blood proteins onto confluent endothelial cell layers; An ICTAS-Supported Project***

Understanding the fluid dynamics of blood flow within the human vascular system is crucial in the development of blood-compatible surfaces. These dynamics are dominated by interactions between the blood components, such as plasma, blood proteins, and platelets, and the lining of endothelial cells along the blood vessel walls. This work aims to model fluid transport over biological surfaces by growing confluent layers of endothelial cells on various surfaces, for example, capillaries and flat sensors. A quartz crystal microbalance with dissipation monitoring (QCM-D) was used to monitor the variation in mass of confluent cell layers upon exposure to model blood proteins, indicating interaction of the proteins with the cell layer. Growth of human microvascular endothelial cells on QCM-D sensors was promoted with fibronectin. When a flow rate of 0.5 mL/min of media containing albumin was fed to the QCM-D, protein adsorption onto the cell layer was observed as a decrease in the sensor's oscillation frequency indicating a mass increase. The adsorption was reversible because flow of protein-free solution resulted in a mass decrease, demonstrating protein decoupling. COMSOL models of the solution's flow inside the QCM-D confirmed that a flow rate of 0.5 mL/min exhibits laminar flow and low shear rates at which the media is shear-thinning, comparable to blood flow in blood vessels. Obtaining a greater understanding of the adsorption behavior of proteins found in human blood, and modeling the resulting shear stress caused by protein adsorption is important for an accurate assessment of the effects of protein adsorption onto blood vessel walls on blood flow dynamics.



## MELODIE ASHLEY

CHEMISTRY

## ALISHA BAJAJ

COMPUTATIONAL MODELING & DATA ANALYTICS

## MOLLY DEAN-TAYLOR

COMPUTATIONAL MODELING & DATA ANALYTICS

## MATTHEW FERNANDEZ

PHYSICS

## CHRISTOPHER HULL

COMPUTATIONAL MODELING & DATA ANALYTICS

## ANDREW MILLER

BIOLOGY

## PRASHANT PRADHAN

PHYSICS

## DEVIN SOHI

COMPUTATIONAL MODELING & DATA ANALYTICS

### ***Learning Out of This World***

As a part of the Curie and Da Vinci Science Living Learning Community, we are tasked with completing a collaborative project in the community Makerspace. The purpose of these projects is for students to learn valuable problem solving, inquiry, integration, team working, and also team building skills. This project helps prepare us for the more complicated and detailed tasks that we will be challenged with throughout our college careers. Our individual project is focused on designing and building an instrument to gather solar energy and convert it to electricity for use on Mars using automatic deployment and self-cleaning systems. We developed a game plan for the design process, came up with a model design, and have started to build the prototype. After many creative ideas were presented, we selected a final design and will present a working prototype at the Experiential Learning conference.

*Mentor(s): Lori Blanc (Biological Sciences, Curie & Da Vinci LLC).*



**ANISSA Z. ASHRAF**

UNDECIDED

**LANEY HULL**

REAL ESTATE

**SEBASTIAN ANDRADE**

INTERNATIONAL RELATIONS

**STEPHENEY HIMES**

BIOLOGY

### ***Leading Hokies Towards Leadership***

Leadership Tech is a leadership development program for students of Virginia Tech. The curriculum is based upon the Division of Student Affairs Aspirations for Student Learning, Seemiller and Murray's Leadership Competencies, and Gallup's CliftonStrengths. The purpose of this experience is to prepare for, engage in, and reflect upon leadership in a small group setting. It allows students to discuss their strengths, weaknesses, and personal experiences in order to become stronger leaders.

*Mentor(s): Meghan Kuhn (Leadership Education Collaborative); Emily Paetz.*



**ABIGAIL D. AUGUST**  
GEOGRAPHY

### ***A Space to Share: A Cookbook Filled with the Recipes and Stories of International Women***

The ability to cook is a knowledge that is gendered and not valued as it is often a labor that is expected and unpaid. The process of cooking comes with a very specific knowledge and is more than the preparation of food but a result of the lived experience of the cook. A compilation of the YMCA's international women's cherished recipes and associated stories into a cookbook will act as a tangible representation of the unique experiences surrounding the food culture of women from different parts of the world. While storytelling is empowering in itself, the product of a physical cookbook allows women to share cultural food experiences with others. The capstone project was completed over twelve weeks using group and individual oral interviews that were transcribed into a cookbook.

*Mentor(s): Dr. Susan Clark (Horticulture); Jenny Schwanke (Civic Agriculture and Community Food Systems Community Liaison and Hale-Y Community Garden Coordinator).*

**DHANYA M. BABU**

HUMAN DEVELOPMENT

**JOHN B. BATMAN**

CLINICAL NEUROSCIENCE

**DAYA S. JESSEE**

MARKETING

**RACHEL S. MCNEAL**

HUMAN NUTRITION, FOODS, AND EXERCISE

**PRITHVI DHINGRA**

COMPUTER ENGINEERING

**BRYCE C. MCINTIRE**

GENERAL ENGINEERING

***Learning and Service Through Pritchard Hall Council***

The goals of Pritchard Hall Council are to foster a community within Pritchard Hall through diverse and fun social events, advocate for Pritchard residents to the Residence Hall Federation, and bring their ideas for the hall into a reality. The purpose of Pritchard Hall Council is to organize events for the residents of Pritchard Hall, and to develop and promote a more inclusive and diverse community. Our goals and purpose of Pritchard Hall Council are satisfied and fulfilled by the following: educational events such as those in partnership with Residence Life Resource Officers, interactive events such as a Halloween contest, and purely social events when we deliver or offer free food. 4. Pritchard Hall Council events have been generally successful considering that the team was assembled at the beginning of the academic year and consists primarily of first year students. The residents of Pritchard are engaged with at least two Hall Council events every month and our consistency makes the building, which houses over a thousand residents, feel like home. As members of the Pritchard Hall Council, we have learned about many resources across campus and enhanced our teamwork skills as we have organized, executed, and evaluated various events throughout the year.

*Mentor(s): Stephen Henninger (Housing & Residence Life); Erin Coiley (Housing & Residence Life).*



**ANDREW C. BACSO** POLITICAL SCIENCE  
**BLESSING ABEHO** COMPUTER ENGINEERING  
**DORICE BAGENDA** MINING ENGINEERING  
**CAROLINE BONNES** INDUST. SYST. ENGINEERING  
**RACHEL BOXWELL** POLITICAL SCIENCE  
**ELYSIA BUDU** HISTORY  
**BRYAN MARCEAU** POLITICAL SCIENCE  
**ARMAND MATINI** POLITICAL SCIENCE  
**MICHAEL MARINO, SARAH MEASE,  
 GRACE STEVENS, TIM TUMWIKIRIZE**

### ***The Small Arms/Light Weapons and Conventional Munition Threat in the African Great Lakes Region***

This project is intended to aid the Department of States' Office of Weapons Abatement and Removal in implementing effective and efficient Conventional Weapons Destruction (CWD) activities in the Great Lakes region of Burundi, Democratic Republic of Congo, Kenya, Rwanda, Tanzania, and Uganda. Stockpiles of excess small arms and light weapons pose a range of security-related and humanitarian threats. Terrorists, insurgents, and criminals exploit poorly-secured munitions to fuel instability and violence that imperil U.S. security interests, as well as the welfare of the communities around them. Where poorly-secured stockpiles include MANPADS, the consequences of theft or loss could have wide-ranging, catastrophic outcomes. Further, poorly-maintained stockpiles may explode without notice, devastating nearby civilian populations. CWD programs assist partner countries with destroying their excess, unstable, and at-risk munitions (including MANPADS); improving physical security at munitions storage facilities; and bringing stockpile management practices into line with international standards. The research will include information and options for prospective approaches to implementing effective and efficient CWD activities in the African Great Lakes region, culminating with an oral presentation of findings to the Bureau of Political/Military Affairs and Office of Weapons Abatement and Removal at the US Department of State.

*Mentor(s): Chris Price (Political Science) .*



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**GRACE BAGGETT**

LITERATURE AND LANGUAGE

**ALANA HASSETT**

PROFESSIONAL AND TECHNICAL WRITING

**HANNAH M. GOODE**

PROFESSIONAL AND TECHNICAL WRITING

***Preserving VT History through the Power of Narrative***

VT Stories is an oral history project located in the Center for Rhetoric in Society. As undergraduate interns, we work with professors and graduate assistants to interview Virginia Tech alumni and faculty and share their stories. The goal of VT Stories is to preserve Virginia Tech history, as told by the people who lived it, while giving us the opportunity to learn about oral history methodology. VT Stories presents the spirit, culture, and history of Virginia Tech and shows how the university has changed over time. In addition to conducting interviews and writing articles, we combine qualitative and quantitative methods in order to identify common themes appearing in the interviews. We also sync the interviews into the digital Special Collections database. We have written over 150 stories about alumni and faculty from graduating classes spanning from 1937 to 2015. Our group of six interns have conducted interviews, written stories, and analyzed data, all while developing research, technical, and writing skills. Using the skills we've honed through experiential learning, we hope to expand the project within the Virginia Tech student body by sharing interesting aspects of stories on social media. Additionally, we are interested in publishing our research findings and emphasizing the significance of our project's contribution to the VT community.

*Mentor(s): Carlos Evia (English); Allison Hutchison (English).*



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## COLTON R. BALDRIDGE

ELECTRICAL ENGINEERING

### ***Research Portfolio***

Presenting research portfolio created in my honors portfolio practices class. It demonstrates several artifacts created both before and after college that show off my experiential learning.

*Mentor(s): Kayla McNabb (University Libraries); Amanda MacDonald (University Libraries).*

**JOSEPH BARKER**

CHEMISTRY

**BRIAN BENNETT**

CHEMISTRY

**MARTIN DUDEK**

CHEMISTRY

**KAI LIN**

CHEMISTRY

**MEGAN STOKLOSA**

METEOROLOGY

**ANURADHA TRIVEDI**

MATHEMATICS

**LILING YUAN**

MATHEMATICS

### ***Rock-It Project: Collaborative Construction of a Functional Rocket***

In the Curie and Da Vinci Science Living Learning Community, students complete a semester-long project in a residential makerspace. In this project, we focussed on developing collaborative problem-solving and technical skills through the construction of a functional rocket with very little guidance or instruction. We utilized prototyping equipment in the inVenTs design studio to both build the rocket in an optimal way and learn technical skills such as computer aided design (CAD) software, soldering and laser cutting. The primary project goal was to design and construct a rocket using OpenRocket software and provided materials. We also had to launch the rocket and use Arduino to collect data on altitude, vertical acceleration, and vertical velocity during the flight. The purpose of this hands-on learning experience was to have students leave their comfort zones to advance problem solving, group communication, and research skills. We will present our completed rocket and the data collected during the launch, and discuss the technical and problem-solving skills we learned throughout the construction of the rocket.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC) .*

FIRST YEAR  
EXPERIENCE



LEADERSHIP  
PROGRAM





**SYDNEY M. BAXTER**

AGRICULTURAL SCIENCES

**SELENA D. ANAND**

BIOLOGICAL SCIENCES

**ASHLYN M. PUGH**

GENERAL ENGINEERING

### ***The Hokie Hunger Experience***

The Hokie Hunger Experience is an educational and interactive event where students can learn about hunger facing Virginia Tech's campus. The Hokie Hunger Experience was hosted on March 26th; current Virginia Tech Students learned through interactive experiences including icebreakers, a poverty meal, and brainstorming action plans to address hunger on campus and in our community. This project is based on the UN sustainability goal of Zero Hunger. Currently, the food insecurity rate in Montgomery County is 14.5 percent (â€œFood Insecurity,â€ 2015). In the busy lives that college students lead, it is common that we go through our day not realizing that many around us are affected by hunger. With this project, we hope to educate our peers about hunger in the area to increase their awareness and to inspire them to help combat the issue. We plan to measure the success of our event by the use of pre- and post- surveys, as well as our own thoughts and the thoughts of our professors. We plan to share the outcome of these surveys in our video presentation in order to demonstrate the impact that our project had on campus. In our video, we will show footage from the event which will convey what exactly took place as well as emotions expressed by participants. Along with the video, we plan to do an oral presentation. Work Cited: Food Insecurity In Montgomery County. (2015). Retrieved from <http://map.feedingamerica.org/county/2015/overall/virginia/county/montgomery>.

*Mentor(s): Meghan Weyrens Kuhn (Leadership Education Collaborative / Residential Leadership Community).*



**COLTON BEARDSLEY**

AEROSPACE ENGINEERING

**MOHANTY AMAR**

MECHANICAL ENGINEERING

### ***Learning about Bat Biosonar from Designing Biomimetic Robots - Acoustics***

Horseshoe bats have sophisticated biosonar system that is based on ultrasonic pulses emitted through the nostrils. Inspired by this biological system, a technical sonar system has been developed to simulate this. The sonar system employs two ultrasonic loudspeakers to generate pulses. Mimicking the wide bandwidth (100 kHz), the high output amplitudes (over 100 dB SPL), and the small nostrils (a few millimeters) of bats poses a substantial challenge. To overcome these challenges and realize the desired properties, an electrostatic ultrasonic loudspeaker with a larger diameter was coupled to a custom-designed waveguide to guide the pulses into a small opening that matched the diameter of a bat's nostril. This study investigates computational modeling as a means to design a waveguide that outputs the optimal power. A multiphysics software was used to simulate the acoustic emission of the loudspeakers through the waveguide. COMSOL computationally solves for the acoustic pressure as a function of time throughout the waveguide's geometry. The inlet faces of the waveguide are modeled as having a time-dependent pressure ranging in frequency from 5 to 105 kHz. The output faces were coupled into a hemispherical volume that modelled propagation into the free field by virtue of an impedance boundary. This computation approach will be used to survey a parameter space for the waveguide design to find a good solution for the coupling problem posed by the biomimetic ultrasound emitter.

*Mentor(s): Rolf Mueller (Mechanical Engineering).*



**ELIZABETH T. BENOS**  
GENERAL ENGINEERING

***Freshman Year***

I would like to present a research portfolio which includes documentation of my academic work thus far in my academic career.



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**ASHLEY M. BERRY**

CREATIVE TECHNOLOGIES

**LAURA G. BAILEY**

HUMAN NUTRITION, FOODS, AND EXERCISE

**TRAFTON ADDISON**

CHEMICAL ENGINEERING

**BRAYDON T. VENUS**

HUMAN NUTRITION, FOODS, AND EXERCISE

**CAMERON S. SIMS**

HUMAN NUTRITION, FOODS, AND EXERCISE

**BRIGID E. TUIITE**

FASHION MERCHANDISING

***Boys and Girls Club Visits Virginia Tech***

We want to get middle school students from Shawsville Middle School excited about health and well-being. Our purpose is to give students the lifelong tools they can use to maintain their health and well-being through daily fitness and a balanced diet. We have planned fun and innovative games to give the students various ways to stay active. We are also hosting fun and interactive lessons where we discuss healthy dietary habits and how to implement them into daily life. Our group believes that by giving these students information in a unique way, it will have long-lasting results and benefit their lives.

*Mentor(s): Perry Martin (Agriculture and Leadership RLC) .*



**CALE BIGELOW** MICROBIOLOGY

**JESSICA BRIDGE** ANIMAL AND POULTRY SCIENCES

**TAYLOR HATTER** ANIMAL AND POULTRY SCIENCES

**MORIAH HEIFETZ** MICROBIOLOGY

**MACKENZIE MARRELLA** ANIMAL AND POULTRY SCIENCES

**JARED MILLAR** MICROBIOLOGY

**KRISHMA POUDEL** BIOLOGICAL SCIENCES

**ALANA TAY** ANIMAL AND POULTRY SCIENCES

### ***Assisting Blind Dogs Through the Use of Prosthetics***

An animal prosthetic is any device that aids an animal in carrying out the functions of everyday life without limiting movement. As part of the Curie and Da Vinci First Year Experience collaborative project program, we created a prosthetic device that will help a blind Italian Greyhound dog sense and navigate his surroundings safely. This brace will supplement the animal's ability to sense its external environment by serving as a supportive mechanism for the animal's sense of vision, or lack thereof. The brace will consist of a modified harness that will allow the dog to navigate in its daily life more safely. A unique feature of this project is that the scale can be adjusted to fit many different circumstances. Depending on the final design specifics, it could potentially be mass produced to assist blind dogs on a large scale. As part of this collaborative learning experience, we coordinated project scheduling, meetings, prototype designs, material selection, and project assembly, resulting in valuable experiential learning and growth opportunities for our team.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



**ANDREW J. BISCARDI**

BIOLOGICAL SCIENCES

**YEJIN SEO**

BIOLOGICAL SCIENCES

### ***Targeting platelet-mediated cancer cell extravasation using a Disabled-2-derived peptide***

Disabled-2 (DAB-2) is a protein that mediates platelet aggregation and has been found to be down regulated in many different types of cancers. This protein functions by binding to sulfatide, a sphingolipid localized to the extracellular surface of the membrane in activated platelets. This is one of the requisites for inhibiting P-selectin expression at the extracellular surface. P-selectin is a coagulation protein that has been implicated in mediating tumor cell adhesion to vascular epithelium and extravasation of tumor emboli. Our research lies in enhancing the sulfatide-binding motif (SBM) capacity of DAB-2 via site directed mutagenesis aimed at increasing the binding strength to sulfatides, and also in increasing the stability of the protein so as to make it a more suitable candidate for therapeutic uses. Using protein lipid overlay assays, we have discovered a few mutant peptides that show promising binding interactions with sulfatides as compared to the wild type protein. We hope to further kinetically quantify this interaction using artificial sulfatide-enriched lipid bilayers using surface plasmon resonance analysis in order to choose the most suitable candidate for future therapeutic agent development.

*Mentor(s): Daniel Capelluto (Biological Sciences, Biocomplexity Institute); Wei Song (Biocomplexity Institute).*



**LILLIAN BLEICKEN** BIOLOGICAL SCIENCES

**BRITTANY FOGG** CLINICAL NEUROSCIENCE

**BENJAMIN GRAUSZ** COGNITIVE AND BEHAVIORAL NEUROSCIENCE

**OWEN LEITZEL** COMPUTATIONAL AND SYSTEMS NEUROSCIENCE

**JOHANNAH MCCONKEY** BIOLOGICAL SCIENCES

**CELINE MILLER** NEUROSCIENCE

**ROSE THAI** BIOLOGICAL SCIENCES

**SARAH TURNER** BIOLOGICAL SCIENCES

### ***Acrylic Laser Cut Image of Brain Injury***

As members of the Curie and Da Vinci Living Learning Community, we completed a semester-long collaborative brain imaging project in our residential makerspace. Our project had two main objectives: to diagnose injured areas of the brain based on case study information, and develop skills that will help prepare us for our future careers. To determine the location of brain trauma underlying associated injury and behavioral symptoms, we studied textbooks and scholarly journal articles, and interviewed professors and a graduate student in the School of Neuroscience, Department of Psychology, and the Translational Biology, Medicine, and Health graduate program at Virginia Tech. We then used computer aided design software and a laser cutter to create an acrylic model of the brain showing the location of the trauma. Throughout this endeavor, we developed and managed our own project structure, expectations, and timeline. We have learned to celebrate our successes, resolve conflicts, and create a positive team dynamic. At the Experiential Learning conference, we will present the completed acrylic model of the brain and discuss our learning experiences.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



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## JENSEN BLEVINS

HUMAN DEVELOPMENT

## BEN SHENAL

POLITICAL SCIENCE

## KAITLYN COLE

MARKETING MANAGEMENT

## CRICKET SPILLANE

INTERNATIONAL RELATIONS

### ***Human Trafficking in the New River and Roanoke Valley***

Human trafficking has grown into an enormous issue that impacts millions of people's lives around the world. Human trafficking is the 3rd largest crime industry and it is an issue that tends to be kept silent. The overall purpose of our experiential learning experience was to educate ourselves on human trafficking and then take that knowledge and educate others. Through partnering with a local non-profit human trafficking shelter, we were able to learn not only about the issue in general, but also what implications the issue has on our community and surrounding communities. Our objective in doing our projects and studying this issue is to make an impact on our community and support a local shelter. Nearly 20.9 million people are trafficked each year around the world. However, to bring this issue closer to home, Interstate 81 is the largest human trafficking roadway in the United States. This one fact rattled our minds and prompted us to try and get involved locally. Street Ransom in Roanoke, Virginia is a non-profit that houses and supports previously trafficked victims. Our leadership group wanted to come up with ways to support them and raise awareness while doing so. Through this conference we believe that we can educate people on what human trafficking is and how it is a relevant topic. We also want to show what we can do to help victims especially in the local area.

*Mentor(s): Meghan Kuhn (Leadership and Social Change); Perry Martin (Leadership and Social Change).*



**JESSICA A. BOEHLING**

HUMAN DEVELOPMENT

**ALLISON P. CEDRONE-RICKS**

HUMAN DEVELOPMENT

### ***Eastern Montgomery Elementary School Experience***

By engaging in service learning through volunteering at Eastern Montgomery Elementary School, we have developed a greater understanding about how to effectively communicate and work with children. Gentry said that learning was done through trial and error, and we can attest to that through our efforts at making a productive work environment in the elementary classroom (1990). In courses such as Principles of Human Services, we have learned how to connect with people in a professional manner regardless of social economic backgrounds. Through connecting our prior knowledge to our weekly experiences, we have built relationships with the children and have learned tactics to create a positive, work friendly environment (Yardley, 2012). Eastern Montgomery Elementary School has provided us with a hands-on experience that has given us a glimpse of what working with children as a profession would be like. The teachers let us work directly with their students and provided constructive criticism about our service experiences, which helped us learned more about how to manage a classroom than we would through just listening to a lecture about it (Yardley, 2012). Through actively engaging with the students and asking the teachers about their occupation, our experiential learning service hours have benefited our collegiate experience by giving us a glimpse of our future professions that we would not have obtained through course curriculums.

*Mentor(s): Matthew Komelski (Human Development) .*

**KATHERINE BOUCHARD**

CONSTRUCTION ENGINEERING MANAGEMENT

**AIDAN MULLIGAN**

BUILDING CONSTRUCTION

**DILLON SMITH**

BUILDING CONSTRUCTION

**EMILY LEWANDOWSKI**

CONSTRUCTION ENGINEERING MANAGEMENT

**HOLLY WHITE**

CONSTRUCTION ENGINEERING MANAGEMENT

**JOHN HINSON**

BUILDING CONSTRUCTION

**JOSE ARELLANO ALVAREZ**

CONSTRUCTION ENGINEERING MANAGEMENT

**JULIO VILLARROEL**

GENERAL ENGINEERING

**EZEKIEL VOLK, MAGGIE WILCHER, NEFE  
HEATH, RICABELLE PAGARA*****You Better Belize It***

Over Spring Break, 12 students from the Myers-Lawson School of Construction and College of Engineering traveled to Belize to complete a Service Learning Project. All the students, coming from different backgrounds came together to build a pavilion for a local youth center in the southside of Belize City. Their goal was unified: to give back to a community in need. In Belize, children do not have to attend school past the 6th grade. If they decide to further their education their parents are required to pay for it, which is often impossible in a community where the average household income is \$200 a month. This trip was eye opening for all the students involved. Our goal with this presentation is to convey our experience, and encourage other students to seek similar opportunities. We often take for granted the luxuries we have here in the United States. Understanding this difference of lifestyles around the world paints a new outlook on life when you return. Not only did this opportunity help others in need, but it also helped those involved develop both personally and professionally. We believe it is important to model Ut Prosim at every chance we get. Nothing matches the feeling of working alongside fellow Hokies towards a greater good. We will share this feeling with current and incoming students, so we can continue to build and serve around the world.

*Mentor(s): Ashley Johnson (Construction Engineering Management).*



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## HUNTER C. L. BOWERS

POLITICAL SCIENCE

### ***Empowering Others to Tell Their Strengths Story***

During the past two years, I have had the privilege to serve as an Intern for the Office for Learning Partnerships. I originally became an intern for the Office with the hope to better understand how Strengths can be used to encourage students to tell their story. As a part of my role, I have become only one of two students at Virginia Tech that has been certified by Gallup as a Strengths Coach. This has allowed me to truly understand what each strength means and how to facilitate a conversation around such. Furthermore, I have been in charge of outreach and social media from the Office for Learning Partnerships.. Even more, I was able to build our followers from the ground up to our current standing of 72 followers and an average of 700 viewers per post. Lastly, I have helped student leaders to better understand the connection of strengths in their position of their organization. As a result of my work, we have truly increased our outreach at the university when it comes to Strengths-Based Learning Initiatives. We continue to expand our office and our resources, and my work helped to create the Office to what it is today.

*Mentor(s): Taran Cardone (Office of Learning Partnerships); Hayley Meredith (Office of Learning Partnerships).*



## CASEY A. BOYER

ANIMAL AND POULTRY SCIENCES

### ***Limiting Fat Deposition in Broilers through Dietary Bioflavonoids***

Due to genetic selection for rapid growth, broiler chickens deposit more body fat, are susceptible to metabolic diseases, and experience more skeletal disorders. The use of phytochemicals in diets has become a popular area of research with the phasing out of antibiotics in broiler production. My research project focused on using plant-derived compounds as feed additives in broiler diets to reduce fat deposition. Flavonoids are a class of polyphenolic compounds that exert anti-oxidative and other beneficial health effects. The objective of this research was to identify compounds that affect adipose tissue development during the first week post-hatch. We obtained 50 Cobb-500 chicks on day of hatch and distributed them into 3-4 dietary treatment groups by body weight. Feed intake and body weight were recorded daily. At six to eight days, the chicks were euthanized, body measurements taken, and fat samples collected in RNA later. Of the three compounds tested, quercetin, kaempferol, and baicalein, baicalein showed the most promise in terms of reducing the accretion of fat without compromising growth and muscle development. The gene expression results revealed increased expression of a transcription factor responsible for fat cell development, in the control and low dose-supplementation groups compared to the medium-dose treatment group in abdominal fat. Further studies are needed to explore effects of dietary supplementation of these compounds at different ages.

*Mentor(s): Elizabeth Gilbert (Animal and Poultry Sciences).*



## NOEL C. BOYLE

ENGLISH

### *ePortfolio Experience*

The goal of this ePortfolio is to show my work as a college student and my progress throughout my four years. Because I am an English major, I have several pieces of writing designed to show my initial writing and communication skills. By the time I graduate from Virginia Tech, I hope to have a collection of my writing in several languages to show how I've grown. While only having my work from my freshman year so far, I believe my portfolio has shown the level of writing I am currently at. It has also shown me that while I do have some good examples of professional writing, I have more examples of more colloquial reflection. This is not necessarily a bad thing, but I have realized that, in moving forward, I need to focus more on some of my technical and professional communication skills.

*Mentor(s): Amanda MacDonald (University Libraries); Kayla McNabb (University Libraries).*

**MORGAN BROOM**

PSYCHOLOGY

**JEYEIN S. CEPILLO**

INDUSTRIAL AND SYSTEMS ENGINEERING

**SETH R. HERNDON**

COGNITIVE AND BEHAVIORAL NEUROSCIENCE

**SHARLEEN L. HE**

HUMAN NUTRITION, FOODS, AND EXERCISE

**EMILY E. WARWICK**

NATIONAL SECURITY/FOREIGN AFFAIRS

**RONNI HO**

BUSINESS MANAGEMENT

***Hokies Laundry Love***

Statement of the goals of project or research question(s): the goal of our project is to help individuals that are less privilege than us to be able to afford the simple luxury of having clean clothes. With this, they will be able to go to job interviews and other events looking the best they can in hopes of finding a stable job to further sustain them. Our group wants to research the poverty percentage in our Blacksburg community, where these people live, and how often they usually do laundry. Purpose of the project, experience, study or creative work (i.e. big picture and where it fits in): the purpose of this project reflects the idea of "think globally, act locally. Poverty is a real and crippling thing that continues around all parts of the world. Our group's purpose is to strive to extend a helping hand out to our local neighbors so that we can make a difference here at home. Methods or description of experiential/creative/analytic processes used: first, our group will contact potential laundromat and ask them if they are open to our cause and willing to have us set up a laundry love booth at their location. After agreement, we will register the location and booth hours to the Love Laundry website so that others know when and where we will be. our group will begin to raise money by advertising around campus for donations through Venmo. After a certain period of time, we will be setting up a Love Laundry booth in front of the North Mainstreet Laundromat for several weeks.

*Mentor(s): Mallory Foutch (Women's Resource Center); Perry Martin, (Residential Leadership Community).*



**ELYSIA A. BUDU**

HISTORY

**SAM WENTWORTH**

HISTORY

**JASMINE V. CASTILLO**

HISTORY

**ANDREW WILLS**

HISTORY

### ***Bomb the Cathedral***

The goal of this game is for students to work within the confines of their character sheet to accomplish a goal. The purpose is for students to place themselves in history and learn how history actually went. Players will get a role sheet that they should keep hidden from other players because instructions are specific for each player. Players with similar goals will group and come up with a strategy to win. Players will give speeches and vote and based off their decision and a role die the “game master” will tell them the outcome. After students make the final decision to either bomb the cathedral or leave it alone then entire group will regroup and reflect about their experience. Role sheets will be collected also. We expect that students will enjoy working with their peers and coming up with a solution. Students will gain the skill of public speaking. Students will also better understand class and gender decision during the “dark ages”.

*Mentor(s): Robert Stephens (History).*



**REAGAN BULLINS**

NEUROSCIENCE

**ERIN BURNS**

WLSC

**REIJYEL CARR**

BIOLOGICAL SCIENCES

**LILY CARROLL**

NEUROSCIENCE

**CARLEY CONOVER**

BIOLOGICAL SCIENCES

**ALYSSA KUHN**

ENVIRONMENTAL RESOURCES MANAGEMENT

**HANNA MORELAND**

WLSC

## ***Depicting Frontal Lobe Magnetic Resonance Imaging using Laser Cutter Technology***

The Curie and Da Vinci living learning community provides experiential learning for biological, life, physical, and quantitative science majors. Students attend classes and live together, and receive training in a peer mentoring program. In this First Year Experience program, students complete a semester-long project in their residential makerspace. These collaborative projects emphasized the development of teamwork and technical skills through the application of technology such as a laser cutter and 3D computer aided design (CAD) software, as well as independent research. For this project, we were assigned a case study in which a 20 year old male was injured in a severe motor vehicle accident that resulted in a traumatic brain injury. Using behavioral and medical symptoms, we conducted independent research to identify the part of the brain that was injured. We determined that the injury occurred in the frontal lobe of the patient's brain. Using Rhinoceros CAD software, we created a digital sketch of the brain injury and used a laser cutter to transfer the sketch to an acrylic plate for visual display. We created a reversible brain diagram showing a normal brain on one side and the affected area of the brain on the other. We will present these laser-etched brain images and discuss our research findings. This project has helped enhance our communication, problem solving, teamwork, and technical skills in ways that will follow us through our undergraduate education and beyond.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



**NEDDIE M. BYRON**  
MECHANICAL ENGINEERING

### ***Mechanical Engineering Cooperative Education Experience***

The purpose of my cooperative education experience at K2M was to gain real world knowledge and experience relevant to my major, mechanical engineering, and my minor, biomedical engineering. K2M is a company that specializes in complex, minimally invasive, and degenerative spinal conditions. While there, I was able to apply theories and software learned in class to problems encountered at work. This helped me better understand the importance of what is taught in class. During my time at K2M, I worked on a project to validate the use of additively manufactured stainless steel for medical devices. K2M currently 3D prints titanium interbodies, however they wanted to expand their 3D printed technologies to stainless steel. This would allow the additive manufacturing of screw assemblies and spinal plates. By 3D printing spinal implants, parts can be more detailed and assembly steps can be eliminated. Although the detail was at an acceptable level, the 3D printed stainless steel parts did not have finishing processes, such as heat treatment, that allowed the parts to be aesthetically equivalent or have an allowable strength. During my co-op, I also got to work in the quality control department. This allowed me to see the entire product development process - from design to manufacturing to quality control. Finally, by being the first machine shop co-op for the company, I learned how to navigate the obstacles associated with a brand new position.

*Mentor(s): Kathryn Jordan (Career and Professional Development).*



**MADELEINE CACERES**

POLITICAL SCIENCE

**SEBASTIAN ANDRADE**

INTERNATIONAL STUDIES

**KYLE BASSETT**

BUSINESS ADMINISTRATION

**STEPHANIE LEMUS-ORTIZ**

INTERNATIONAL STUDIES

### ***Courageous Leadership: Beyond the Abstract***

Our presentation will follow a panel-discussion format; after introducing ourselves by name, we will show a brief video compilation summarizing who we are and how we came together as a group to attend the 2018 ACC Leadership Symposium. Next, we will pose discussion questions based on our individual, unique leadership experiences throughout the Virginia Tech community. After tables have had time to discuss our prompt and share a few answers with the larger group, we (the panelists) will respond to the questions based on our personal, unique leadership experiences OR experiences from the ACC Leadership Symposium. While our questions/prompts are meant to provoke discussion, inspire participants, and encourage new ways of thinking about and “doing” leadership, we also want to share what we have learned through our experiences and unique opportunities as part of the Virginia Tech ACC delegation.

*Mentor(s): Meghan Kuhn (Leadership Education Collaborative).*



## KAYLA B. CAREY

ANIMAL AND POULTRY SCIENCES

### ***Direct injection of CRISPR/Cas9 system into porcine zygotes does not result in off-targeting events.***

During my project, I examined different DNA samples from CRISPR/Cas9-mediated genetically engineered pigs for off-targeting events. The purpose of this project was to test the safety and accuracy of the CRISPR/Cas9 gene editing tool, specifically for use in creating genetically modified pigs as biomedical models. The questions addressed were, at what frequency does CRISPR/Cas9 system cause off-targeting events, and does the quality of the guide affect the frequency of off-targeting? To evaluate these questions, I used online databases to search the porcine genome for potential off-target sites, tested those sites using PCR and molecular cloning techniques, and Sanger Sequenced the DNA to evaluate each potential site. Graduate students in Dr. Lee's lab provided technical support, when needed, but this was my independent project, which I led and then drew conclusions. I found that increased quality of the guide lowered the frequency of off-targeting. I also found that when a high-quality guide was used, there were no off-targeting events. In conclusion, my project demonstrates that CRISPR/Cas9 system can be safe and accurate to be used in creating genetically modified pigs for use as biomedical models, but the quality of guides is important. My findings could be a portrait to the potential use of gene-editing system in human application.

*Mentor(s): Kiho Lee (Animal and Poultry Sciences).*



**MITCHELL CASSELL**

PHYSICS

**HUNTER DERMANELIAN**

CHEMISTRY

**JULIA KAWAS**

PHYSICS

**PETER LANDERS**

PHYSICS

**ANDY LOWE**

CHEMISTRY

**MATTHEW SIMMERS**

NANOSCIENCE

**LUIS YON**

NANOSCIENCE

### ***Autonomous Solar Powered Terrestrial Explorer***

The Curie and Da Vinci Living Learning Community is comprised of life science and quantitative science majors, and promotes experiential learning within its residential makerspace. The makerspace includes a variety of technological resources such as a laser cutter, 3-D printers, and power tools. In our First Year Experience course, students in different majors work in teams to complete a semester-long studio project. This learning experience requires students to collaboratively develop solutions to project-based problems through the integration of a variety of technologies. Students also develop important workplace skills such as cost management, working in teams, and time management. The goal of our project was to use the makerspace resources to create a model of a solar array to explore extra-terrestrial grounds. This project was inspired by NASA's Big Idea Project. The goal of this array is to provide a sustainable power collection system which can sustain crewed missions for the next ten years. In order to keep the array operational, we had to design a new form of dust abatement due to the conditions of the Martian atmosphere. We will present a virtual CAD model that allows for the best understanding of our design.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



## SARANSH CHAND

MECHANICAL ENGINEERING

### ***What's it like to Co-Op in Europe... twice?***

To provide the audience an understanding of the insight I gained through working for an employer abroad. To explain what I took from my experiences. Appeal to the creativity of the students by talking about interesting projects I got to be a part of. Each Co-Op served its purpose. Siemens- The big leap I decided to take in my career by pursuing my 1st Co-op in Munich, Germany with a Tech giant. I was a year into my Computer Science minor; perfectly ripe to take a deep dive into a corporate project where I could improve my programming skills with respect to Engineering Projects. Once I had mastered the skills from my 1st experience, I was ready for my 2nd Co-Op with an Automotive giant, Opel, which Sold from GM to PSA in 2017. Here, I strengthened and widened my knowledge about MATLAB and the role it plays in Automotive development. Siemens- Programmed with XAML and C#- for back-end and front-end development respectively. Opel- Worked with MATLAB, Simulink, Stateflow to simulate, control and display vehicle parameters to will, and observations based upon these factors is what drives automotive design. Overall success in terms of achieving the outlined Learning Objectives that are produced in the beginning of each work experience. Siemens- I not only improved my programming skills- but learnt how to think outside the box. Opel- I converged my passion of programming with automotive design, to produce work for the company that was respected by all Engineering Managers.

*Mentor(s): Kathryn Jordan (Career and Professional Development).*



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**ALEXIS A. CHEATHAM**

BUSINESS, UNDECIDED

**ERIN HOOD**

HUMAN NUTRITION, FOODS, AND EXERCISE

**AVA ADENAUER**

UNIVERSITY STUDIES

**MATTHEW LANG**

FINANCE

**JACK SOBEL**

UNIVERSITY STUDIES

***Biking to Build a Sustainable Future***

Beginning in the fall of 2017, our team has been working on a praxis project as part of the Residential Leadership Community. This community is a living learning community where students study and learn leadership skills. Our project goal is to encourage student involvement with alternative transportation on campus and in the local community. We have partnered with the University's Office of Alternative Transportation, specifically the Hokie Bike Hub, to assist the bike hub in spreading awareness of the organization's services available to college students and engaging populations that have never used biking as their primary mode of transportation. Through promoting and assisting the Hokie Bike Hub, we hope to engage more students to engage in alternative methods of commuting to campus. This is important to the campus as the Office of Sustainability has stated goals of realizing the impacts of individuals' day to day actions that are put on a world-wide scale. The Hokie Bike Hub holds an annual Bike to Campus Day event every year during Earth week encouraging cyclists to bike more often. The organization also holds group rides that are open to all participants. Environmental sustainability has to start with social change, and though it may be a small step in the right direction, this transportation-based project is our way of promoting change in our community. At the end of the event, we will collect successful stories from the event participants to measure

*Mentor(s): Karlee Siepierski (Sustainability) .*



## CRANDALL CHRISTIE

ENGINEERING SCIENCE AND MECHANICS

### ***Effects of rearing temperature on the viscosity of hemolymph in Manduca sexta larvae***

As poikilotherms, internal body temperature of insects varies with environmental temperature. Temperature influences many aspects of insect physiology, but it is not well known how it affects the blood, termed hemolymph. The physical properties of hemolymph, particularly viscosity, are essential to the dynamics of circulatory flows and may be significantly affected by temperature. In this study, we measured the viscosity of hemolymph of *Manduca sexta* larvae reared in three different temperature regimes: 10/15 (cool), 20/25, (room) and 30/35 (warm) °C, with 10/14 hour night/day cycles. Viscosity measurements were taken using a cone and plate viscometer attached to a circulating bath to control temperature at 15, 25, and 35 °C. Additionally, hemolymph was tested for cell diameter and volume. Preliminary results show equivalent viscosity values for all rearing conditions when measured at 25 and 35 °C, but significant decreases in hemolymph viscosity for warm and cool-reared insects at 15 °C. In addition, while there were no differences in cell volume between rearing conditions, average cell diameter decreased with increasing rearing temperature. These data indicate some response of hemolymph viscosity and composition to rearing temperature of the insect. Insects are known to exhibit other responses to temperature changes, such as release of proteins or fatty acids, which may be driving the changes in hemolymph viscosity observed here, functioning to maintain circulation.

*Mentor(s): Jake Socha (Biomedical Engineering and Mechanics); Melissa Kenny (Biomedical Engineering).*



# ANNA CHRISTOVICH

GENERAL ENGINEERING

## *Academic Development Portfolio*

I am presenting my research portfolio demonstrating my academic development and work from high school through my first year at Virginia Tech. This portfolio will exhibit my progress as an academic scholar and learner across a span of several years. Through this personal analysis I am now more prepared for my future academic career.

*Mentor(s): Kayla McNabb (University Libraries); Amanda MacDonald (University Libraries).*



**GINA CINTRON DIAZ**

BIOCHEMISTRY

**KATIE GOERINGER**

MATHEMATICS

**KATRIONA LANE**

BIOLOGICAL SCIENCES

**JOSIE MOORING**

BIOLOGICAL SCIENCES

**LILY-ANA FAIRWEATHER**

**HANNAH WOJTYSIAK**

***Peer-to-peer mentoring as experiential learning: a four-year, four-level perspective***

This panel will include students from the Curie and Da Vinci Science Living Learning Community. These students represent the lifecycle of this community's robust peer mentoring program. Panel members will include students representing 1st-year mentees, 2nd-year peer mentors, 3rd-year "super mentors", and a 4th-year "mentor lead". Each participant represents a unique layer of the program, and each participant has their own perspective of what it means to mentor and/or to be mentored. Panel participants will share their own individual experiences: what they learned as mentees and how that knowledge impacted their decisions in their first year, how and why they chose to lead their peers as mentors, and what they have learned (about themselves and about others) while serving in the mentor role.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



## ANNA R. CLAPP

HUMAN NUTRITION, FOODS, AND EXERCISE

### ***Characterization of Single Nucleotide Polymorphisms in Genes Linked to Metabolic Inflexibility***

Metabolic inflexibility is the body's inability to switch substrate oxidation for energy, and can occur in obesity, diabetes, and metabolic syndrome. Our research objective is to identify a set of human genes and associated human polymorphisms that can be used to understand inherited metabolic inflexibility. Pathway analysis and online databases of genomic-wide association study results were used to find genes important for maintaining metabolic flexibility in humans. Approximately 10 genes were initially investigated using the primary literature, allowing us to narrow our focus to two genes CD36 and TLR4. Both of these genes are involved in sensing and signaling metabolic status and have been implicated in human GWAS studies. CD36 is a membrane glycoprotein that binds to long-chain fatty acids, transporting them into adipocytes. TLR4 is a membrane receptor for bacterial lipopolysaccharides, linking innate immune responses to obesity. Analysis of these genes and their proteins were performed using in silico tools, including SNPedia, NCBI database of single nucleotide polymorphisms (SNP), and the Protein Data Bank. A total of 371 and 566 missense single nucleotide polymorphisms (SNPs) were characterized within the protein coding regions of CD36 and TLR4 respectively. Protein 3D structural models of the mutant proteins are now being developed using SwissModel 3D viewer. During the poster presentation, participants will have the opportunity for hands-on use of the SwissModel

*Mentor(s): Deborah Good (Human Nutrition, Foods, and Exercise).*



**NATHANAEL B. CLARK**  
BIOLOGICAL SCIENCES

### ***Change in Gene Promoter Activity in Arabidopsis as a Result of Infection With Hpa***

*Hyaloperonospora arabidopsis*, also known as Hpa, is a pathogen of the model plant *Arabidopsis thaliana*. The pathogen does not have the ability to utilize inorganic minerals as nutrients, and so must obtain nutrients from its host. It is believed to do this, in part, by utilizing the plant's amino acid transport proteins. The goal of this project was to determine how infection with Hpa changes promoter activity of different amino acid transport proteins in *Arabidopsis*. This was achieved through the use of the GUS gene reporter system. GUS is an enzyme which catalyzes several chemical reactions which result in colored or fluorescent products; by measuring the fluorescence of extracted plant protein samples, this can be used to determine how active the promoter for a specific gene is. Chemical staining can also be used on plants expressing GUS to show where the gene is being expressed. Transgenic lines of *Arabidopsis* expressing the GUS gene, driven by promoters for four amino acid transport proteins, were analyzed using this method, comparing uninfected plants and plants infected with Hpa. It is expected for infection with Hpa to significantly change (likely increasing) the promoter activity of these four genes, as well as changing where the gene is being expressed in the plant. Knowing this will allow for targeting of these genes for modification in order to create plants resistant to Hpa and other related pathogens.

*Mentor(s): Guillaume Pilot (Plant Pathology, Physiology, and Weed Science).*



**JOHN CONNOCK**  
WILDLIFE CONSERVATION

### ***Evaluation of a new technology for studying an aquatic giant salamander (*C. a. alleghaniensis*)***

Cryptic species are often hard to study and many are of conservation concern, such as the secretive giant salamander, the eastern hellbender (*C. a. alleghaniensis*). Implementation of artificial nest-boxes has made studying hellbenders less dangerous for the animal, however, nest-boxes require frequent manual surveys to identify and track individuals. This study tested whether new portable passive integrated transponder (PIT) scanning technology can allow for remote identification of hellbenders without removal from the nest-box. Specifically, we examined how the scanner's ability to accurately detect PIT-tagged hellbenders was influenced by various factors including nest-box cover rock depth, PIT tag location within the nest-box, and tag orientation (horizontal vs. vertical). In total, we scanned 58 nest-boxes, and manually verified box occupancy status. Of the 32 nest-boxes occupied with a tagged individual, the scanner had a true positive read proportion of 31.25% with cover rocks in place vs. 87.5% when cover rocks were removed. Furthermore, the scanner's probability of detecting tagged individuals dropped below 50% once cover rock depth exceeded 11 cm. We also found that the interface, wall, and center locations of the nest-box, and a vertical tag orientation, had significant additive effects on the scanner's ability to detect PIT tags. Overall, this technology shows great potential as a research tool for studying PIT-tagged hellbenders and other cryptic species.

*Mentor(s): William Hopkins (Fish and Wildlife Conservation); Brian Case (Fish and Wildlife Conservation), Jordy Groffen (Fish and Wildlife Conservation), Thomas Galligan (Fish and Wildlife Conservation).*



**DEIRDRE A CONROY**  
WILDLIFE CONSERVATION

### ***Bat species composition and diversity on private property in the Ellett Valley of Montgomery County, Virginia***

The majority of habitat for bats in the eastern United States is on private land, which has much to offer in terms studying the effects of various stressors, including white nose syndrome, agriculture, and wind farming, on bat species. Thus, the overall research objective was to identify the distribution and diversity of bat species across the landscape of a privately-owned property using acoustic survey techniques. We systematically allocated acoustic survey locations in habitats preferentially used by bats along an elevational gradient, with 10 sites in riparian areas, and 8 in non-riparian areas, in or adjacent to edge habitats. We deployed four SMZ4 Songmeter acoustic detectors for two-week periods at each of these locations across the 660-acre property. Overall, we found nine total species present on the property, the most common of which were big brown bats (*Eptesicus fuscus*), eastern red bats (*Lasiurus borealis*), and silver-haired bats (*Lasiurus noctavigans*). Notably, two species that were detected, the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*), are federally listed as endangered and threatened species, respectively. We found no correlation between species richness and cover or elevation. Because of the richness and activity of species detected on the property, the data suggests that the study site property provides suitable habitat for the full suite of bat species occurring in the Southern Appalachians.

*Mentor(s): Verl Emrick (Conservation Management Institute).*



## ROSS C. COOPER

WATER: RESOURCES, POLICY, AND MANAGEMENT

### ***Spatial and Temporal Changes in Water Quality in the Shenandoah River Watershed***

The Shenandoah River Watershed contains agricultural operations that produce large amounts of nutrient- and bacteria-containing waste. In accordance with Total Maximum Daily Loads plans, agricultural best management practices such as stream fencing and conservation tillage have been implemented by the Commonwealth of Virginia to reduce pollution. This analysis evaluated the effects of land use changes and best management practices to understand their impact on streams within the watershed over a 15-year period. Utilizing data obtained from Friends of the Shenandoah River, 29 sampling sites were analyzed for concentrations of nitrate, ammonia, and orthophosphate. Using regression analysis, sites were ranked for either positive, negative, or stable trends in nutrient concentrations. Preliminary analysis has indicated that 1 site displayed an increase in ammonia, 16 sites exhibited increases in nitrate, and 2 sites demonstrated an increase in orthophosphate. Ammonia in 23 sites displayed decreasing trends, 5 sites showed decreases in nitrate, and 16 sites exhibited decreasing trends in orthophosphate. Due to TMDL requirements, wastewater treatment plants have been targeted for a decrease in nutrient emissions; congruently, at a wastewater treatment plant located on Hawksbill Creek, exhibited negative nutrient trends for all parameters.

*Mentor(s): Serena Ciparis (Fish and Wildlife Conservation) .*



**MICHELLE M. CORINALDI**  
SOCIOLOGY

### ***Asian American Women and Non-Binary Individuals are Front and Center!***

This community engagement project provided a platform for perspectives that are oftentimes unheard in public discourse about racial and gender identities. It featured Asian American women and non-binary at its forefront. The conversations within this community engagement project were utilized to augment a more nuanced understanding of the construction of marginalized realities. A focus group was utilized for the collection of empirical data and the development of subsequent social inquiry. These conversations focused on their self-identification, community belonging, lingual implications, and firsthand interactions illustrated existing sociological insights, theories, and concepts. The theoretical frameworks conceptualized and illustrated of individual identities, orientations, heritages. The dialogue illustrated the breadth and depth of Asian American identity and identities within the Virginia Tech campus and wider community. Their lived experiences illustrated shared themes of hyperconscious performance and presentation of race, gender, and sexuality.

*Mentor(s): Sarah M. Ovink (Sociology).*



**SAMANTHA M. CORNWELL**

BIOCHEMISTRY

**EMILY VINCHIARELLO**

PSYCHOLOGY

**BRENNA P. LAFFERTY**

BIOCHEMISTRY

**HARRELL J. DIXON**

BIOCHEMISTRY

### ***Fluency Performance Among High- and Low-Anxious Individuals Following a Stressor***

This experiment is being performed based upon the study performed by Dr. D Erik Everhart and Dr. David Harrison, “Heart Rate and Fluency Performance Among High- and Low-Anxious Men Following Autonomic Stress” (2002). The purpose of this experiment is to expand Dr. Everhard and Dr. Harrison’s study to include women. The expected results are based upon the sex of the participant. For example, if a participant is a female, then there will be better regulation of heart rate and blood pressure, as well as higher mean scores upon verbal fluency tasks due to decreased lateralization between the hemispheres allowing for greater utilization of both hemispheres. To further expand, the high-anxious women would score the highest upon the verbal fluency tasks following a stressor, while low-anxious men are expected to score lowest upon the verbal fluency tasks. These results are further generalizable to the student population as we compare the fluency tasks to that of academic tests and see how students who have anxiety, and those who do not, perform on these tasks, thus showing which condition is advantageous for test taking.

*Mentor(s): Kelly Harrison (Psychology).*



## SAMANTHA CORNWELL

PSYCHOLOGY

## ELLIE MURACA

PUBLIC AND URBAN AFFAIRS

## ABRIL V. YU-SHAN

CIVIL ENGINEERING

### ***Decision Sciences for Resilient Communities: An ICTAS-Supported Project***

The goal of the study is to learn how local public actors (elected and administrative officials) make decisions at the intersection of land use and stormwater management. We are gathering data on cognitive processes, organizational attributes, and formal regulations--how actors think, how they interact, and what rules they adopt. For this pilot study, we are focusing on local public actors in Blacksburg and Christiansburg and using a combination of survey and semi-structured interview to gather data. From the survey and interview questions we have developed, we hope to learn how actors vary in their knowledge and biases (especially planners versus engineers), how Christiansburg and Blacksburg differ in their organization of land use/stormwater management, and the adoption and implementation of rules about it. Our project specifically has given us the opportunity to become more aware of environmental issues which are commonplace in local government and learn how to fully develop an experiment from start to finish. We hope that through our research, others can learn about the decision-making processes which occur in local government, and how to improve communication and mitigate decision bias within those processes.

*Mentor(s): Thomas Skuzinski (Urban Affairs and Planning); Tripp Shealy (Civil and Environmental Engineering), Robin Panneton (Psychology).*



## STARLA Y. COUSO

ENVIRONMENTAL POLICY AND PLANNING

### ***Understanding the Successes of the Collaborative Forest Landscape Restoration Program (CFLRP): A Study of Appeals and Litigation***

The goal of this research is to critically analyze the relationship between natural resource management projects conducted by the United States Forest Service under the Collaborative Forest Landscape Restoration Program (CFLRP). The CFLRP was established in 2009 to facilitate collaborative decisionmaking and ecological restoration on national forest lands. Prior research on non-CFLRP projects shows steadily high rates of appeals and litigation against Forest Service. Using the Planning, Appeals, and Litigation System (PALS), this research aims to uncover if CFLRP projects also correlate with the non-CFLRP rates of appeals and litigation regionally and nationally. By studying the environmental assessments (EAs) and environmental impact statements (EISs) pursuant the National Environmental Policy Act (NEPA), a database was created to explore this relationship between CFLRP projects and appeals and litigation. This research highlights not only the successes of the Collaborative Forest Landscape Restoration Program, but also its limitations.

*Mentor(s): Marc Stern (Forest Resource and Environmental Conservation).*

**BRYAN P COVELL**

GENERAL ENGINEERING

**ATTICUS BOGGESS**

BUSINESS

**HAILEY RICHART**

GENERAL ENGINEERING

**MASON MILLNER**

ARCHITECTURE

**HANA EDEN**

HUMAN NUTRITION, FOODS, AND EXERCISE

**AMELIA B. BROWN**

COMMUNICATION STUDIES

**CAMERON R. SCHOFNER**

ECONOMICS SCIENCE

SERVICE  
LEARNING

FIRST YEAR  
EXPERIENCE



LEADERSHIP  
PROGRAM



### ***LDRS 1016 Breakout: Campus Kitchen Partnerships***

As part of the Residential Leadership Community, students are given the opportunity to tackle one of the UN's Sustainable Development goals. Our breakout group focused on the goal of Peace, Justice, and Strong Institutions - specifically, on alleviating hunger within the NRV area. To do this, we partnered with Campus Kitchen, a branch of VT engage that shares this agenda. One of Campus Kitchen's goals is to provide bagged dry meals for those who are unable to get access to nutritious meals over the weekends. However, these meals can only be delivered if they are prepared by volunteers. Therefore, this project consisted of reaching out to student organizations on campus to connect Campus Kitchen with a list of groups who would be interested in holding food drives and meal packaging events. First, our team held our own miniature packaging event so we would fully understand the process. Then we reached out to various organizations to with the goal of finding at least five groups that would consider partnering with Campus Kitchen in the future. As a result of this project we hope to provide Campus Kitchen with a steady source of volunteers so they can continue meeting community needs in the future.

*Mentor(s): Perry Martin (Leadership and Social Change) .*



**CLARK A. CUCINELL**  
COMPUTER SCIENCE

### ***Identification of Genetic Type and Infectious Agents in Laboratory Mice by Analyzing RNA-Sequence Metadata***

Next-generation DNA sequencing technologies are producing massive amounts of data. Today, the Sequence Read Archive (SRA) database from the National Center for Biotechnology Information (NCBI) boasts 4,107,271 sequence files, averaging 3.57 Gigabases (Gb) per sequence file. The purpose of this project is to identify genetic type (strain) and presence of infectious agents in laboratory mice, *Mus musculus*, by analyzing their RNA-Sequences taken from the SRA database. To do this, we developed a pipeline for processing RNA-sequence data files and gathered information on the expression levels of each gene, the identities of foreign sequences, and characterized single-nucleotide polymorphisms (SNPs). We also measured and optimized processing times for each of the programs involved. We will determine the abundance of foreign sequences and their associated species, as well as use the sequence information to identify sequence files lacking mouse species identifiers. This project can be expanded by analyzing gene relationships extrapolated from the sequence data, giving insight into gene functional groups that may not be currently known. Furthermore, this process can be extended to the human genome in a similar way, divulging information on possible infectious sequences in human DNA and previously unknown gene functional relationships.

*Mentor(s): Allan Dickerman (Biocomplexity Institute) .*



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## CAYLEE CUPPERNULL

ANIMAL AND POULTRY SCIENCE

### *Caylee Cuppernull Portfolio*

To display my previous accomplishments and work that I have completed. The purpose of this project is to supplement any future applications for graduate programs or internships with evidence of my abilities. Putting together a research portfolio documenting my accomplishments and academic work from high school through the first-year of college.

*Mentor(s): Kayla McNabb (University Libraries).*



## DALLECE E. CURLEY

CLINICAL NEUROSCIENCE

### ***Investigation of Astrocytic Reduction and Proliferation in Response to Mild TBI/Concussion***

Mild traumatic brain injuries (TBIs) can cause patients to suffer from memory loss, concentration difficulties, and general cognitive deficits. Due to an absence of apparent lesions using various imaging modalities, the underlying cellular mechanisms of the progression of this disease have remained a mystery. Astrocytes respond to brain injury with astrogliosis, which seals off damaged areas but can result in loss of critical housekeeping functions. The specific aims of this study were to investigate possible astrocytic reduction/loss, as well as the proliferation response in sham (control) compared to mTBI (injured) mouse models. We used a mouse model of repeated mTBI to assess key features of astrogliosis, which includes astrocyte proliferation. The Modified Marmarou weight drop injury model was used, and IHC was performed using antibodies against GFP, Ki67, and BrdU. Quantification of astrocyte densities did not show areas of complete loss of astrocytes in mTBI mice, however we did find uncharacteristic reduction of GFP-reporter in these areas ( $p < 0.001$ ,  $n=3$ ). Astrocyte proliferation acutely stained by Ki67 showed negligible proliferation in mTBI mice (0.031% ki67+/GFP+,  $n=3$ ) compared to shams, so the cumulative BrdU stain was used as a comparison. The reduction indicates that astrocytes respond very differently to repeated mTBIs than previously observed in other types of TBI, and that astrocyte dysfunction might contribute to the pathobiology and progression of disease.

*Mentor(s): Stefanie Robel (Neuroscience).*



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## JUSTIN DAILEY

COMPUTATIONAL MODELING & DATA ANALYTICS

## EMILY PEACOCK

COMPUTATIONAL MODELING & DATA ANALYTICS

## MAX HUDAK

ECONOMICS

## HIBA MALIK

COMPUTATIONAL MODELING & DATA ANALYTICS

## MARIAM SAYGSYAN

COMPUTATIONAL MODELING & DATA ANALYTICS

### ***Bringing it All Together: Understanding Affordable Housing in the D.C. Metro Area through Data Analytics***

Affordable housing is a pressing issue in the D.C. metro area. Economic growth and high median incomes have led to rising housing prices, while housing development has failed to keep pace with the need. Addressing this crisis is a complex issue involving public policy, economic stakeholders, and community dynamics. Our multidisciplinary undergraduate research team is partnered with the Arlington Partnership for Affordable Housing (a nonprofit developer) and the Social and Decision Analytics Laboratory of the Virginia Biocomplexity Institute to provide data-driven research and analysis. Although our research is largely rooted in data analysis, numerous perspectives are necessary to completely understand the issues surrounding affordable housing. Topics such as gentrification and unemployment span the disciplines of Sociology, Economics, and Political Science. Our analysis has also been guided by the department of Science, Technology, and Society, where we have explored the impact of how we classify information, and how these decisions define the context of our research. The panel will discuss how our experiences gave us the opportunity to apply our academic knowledge and skills across multiple disciplines to develop actionable, data-driven solutions to a real-world problem.

*Mentor(s): Samantha Fried (Science, Technology, and Society) .*



**MICHELLE T. DAO**

GENERAL ENGINEERING

**SHI QI C. WONG**

GENERAL ENGINEERING

**THOMAS OZOROSKI**

GENERAL ENGINEERING

**CAMERON WETZLER**

GENERAL ENGINEERING

**ARYAN KUMAR**

GENERAL ENGINEERING

### ***Cooked, Wasted, & Composted: A Study in Food Waste at D2 Dining Hall***

Our overall goal is to reduce the amount of post-consumer food waste within the D2 dining hall. To do so, we conducted a food waste audit at the beginning of the spring semester in order to gauge how much food waste is present in Virginia Tech's all-you-can-eat dining hall, D2. A food waste audit is where we collect compostable food after people are done eating and weigh it to see how much total food is wasted. Then, we aimed to educate the public about the amount of food that was wasted by presenting our data that we have collected and implementing an educational marketing campaign in D2, including posters, table cards, and digital ads. We will host a second food waste audit at the end of the spring semester to measure whether or not social marketing plays a role in students' day-to-day activities. Our marketing materials contained information about what we could be doing with the amount of food that goes to waste, and how students can reduce their own amount of waste. This allows us to become more aware of the consequences of their actions. By knowing these facts, we hope that our audience becomes more aware of their own impact on the environment and are more aware when it comes to making dining decisions. Additionally, we would like to promote and celebrate the steps that Virginia Tech's dining program currently takes to help reduce our campus' impact on the environment, especially the composting program.

*Mentor(s): Karlee Siepierski (Campus Sustainability Planner).*



## KATHERINE A. DARRAH

ANIMAL AND POULTRY SCIENCES

### ***The Effect of Delayed Access to Feed on Intestinal Morphology and Stem Cells in Chickens***

Chicks are typically without feed for the first 24-48 hours after hatching due to various poultry industry practices which can negatively affect their intestinal morphology and therefore greatly impact their nutrient uptake. An inability to efficiently absorb nutrients in the small intestine can lead to decreased body weight gain and result in economic losses for the poultry industry. The goal of this project is to analyze the effect of delayed access to feed on intestinal morphology and stem cells of newly hatched chicks. The chicks were divided into three groups: no delayed access to feed, 24-hour delayed access, and 36-hour delayed access. Stem cells in the crypts were identified using the RNAscope in situ hybridization assay and a probe for olfactomedin 4, a known stem cell marker, on formalin fixed paraffin embedded intestinal sections. Preliminary results showed that the villus lengths and widths for the no delay group were greater than the delayed groups at day two post-hatch. Crypt lengths were longest on day of hatch compared to day two. This may indicate rapid differentiation and proliferation of stem cells upon hatching. The effect of delayed access to feed on crypt length and width is still being analyzed. In summary, delayed access to feed decreased growth of the villi, which would affect nutrient uptake.

*Mentor(s): Eric Wong (Animal and Poultry Sciences).*



**ANTONIO B. DE CECCO**  
BIOLOGICAL SYSTEMS ENGINEERING

### ***Evaluation of an In-Situ Streambank Erosion Test Device: Accuracy of Data Analysis Techniques***

Streambank erosion is a major source of sediment pollution and a vector for other pollutants in streams and watersheds, which can negatively affect water quality, water treatment, and aquatic ecosystems. The excess shear equation is typically used to model the erosion rate of cohesive streambanks and is dependent on two erodibility parameters: critical shear stress ( $\tau_c$ ) and erodibility coefficient (K). The most common method for measuring these erodibility parameters in situ is the submerged jet erosion test (JET). However, questions remain regarding which data analysis technique is most accurate. Analysis of JET test data for clay and clay loam were conducted utilizing the JET Erosion Test Spreadsheet tool created by Dr. Erin Porter. The spreadsheet tool was used to solve for erodibility parameters utilizing the Blaisdell, Iterative, and Scour Depth techniques, being the techniques of interest. Minitab 18 was used to compare results for each data analysis technique to flume test results, which is considered standardized, for the same soil type and runs to determine statistical significance. The Iterative technique was found to be statistically significant for both soil types in solving for K, displaying a high degree of accuracy, with no statistical significance in solving for  $\tau_c$ . Statistical significance was not determined for the Blaisdell or Scour Depth in any case. Analysis is ongoing to account for variation in flume results in order to better define cases of accuracy.

*Mentor(s): Tess Thompson (Biological Systems Engineering).*



**TANNER DEAN**

BIOCHEMISTRY

**JOHN GAMBINO**

BIOCHEMISTRY

**FAHD MOHAMED**

BIOCHEMISTRY

**PATRICK O'CONNELL**

BIOCHEMISTRY

### ***Acrylic Anatomical Model of the Human Ear***

This project was created as part of the peer-to-peer project program in the Curie and Da Vinci Science Living-Learning Community. These projects are designed to prepare students with skills like critical analysis, problem solving, and team building that will be used throughout their college careers and into professional life. The main goal of our project was to create an acrylic model of the human ear using 2D computer aided design software and laser cutter technology. The purpose of our project was to better apply our knowledge to new and unknown situations through experiential learning. In doing so, we learned to work as a team, process new information, better understand the human ear and learn new technologies to create the model. We also learned skills in information literacy, creative prototyping, computer-aided design software and laser cutting. We will present our model using different colors of acrylic to visually depict the ear.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



**DANIELLE D DECANIO**  
HOSPITALITY AND TOURISM MANAGEMENT

**MADELINE MONTGOMERY**  
HOSPITALITY AND TOURISM MANAGEMENT

**JULIA CAVALLARO**  
HOSPITALITY AND TOURISM MANAGEMENT

**KAYLA ROBERTS**  
HOSPITALITY AND TOURISM MANAGEMENT

### ***Punta Cana Study Abroad - Hospitality and Tourism Management***

The purpose of the study abroad to Punta Cana, Dominican Republic was to expose students to the importance of sustainable tourism in a tropical destination, while also teaching about the different types of work required to run all-inclusive resorts and its extended activities. Students learned in the classroom each evening going over topics and digging deeper into some of the details of destination tourism. The days were filled with experiential learning, from touring resorts, to a cruise, to volunteering and even seeing how the locals live. There was always time for some fun in the beautiful weather, but the lessons learned on this two week immersive trip are lessons that couldn't have been taught in a standard classroom. This program is about seeing different areas in the hospitality industry in motion and how they must work to maintain their business and the natural creations around it. This past winter semester the program hosted eleven students, each who left the Dominican with a different story, but all with a greater understanding and appreciation for the work that goes into running the different facets of the industry. Our two weeks in Punta Cana, was without question two of the most important and informative weeks of our entire educational career.

*Mentor(s): Tom Duetsch (Hospitality and Tourism Management).*



**RITIKA DOKANIA**  
STATISTICS

### ***Experience as a Graduate Assistant for Learning Partnerships***

In this presentation, I intend to share my experiences as a Graduate Assistant (GA) in the Office of Learning Partnerships (OLP) for 2017-18. I would like to talk about two major projects that I undertook as a GA in the past one year, how I applied my skills in executing the projects and the likely impact of these projects at the University-wide level. Overview of key projects: 1) Analysis of Strengths data - a. Most commonly occurring Strengths themes in VT - b. Performed various statistical analysis to gain insights on data - i. Strengths Correlation Analysis ii. Cluster Analysis of Strengths iii. Most commonly co-occurring themes c. Development of Strengths Infographic - d. Developed excel tools and how-to documents for future reference. 2) Strengths Newsletter - a. Development of proposal for the Strengths email curriculum - b. Identifying the preferred email platform for Strengths Newsletter - c. Creating the Newsletter template - d. Development of Newsletter Content - e. Rollout plan. I would also be interested in discussing the new skills I acquired along the way while implementing these projects. Some of them are listed: - Programming language: Python - Jupyter Notebook to implement Python Scripts - Visualization Software: Tableau - Infographic platform: Canva - Infographic platform: Venngage - Building Newsletter on the Email Platform - Creation and Analysis of Baseline Survey

*Mentor(s): Taran Cardone (Office of Learning Partnerships).*



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**JESSICA F. DORSCH**

NATIONAL SECURITY &amp; FOREIGN AFFAIRS

**MAURA K. MCDONOUGH**

POLITICAL SCIENCE

**HANNAH R. PLEDGER**

NATIONAL SECURITY &amp; FOREIGN AFFAIRS

**WILLIAM H. FRESCHI**

FINANCE

**DAVID M. SCHMIDT**

NATIONAL SECURITY &amp; FOREIGN AFFAIRS

***U.S. Department of State's Diplomacy Lab***

Launched by the Department of State in 2013, Diplomacy Lab is a public-private partnership that enables the State Department to “course-source” research and innovation related to foreign policy challenges by harnessing the efforts of students and faculty experts at colleges and universities across the United States. Diplomacy Lab is a partnership between the Department and U.S. colleges and universities. Partner universities are responsible for recruiting student teams to undertake Diplomacy Lab projects and faculty members to guide the teams. Students have opportunities throughout the semester to discuss their research with State Department officials. The State Department is responsible for responding to a wide array of international issues and challenges, including climate change, weapons nonproliferation, democracy and human rights, counter-terrorism, global health, energy security, gender equality, economic policy, trafficking in persons, food security, and conflict and stabilization. Diplomacy Lab projects come from offices across the Department. The Department makes an effort to provide projects matching the strengths and interests of universities participating in Diplomacy Lab. Most Diplomacy Lab products are short policy memos with data and supporting research attached in appendices as necessary. In some cases, final projects may take the form of longer research papers, statistical analyses, or even data sets.

*Mentor(s): Christopher Price (Political Science); Brett R. Netto (Political Science).*



## JESSICA F. DORSCH

NATIONAL SECURITY AND FOREIGN AFFAIRS

### ***Diplomacy Lab: Vory z Zakone in Georgian Prisons: Development and Adaptation***

The research team for this project would take a mutli-disciplinary approach to examine the current state of the vory v zakone in Georgian prisons, the level of control they have within institutions, how they exert influence outside of correctional facilities, the scope of vory influence within the different prison populations, and whether there are any intersections between vory and violent extremism. The purpose of this project was to enable undergraduate students to engage in research designated by the Department of State, regardless of his or her major. In addition, the students became engaged in researching and exploring real-world issues. The research was aided by a creative approach in order to identify the relationship between the vory and Georgian radicals. This research included searching through YouTube videos and other websites, using language skills such as Russian and Georgian to examine literature in other languages or videos on other websites. The results of the research showed that the vory is interested in financial gain. This international crime organization has control over the black markets. Also, the vory could be motivated by their anti-establishment and anti-government beliefs. Lastly, the vory may be asked to identify prisoners that would be easy to radicalize. However, this is mainly to due to vory's interest in money.

*Mentor(s): Christopher Price (Political Science); Brett Netto (Political Science).*



**ASHLEY C. DOYLE**  
PUBLIC RELATIONS

### ***What Causes People to Accept Friend Requests on Facebook: A Survey Experiment***

In today's social media age many people use online platforms to keep up with others. Facebook is unique because both the friend requester and recipient have to approve a connection. This research explores what causes Facebook users to accept friend requests on the platform. A survey experiment looks at how the number of mutual friends, age, and sex affect the acceptance of requests. Mutual friends had the biggest impact on whether a request was accepted with more mutual friends increasing the likelihood of acceptance. However, there was no significant relationship between age of the requester and request was acceptance. Finally, there was a significant relationship in regards to sex: both males and females were more likely to accept female friend requests.

*Mentor(s): Katherine Haenschen (Communication) .*



## MADELYN R. DYNES

CROP AND SOIL ENVIRONMENTAL SCIENCE

## ABIGAIL M. HAN

CROP AND SOIL ENVIRONMENTAL SCIENCE

## ABIGAIL ENGLAND

GEOGRAPHY

## SARAH V. BATEMAN

CROP AND SOIL ENVIRONMENTAL SCIENCE

### ***Community-Based Initiatives Fighting Food Insecurity in Southwest Virginia***

Through the service-learning projects participated in, students became more aware of the food security issues in our own community. The group was able to experience first-hand the obstacles, impact, and strong leadership of the organizations with whom they worked. Through the analysis of the methodology of these three community programs, it can be concluded that through collaboration of organizations, volunteers, and a dedicated community, an increase towards food security can be achieved. Focused administration and open communication recognizes the needs of the community and allows for a centralized approach in nourishing the community. These actions result in an increase in awareness of food insecurity amongst community members and a facilitation of educational programs within the community. The role of the community should not go overlooked when it comes to achieving furthered availability, accessibility, and utilization of food and resources in both the developed and developing worlds. Main concluding thoughts: - Community leadership and collaboration is critical - Administrative organization is often unnoticed, but is necessary - Policy should react to community feedback. The key to achieving these characteristics is cultivating food leaders with knowledge and resilience. Money and policy alone cannot build strong, food-secure communities. The common saying “takes a village to raise a child” can parallel the idea that it takes a whole community to achieve food security.

*Mentor(s): A. Ozzie Abaye (Crop and Soil Environmental Science).*



## HAYLEY M. EDWARDS

CIVIL ENGINEERING

### ***Feasibility of Buoyant Foundation Systems***

Most homes depend on a connection to a water source whether it be a lake, river, or ocean. As global climates rise, critical sources of life become weapons of mass destruction. Flooding is the most common natural disaster globally and is expected to triple the number of people affected worldwide by 2030. While it is out of our ability to prevent flooding and water related natural disasters, solutions are being developed to mitigate damages. Amphibious architecture allows foundations to become flexible with the rise and fall of floodwaters. The goal of this project is to conduct aesthetic and geo-technical analyses on buoyant foundation systems for FutureHAUS Dubai. The project's purpose is to analyze the aesthetics and adaptability of amphibious architecture and to provide effective, preventative foundation designs that decrease the level of flood damage to residential structures. An aesthetic analysis is used to evaluate the overall refined look of buoyant foundation systems and a geo-technical analysis is used to assess the site conditions of the locations considering buoyant foundation systems. The anticipated results will include aesthetically pleasing, adaptable foundation systems for different scopes of structures. Buoyant foundation systems could be the key to mitigating flooding disasters for residential structures.

*Mentor(s): Fredrick Paige (Civil Engineering).*



**GABRIELLE Y. EID**

ENVIRONMENTAL SCIENCE

**THOMAS P. MECHERIKUNNEL**

PHYSICS

**ERIK S. SHARRER**

ENGINEERING

**RYAN KELLY**

BUSINESS

**ABASIN KHOROSH**

ENGINEERING

**ANDREW BOWERS**

BUILDING CONSTRUCTION

### ***Turn Off the Lights Payne!***

Our goal is to reduce the amount of energy consumption within Payne Hall. The purpose is to see the impact students have on the amount of energy consumed and if they change their habits, how it will affect the energy consumption. Our team used various methods to collect data at the beginning of each week about the students current habit, such as using surveys. We also used posters hung up around the dorm and on doors to promote changing a different habit each week. We anticipate that the energy consumption should decrease due to making students aware of the habits they can change.

*Mentor(s): Tim Filbert (Graduate School) .*



**AHMED M. ELNAHHAS**

MECHANICAL ENGINEERING

### ***Passive metamaterial-based acoustic holograms in ultrasound energy transfer systems***

Contactless energy transfer (CET) is a technology that is particularly relevant in applications where wired electrical contact is dangerous or impractical. Furthermore, it would enhance the development, use, and reliability of low-power sensors in applications where changing batteries is not practical or may not be a viable option. One CET method that has recently attracted interest is the ultrasonic acoustic energy transfer, which is based on the reception of acoustic waves at ultrasonic frequencies by a piezoelectric receiver. Patterning and focusing the transmitted acoustic energy in space is one of the challenges for enhancing the power transmission and locally charging sensors or devices. We use a mathematically designed passive metamaterial-based acoustic hologram to selectively power an array of piezoelectric receivers using an unfocused transmitter. The acoustic hologram is employed to create a multifocal pressure pattern in the target plane where the receivers are located inside focal regions. We conduct multiphysics simulations in which a single transmitter is used to power multiple receivers with an arbitrary two-dimensional spatial pattern via wave controlling and manipulation, using the hologram. We show that the multifocal pressure pattern created by the passive acoustic hologram will enhance the power transmission for most receivers.

*Mentor(s): Shima Shahab (Biomedical Engineering and Mechanics).*



**AHMED M. ELNAHHAS**  
MECHANICAL ENGINEERING

***An Experimental and Computational Investigation  
of the translational motion of bubbles “An ICTAS-  
Supported Project”***

Microfluidic devices have promising potential to analyze cells for applications in medicine. Researchers have developed systems that can differentiate cells based on their size, deformability, and electrical properties. Another promising approach is to sort cells based on their acoustic properties. As a starting point, the behavior of bubbles under the influence of acoustic fields is studied in this project. Firstly, a microfluidic chip is designed with a flow focusing geometry to produce bubbles. An external pressure field is induced inside the microfluidic channel through surface acoustic waves created by a piezoelectric disk placed on the surface of the microfluidic chip. A finite element model of the chip is studied using COMSOL Multiphysics to characterize the resulting pressure fields inside the channel. Furthermore, the translational behavior of the bubbles is recorded using high-speed cameras and is compared to the finite element pressure fields. It is found that the primary motion of the bubbles is due to the induced pressure field. However, it is also observed that under certain excitations, the bubbles maintain an equilibrium distance that can be attributed to their mutual interactions.

*Mentor(s): Shima Shahab (Biomedical Engineering and Mechanics)*



**SERENA L. EMANUEL**

BIOLOGICAL SYSTEMS ENGINEERING

**MORGAN CAMPER**

GENERAL ENGINEERING

**CHRISTOPHER B. OSTERHOUT**

MINING ENGINEERING

### ***Diversifying and enriching undergraduate experience through a hands-on environmental monitoring lab***

The LEWAS Lab monitors and provides real-time environmental data to evaluate impacts of the Stroubles Creek Watershed for research and educational purposes. As a result, researchers from multiple disciplines from undergraduate, graduate, and PhD programs are necessary for this lab's success. This presentation will provide insight from three lab members on the Civil team: a Biological Systems Engineering senior, a Mining Engineering sophomore and a General Engineering freshmen, who will each reflect on how this interdisciplinary lab has allowed for growing interest in the engineering discipline, application of knowledge taught in the classroom, and diversification of their academic experience. They have achieved this by calibrating monitoring instruments to understand continuous monitoring, analyzing illicit discharge events to understand climatic and urbanization impacts on watersheds, and leading outreach events to extend the benefit of experiential learning to the wider Virginia Tech community. Each of these experiences built upon their undergraduate engineering learning experience. The aforementioned lab members will also reflect on the value of mentorship from graduate and doctoral students in enriching their learning, due to the diverse academic levels present in the lab.

*Mentor(s): Vinod K Lohani (ICTAS/Engineering Education) .*



ABIGAIL E. ENGLAND

GEOGRAPHY

HANNA KIRYLUK

ANIMAL AND POULTRY SCIENCES

### ***Service Learning Experience in the Dominican Republic***

This service learning experience was looking to build a new relationship with a community in the Dominican Republic, called Pedro Garcia, over a week in January 2018. The students attending were looking to learn from another culture, as well as provide support for this community in the forms of labor as well as with an interpersonal connection. The program format used a framework of adaptability, respect, and inclusion. The leaders of the group focused on creating bonds of trust within the group of students, and between the students and the community. During the trip, many unforeseen obstacles kept the group on their feet and made them more flexible and adaptable by the end of the journey. Because of the unexpected roadblocks, students put more trust in each other and the community, and inadvertently created a stronger bond that fostered more impactful results.

*Mentor(s): Eliza Wethey (VT Engage).*



**ERIC ESPOSITO**  
BIOLOGICAL SCIENCES

### ***Codon Optimization and Noise Control in the Spindle Assembly Checkpoint***

The spindle assembly checkpoint (SAC ) is an intrinsic cellular process that is tightly regulated to prevent missegregation of chromosomes during mitosis. Perturbations of protein concentrations of components of the SAC can lead to failure or impairment of this checkpoint (Heinrich et al., Nature Cell Biology 2013). In line with these findings, the concentration of SAC proteins varies little over time or between cells (i.e. shows low ‘noise’). Previous work suggested that this low noise requires low stability of the mRNA transcripts. A genome wide analysis in yeast has shown that mRNA stability is promoted by optimal codons with high tRNA abundance (Presnyak et al., Cell 2015). SAC genes contain non-optimal codons at high frequency which may help to explain their low noise or variability in protein expression. The purpose of this project is to determine if poor codon usage is an important factor for low noise and proper function of the SAC. We have introduced codon optimized SAC genes via CRISPR/Cas9 and will be experimentally analyzing them to determine if higher noise is observed in vivo.

*Mentor(s): Silke Hauf (Biological Sciences).*



**NICHOLAS C. FALLS**

ELECTRICAL ENGINEERING

**DERIK R. ARONE**

ELECTRICAL ENGINEERING

### ***Design and Development of a Cost-Effective Power Monitoring System for a Real-Time Water and Weather Monitoring System***

The Learning Enhanced Watershed Assessment System (LEWAS) is a real-time environmental monitoring system located on Virginia Tech that collects both weather and water quality and quantity data using different sensors and equipment. Both solar and grid power are currently being used to power the equipment. The Electrical team members initiated a project to design and build a circuit for power monitoring so that the electrical data can be recorded for monitoring power consumption and provide a resource for educational purposes. The team initially explored existing power monitoring devices and found out that they are either too expensive or not suited for the needs. The task then became creating a circuit that could monitor both voltages and currents while also reporting these values back to a Raspberry Pi so that they may be stored. Theory from DC/AC Electrical Circuit Analysis and Introduction to Microcontrollers, classes within the ECE department, was used to design and test the circuit. This circuit allows us to monitor power of the equipment without having to be physically present, which is very useful when going to the field site is impractical. It also provides ECE classes with a valuable educational resource that can be used in different classes. From this experience, the team was able to realize the challenges of real-world applications of circuit design, such as ground loops and integrating different circuit elements.

*Mentor(s): Vinod Lohani (ICTAS/Engineering Education).*



## SAM HPOOR

BIOCHEMISTRY

## NIKI C. ARMSTRONG

BIOLOGICAL SCIENCES: BIOMEDICAL OPTION

## SHIVANI V. IYERR

BIOLOGICAL SCIENCES

### ***The Importance of Teaching Young Children Good Dental Hygiene***

This project was designed in order to incorporate a more in-depth oral hygiene education in elementary schools. Since all members of our team are pre-dental students, we are conscious of and deeply dedicated to the issue and lack of awareness about proper dental hygiene. The importance of oral hygiene is crucial information children should be learning about. According to the American Dental Association, tooth decay is one of the most common chronic conditions of childhood in the United States of America. Left untreated, it could lead to problems with eating, speaking, playing, and learning. But tooth decay is preventable, and it starts with a greater knowledge about the subject. The plan for our project was to visit two elementary schools and give a 30 minute presentation with interactive worksheets and demonstrations to pique their interest and, following, a five question quiz to determine how much the elementary school students worked. We worked with the Pre-Dental Club at Virginia Tech to assist us in the creation as well as delivery of a presentation. They were our community partner and were very helpful and communicative throughout the planning, preparing, and execution of our project. We completed our goal of educating two elementary schools: Prices Fork Elementary and Harding Elementary. After our quiz it was determined that 69% of the students scored above a 80% on the post-quiz, indicating that they learned from this education event. Overall, we believe our project

*Mentor(s): Meghan Weyrens-Kuhn (Leadership) .*



**MELANIE P. FELDMAN**  
ENVIRONMENTAL HORTICULTURE

### ***Active Minds and Bodies: Improving Community Health with Horticulture at the Hale-YMCA Community Garden***

Horticultural therapy is a newly researched medical field involving the use of gardening activities as a therapeutic alternative for the elderly. It can aid in multiple aspects of geriatric care including cognitive abilities and an increase in the quality of life. The development of a horticultural therapy program at the Hale YMCA community garden can strengthen the Blacksburg community through intergenerational companionship and manageable physical activity for the elderly population. The goal of the project is to increase the well-being of our community on a personal and social level through engaging garden spaces. The community garden already has a diverse collective of gardeners and volunteers. This program will add another group to the collective and aid in increasing the health of the community. Activities are selected based on research and suggestions from the therapy group members. Three sessions will be conducted in the spring and impact will be assessed afterwards through dialogue and a written survey. The continuation of this project could include other members of the Blacksburg community such as school groups, special needs groups, or as part of another adult program. Collaborative teaching and experiential learning are addressed through the development of a curriculum with therapy activities. This is also a chance for participation in civic engagement during the therapy workday(s).

*Mentor(s): Susan Clark (Horticulture).*



**DARREN FELTS**

PSYCHOLOGY

**AUSTIN CUNNINGHAM**

PSYCHOLOGY

### ***Self-Motivation and Student Engagement: Factors that predict classroom participation***

At large universities, general education classes serve as a constant across majors and disciplines where students acquire information in lecture halls of several hundred students. In these highly structured environments, participation is often very limited. Given the highly beneficial impact on student learning of participation within the classroom, we examined participation as a function of class size in a previous study (submitted as a poster presentation for VABA). In this study, we addressed factors that potentially influence classroom participation beyond class size. More specifically, we designed a survey to explore various factors that might influence student engagement and class participation, including cognitive engagement and self-motivation. The Qualtrics survey took participants about an hour to complete. Some survey questions targeted such topics as: location in class where student sat, predicted final grade in course, and a self-report item for amount of participation. There are also items on the survey to identify students who display anti-participatory behaviors such as skipping class and leaving class early. In addition, the survey included established scales that measure self-motivation and perceived engagement. The results will indicate which of these factors will predict class participation, and provide information applicable to increasing student participation in large lecture classes. Results would be displayed at the conference.

*Mentor(s): Scott Geller (Psychology) .*



**DARREN FELTS**

PSYCHOLOGY

**AUSTIN CUNNINGHAM**

PSYCHOLOGY

### ***Naturalistic Observations of Participation in a Two Large Lecture Classes: Behavioral impact of class size***

Behavioral data on student participation in two large 75-minute lecture classes were obtained through naturalistic observation in an introductory psychology course. The impact of class size was of interest because we had the unique opportunity to study the same course in two classes of different sizes the same semester. One class had 196 students in a smaller lecture hall, while the other had 640 in a larger lecture hall. A behavioral-observation survey was created and distributed to undergraduate research students, accompanied by training and instructions to record any instance of student participation, along with the antecedent(s) and consequence(s) of each observed participative behavior. The researchers attended the lectures and situated themselves inconspicuously among other students in the class and recorded when students performed a behavior identified as “class participation”. Usually, more than one observer recorded participation simultaneously, thus enabling inter-rater reliability. Significantly more participation was recorded in the smaller class. Specifically, we observed participation over 11 weeks with 13 days per class. In the larger class, students participated on 175 occasions, with an average participation frequency per day of 13. In the smaller class, students participated on 209 occasions, with an average participation frequency per day of 16. In sum, much more participation was seen in the smaller class. Data collection is ongoing.

*Mentor(s): Scott Geller (Psychology) .*



**NEIL FESTE**

BIOCHEMISTRY

**PRERNA DAS**

HUMAN NUTRITION, FOODS, AND EXERCISE

**MARGARET A. EDDLETON**

BIOCHEMISTRY

### ***Parental Perspectives on Single and Combination Vaccine Formulations: A Pilot Study***

Research shows that many parents have concerns about vaccination. A common concern is too many vaccines at the same time. The media commonly reports on concerns about the combination MMR vaccine as a cause of vaccine hesitancy. Studies in the UK, however, show that the majority of parents prefer the combination MMR to its single components. Parental preferences for combination versus single vaccines have not been well studied, particularly in the United States. Combination vaccines allow for children to be vaccinated against more diseases with fewer doctor visits, fewer injections, and less pain. Although European studies indicate many parents prefer combination vaccines, some studies report that parents desire more choices in the vaccination process, particularly parents who follow non-standard approaches. Through a confidential online survey, we will determine parental preferences with respect to single versus combination vaccines within a specific community. We will identify if parents have concerns about combination vaccines, what specific combination vaccines parents are most concerned about, how concerns map onto vaccination status of their children, and whether availability of single vaccine formulations could impact children's vaccination status. This study has received IRB approval and data collection will begin shortly. We anticipate having preliminary results to present by the time of the conference.

*Mentor(s): Bernice Hausman (English) .*



JESSICA E. FITZPATRICK

WILDLIFE CONSERVATION

### ***Using Rapid Bio-assessment to Evaluate Stream Condition of the North Fork of the Roanoke River on the Hahn Farm Montgomery County, Virginia***

Streams located in agricultural watersheds often result in eroded stream banks and increased siltation when livestock access water. Two protocols are commonly used in Virginia to assess stream health: Rapid bio-assessment protocol (RBP) which studies habitat characteristics and the Virginia Stream Condition index (VSCI) which analyzes macroinvertebrate communities. A private landowner in Montgomery County, VA is planning to restore part of the North Fork of the Roanoke River on their property. The research objective was to apply RBP and VSCI to assess stream and ecological condition of the North Fork to serve as a baseline to evaluate restoration success. The river is split into the northern and southern section on the property. For sampling purposes, the river was divided into 27, 30 m reaches where RBP data and macroinvertebrate samples were collected. The southern section had a mean RBP score  $49.7 \pm 3.7$ . The northern section received a score of  $57.2 \pm 6.5$ . Conversely, the southern section had a VSCI score of  $74.9 \pm 5.4$ , which was higher than the northern section with a score of  $60.8 \pm 20.9$ . This is likely due to the extensive cattle access to water and low water crossing found in the northern section, which slows water movement resulting in increased siltation which harms pollution intolerant macroinvertebrates. The good habitat score in the North suggests that exclusion of cattle and removal of the low water crossing would result in quick recovery of the macroinvertebrates.

*Mentor(s): Verl Emrick (Conservation Management Institute).*



**JOSH H. FOELSCH**

MECHANICAL ENGINEERING

**SHIVA R. CHALLA**

BIOLOGICAL SYSTEMS ENGINEERING

**KATIE C. LEDWELL**

POULTRY AND ANIMAL SCIENCES

**DUNCAN A. SIMS**

NANOSCIENCE

### ***Interdisciplinary Research on Automated Agriculture Systems***

The purpose of this project is twofold: firstly, to automate the care of plant test subjects and data collection on said subjects using the 3-axis gantry FarmBot system; secondly, to enrich the middle school learning experience by intertwining it with collegiate research. The ultimate goal of the FarmBot is to automate agricultural processes on a mass scale, thereby optimizing food production in response to an increasing world population and depletion of natural resources.

*Mentor(s): John Wells (Education Curriculum and Instruction).*



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**NATHAN G. FOX**

ENGINEERING

**TIM BURNETTE**

BUSINESS

**JONATHAN HADERER**

BUSINESS INFORMATION TECHNOLOGY

**RACHEL OSBORNE**

BUSINESS INFORMATION TECHNOLOGY

**NATHAN CHURCH**

ENGINEERING

***Achieving Campus Sustainability through Active and Passive Involvement***

Our team was given the task of thinking of a way to spark change in the community with an influential project during Earth Week and creating a simple way to conserve energy on a regular basis. We hope to effectively achieve the full potential of the long-term impact possible with our simple, cost efficient activities. Our goal as a team is achieving sustainable student actions through two different types of engagement. The energy stickers are directed toward behavior change through passive engagement, and the service based tree planting is directed toward active student engagement. Collaborating with us on the project is the Virginia Tech Office of Sustainability, the Virginia Tech Electric Service, and our overarching organization, the Residential Leadership Community. We will be measuring the effectiveness of these projects in two different ways, one is quantitative through measuring energy use, and one is qualitative through recording students' experiences volunteering. Virginia Tech has expressed a goal of lowering University emissions and engaging students in creating a sustainable community. Our efforts are very basic, however, the idea to for the projects to facilitate future movements that further promote the movement towards sustainability and overall awareness to promote a better future. Any movement starts with a small step and we consider this essentially a push in the right direction, in hopes that it will inspire better habits or different ways of thinking.

*Mentor(s): Karlee Siepierski (Sustainability) .*



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**H. FRESCHI**

FINANCE

**PATRICK SALMONS**

ASPECT

**KARL C. KRULL**

POLITICAL SCIENCE

**DARA FINLEY**

POLITICAL SCIENCE

### ***Vibrant Civil Society and Strong Economic Growth***

The primary objective of this research is to provide an understanding of the relationship between economic growth and civil society, and the necessity of this relationship in order for foreign direct investment and economic development to occur. Is it possible to have strong economic growth in states lacking a healthy civil society? This literature review examines the governments of Tunisia and Turkey in depth, and provides groundwork for understanding the direct link between civil society and economic growth within the Middle East. One of the main tenets of this report is to provide evidence that civil society and economic development are symbiotic, which it does with the cases of Tunisia and Turkey. Ultimately, the research examined in this paper illustrates that within the Middle East there are several unstable regimes that provide an ideal case study for how civil society and economic development are connected and why it is important to support the citizens within the country in order for economic development to continue. The paper concludes if China and Indonesia continue their current trajectory, they may fall victim to corruption limiting the foreign investment, and staggering their economic growth and political development further.

*Mentor(s): Christopher Price (Political Science); Patrick Salmons (ASPECT).*



**LAUREN A. FRYE**

MICROBIOLOGY

**RYAN A. SALAZAR**

CHEMICAL ENGINEERING

## ***The Binding of Ubiquitin to Phafin2 and its Role in Autophagy***

The main goal of this project is to confirm and expand upon the idea that Ubiquitin binds to the PH domain of the Phafin2 protein, which means it may play a role in autophagy. By confirming the idea that Ubiquitin binds to Phafin2; a whole new branch of protein research could be created having to do with autophagy. Autophagy is the degradation process that helps to maintain balance and health within organisms over a long period of time. Further research into this phenomenon may also provide insight into how proteins other than Phafin2 could play a role in degradation and homeostasis within the body. The processes used in this experimental procedure include, protein purification, gel electrophoresis, FPLC and SPR techniques. The anticipated results of this experiment is that Ubiquitin does indeed bind to Phafin2 and thus plays an important role in cellular processes, which may include autophagy.

*Mentor(s): Daniel Capelluto (Biological Sciences) .*



**KAITLIN M. GARRETSON**  
DAIRY SCIENCE

### ***Colostrum and Calf Health***

My independent research looks at the concentration of IgG and Lactoferrin concentrations in colostrum, transition milk and blood of dairy cattle. My purpose is to see how these critical immune components are transferred from the mother to the calf. By looking at the concentration difference in the colostrum and then the transition milk we can make educated assumptions about the transfer of these influential immune components. I will be using ELISA tests to measure the concentration of each of these components in colostrum, transition milk and blood serum. Using a plate reader, I can then create a standard curve to find the absorbance and then determine the concentration of my IgG and Lactoferrin in my samples. Looking at this transfer in cows and then understanding how it works can have many applications to humans such as the improvement of infant health. While I am still in the process of performing this experiment I am predicting that the concentrations of Lactoferrin and IgG will decrease as the mother's milk moves from colostrum to transition milk as she imparts these essential immune functions to her calf.

*Mentor(s): Katherine Knowlton (Dairy Science); Chrissy Teets (Diary Science).*



## MEGHAN E. GARRITY

AGRICULTURAL, LEADERSHIP AND COMMUNITY EDUCATION

### ***Sprouting Independent Volunteers: Building capacity of volunteers at the Hale YMCA Community Garden***

The Hale YMCA Community Garden is located in Blacksburg, VA. Part of the garden's mission is to incorporate volunteerism as a means of education and outreach. Sprouting Independent Volunteers's goal is to streamline the management of the garden's annual ~1000 volunteer hours by creating a resource handbook for inclusion in the Hale YMCA Community Garden manual. The volunteer handbook includes volunteer activities, a log book, directions and information on volunteer opportunities. One page activity explanations are simple, accessible and simplified for individual volunteer work. Ultimately, the handbook better educates and informs the volunteers and aligns volunteer and garden expectations. To create the handbook, the garden needed to collect directory steps, consolidate garden itineraries, and review handbook drafts. Specific to the CAFS minor, the project relates directly to Civic Engagement and Democratic Participation between the university and the community garden. Within the period of one academic semester, in culmination with previous experience, the handbook was completed. In the end of the project, activity directions and feedback from volunteer groups proved useful for volunteer management. Overall, the volunteer handbook serves the ongoing volunteer activities at the community garden, potentially optimizing the use of volunteers' skills and time. Future CAFS students can build on this framework, or further develop volunteer management practices within the garden.

*Mentor(s): Susan Clark (Horticulture); Jenny Schwanke (CAFS Liason, Blacksburg YMCA).*



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**SIERRA GARRITY**

BIOLOGICAL SCIENCES

**ISABELLA GIRARDI**

BUSINESS INFORMATION TECHNOLOGY

**LEYAO HUANG**

HUMAN DEVELOPMENT

**ALEXANDRA MORRISSETT**

ANIMAL AND POULTRY SCIENCES

**JULIA SEXTON**

ENVIRONMENTAL POLICY AND PLANNING

***Residence Hall Recycling Initiative***

Our presentation aims to explore creative methods that will engage students who live in on-campus residences to recycle more often and to recycle the correct materials. As members of the Residential Leadership Community, we are committed to improving the community we live in, and our project was specifically designed to focus on creating a sustainable community. We decided to focus on recycling in the dorms, beginning with a pilot program in Payne Hall. With initial data collection from residents in Payne Hall, we learned that a number of residents in the community don't participate in recycling, some of which weren't even provided recycling bins for their rooms. Our team is in the process of collecting the recycling in our dorm every week to see if the amount of rooms participating in recycling increases. Another part of our pilot program is providing recycling bins to the rooms who do not have them and adding bins to common rooms and study lounges. Using a poster presentation format, our team will demonstrate the plan and results of our recycling praxis project. We will showcase the journey and planning that started the beginning of the Fall 2017 Semester and has led all the way up to the projects implementation in March of the Spring 2018 semester. Using statistics from door-to-door surveys, we will exhibit the effect our program had on the volume of recycling in our community. We will also demonstrate the feedback we received from our community on whether or not our initiative positively impacted them and made them more willing to recycle. We hope that the success of this project will influence others to organize similar programs in other dorms on campus.

*Mentor(s): Karlee Siepierski (Sustainability)*



**NICOLE M. GEIS**

INTERNATIONAL RELATIONS

**KAREEM YOUSEF**

ECONOMICS SCIENCE

**KELSEA MENSH**

SPANISH

**NALA CHEHADE**

INTERNATIONAL STUDIES

**SOPHIA CAMPOS**

POLITICAL SCIENCE

### ***Diplomacy Lab - Avoiding a Gaza War***

The goals of this Diplomacy Lab were to incorporate research and discussion towards the construction of a final policy memo to present to the US Department of State with our advice of how to prevent a war in Gaza. The purpose of this diplomacy lab was to advise the State Department on the research conducted and present what methods could be attempted via government intervention, grassroots movements to provide a better life for the people of Gaza, targeting the increase in mental health availability, education, and medical care. As well as research conducted on the policies of Israel in this situation, and ways those could be adjusted to increase living conditions and solidify human rights. The methods we used were weekly research assignments that were used to stimulate group discussion and participation towards creating and finalizing a piece of foreign policy. Each student was also assigned a region to bring a news article in weekly for, and to relate it to the Gaza Strip and our overall mission. Towards the end a policy memo was due weekly on the research for the week to practice proper memo writing and clarity on the issues at hand. The end result of this project was a foreign policy memo with the attached research from the semester, with the anticipation that the State Department will look into what tools we recommended could be useful for promoting peace and stability in that region.

*Mentor(s): Chris Price (Political Science); Allison Hernandez.*



**ALEXANDRA GIBSON**  
BIOLOGICAL SYSTEMS ENGINEERING

### ***Cell Delivery Using Crosslinked Kerating Biomaterials***

Keratin is a multi-purpose, naturally occurring biomolecule displaying biocompatibility and tunable hydrogel properties. Biomaterials in the form of keratin microparticles are multifunctional, employing advantageous size and material properties, making them an attractive option for cell delivery to aid in wound healing. The purpose of this project was to investigate the growth, adhesion, maintenance of stemness and general compatibility of Bone Marrow-derived Stem Cells (BMSCs) attached to keratin microparticles with the goal of developing a cell-loaded biomaterial construct to aid in wound healing and tissue regeneration. Analyses showed the integration of cells and microparticles in a suspension culture system. Control samples, consisting of commonly employed collagen-coated microparticles, were similarly tested to provide a comparison. Compatibility testing was comprised of viability assessments of integrated cells at multiple time points after integration. Definitive cellular adhesion to microparticles, a critical factor in successful cell delivery, was validated via immuno-fluorescent staining, which depicted the formation of a complex actin cytoskeleton within the cells and the presence of focal adhesion proteins at the cell-to-biomaterial interface. The conservation of cell “stemness” in the absence of exogenous differentiation signals was confirmed using flow cytometric analyses for a number of external and internal cellular markers.

*Mentor(s): Mark Van Dyke (Biomedical Engineering and Mechanics).*



**JAY H. GILLENWATER**  
ENVIRONMENTAL SCIENCE

### ***Development of molecular markers for marker assisted soybean breeding***

We have been working to develop molecular markers associated with low trypsin content in soybeans. The presence of trypsin in soybeans severely reduces its nutritional capacity when used as animal feed, leading to a lower quality, higher cost feed for farmers. We believe the development of molecular markers will allow for an expedited breeding process for soybean breeders and the eventual production of a cheaper and more nutritional feed for farmers.

*Mentor(s): Bo Zhang (Crop and Soil Environmental Sciences) .*



**AARON J. GIUFFRE**  
ELECTRICAL ENGINEERING

### ***Manufacture of Pancreas Extracellular Matrix Gels for Islet Cell Implantation***

Diabetes is a disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood and urine. One method of rectifying this abnormality is the implantation of insulin producing Islet cells into the fatty tissue of diabetic patients to make up for nonfunctional Islet cells within the patient's pancreas. The overarching goal of this research is to assist in the successful delivery and survival of the transplanted cells. To date, we have developed a method to coat small clusters of Islet cells with polyethylene glycol to avoid negative immunological response. After addressing the body's measures to get rid of potentially harmful foreign bodies, we focused on altering the delivery environment to improve the likelihood of cell survival. Extracellular matrix contains many signaling molecules that are necessary for cell growth and survival. It is the goal of this research to develop a method for extracting the associated extracellular matrix proteins from powdered porcine pancreas. Previously established methods incur too much damage to the signaling molecules, so work has been done to assess the efficacy of more gentle, alternative processes for degradation and extraction. The final process should be able to produce usable quantities of pancreas extracellular matrix powder that can form hydrogels for subsequent integration with the polyethylene glycol coating.

*Mentor(s): Mark Van Dyke (Biomedical Engineering and Sciences); Marc Thompson (Biomedical Engineering and Sciences).*



**ALLISON GONLEY** ANIMAL AND POULTRY SCIENCE  
**WILLIAM LAM** HUMAN NUTRITION, FOODS, AND EXERCISE  
**EMMA LIPSCOMB** ENVIRONMENTAL SCIENCE  
**KAITLYN MOISE** BIOLOGICAL SCIENCES  
**ANNA SCHLEMMER** ENVIRONMENTAL SCIENCE  
**MATTHEW SCRUM** BIOLOGICAL SCIENCES  
**ANISHA SHRESTHA** BIOLOGICAL SCIENCES  
**CHRISTA VENTURA** NEUROSCIENCE

### ***Education beyond the Classroom: Collaborative Creation of Kidney Anatomical Model***

This project was created as part of the Curie and Da Vinci First Year Experience course, which provides students with a unique opportunity to apply lessons learned in class to collaborative, hands-on work in a residential makerspace. Students worked collaboratively to create an anatomical model of the kidney and its role in the urine flow. The students started from scratch to organize, plan, and execute the project through the use of prior skills and knowledge, while also using adaptive skills to use new technology as the project developed over the course of the semester. The awareness involved with working as a group project enabled students to better understand the importance behind team based work, as it developed leadership and communication skills that can further support experiences in post educational work. In addition, students used knowledge learned in a variety of classes to apply an integrated understanding of science to complete the project. This process better developed their abilities to use both facts and communication skills from the classroom to a real world scenario. Students were inspired by online diagrams of the kidney, but worked together to redesign the diagrams to fit required project parameters. The project experience helped students to develop interpersonal, planning, leadership, research, and presentation skills, along with a model of the kidney and its role in the urine flow.

*Mentor(s): Lori Blanc (Biological Sciences; Curie & Da Vinci LLC).*



**MADISON L. GONZALEZ**  
ANIMAL AND POULTRY SCIENCES

### ***Growth Factors Influence Cell Cycle Progression in Equine Satellite Cells***

The goal of this project was to find the factor responsible for activation of equine satellite cells. Satellite cells, also known as muscle stem cells, contribute to repair of skeletal muscle following a damaging event, such as exercise. Normally in a state of quiescence, damage of the surrounding muscle causes satellite cell activation and subsequent entry into the cell cycle. We wanted to investigate this with the hopes to speed up post-race recovery time for racehorses. We treated equine satellite cells with growth factors EGF, FGF2, IGF1, IGF2 and IL6 at time points of 24, 48 and 72 hours. S-phase was identified by inclusion of EdU, a thymidine analog during the final 2 hours in treatment. We calculated the number of EdU positive cells over the total nuclei. We also did a myogenicity assay and looked at the number of Pax7 and myogenin positive cells over time. So far we have found that HGF has a significant effect on the number of EdU positive cells at 72h.

*Mentor(s): Sally Johnson (Animal and Poultry Sciences); Amanda Brandt (Animal and Poultry Sciences).*



**ROBERT C. GONZALEZ**  
BUILDING CONSTRUCTION

***The process of selecting an optimal solar panel system for the dynamic weather conditions in Dubai; An ICTAS-Supported Project***

Utilizing data from Virginia Tech's 2018 Solar Decathlon team, this case study analyzes the process of selecting an optimal solar panel system for the dynamic weather conditions in Dubai. By definition, net-zero energy homes must generate as much energy as they consume. Photovoltaic (PV) panels are an established technology for decentralized renewable energy generation at the residential scale. To further push PV panel innovation and commercialization, the Solar Decathlon pits teams against each other in an competition to optimize market ready PV systems. This case study will highlight the differences between modeled optimization and in-practice optimization.

*Mentor(s): Freddy Paige (Civil and Environmental Engineering).*



REBECCA A. GOOD  
LANDSCAPE ARCHITECTURE

### ***Kowloon Park Edge (a study of Opportunities for Public Space in Hong Kong)***

The project is a study of public space in Hong Kong using the site of the Eastern edge of Kowloon Park to investigate opportunities for public space within a local context of the city. The goal of the project is to develop an understanding of the unique context of Hong Kong, specific population groups and daily life rhythms, and their social and spatial implications for the design of public space, and to propose a set of public spaces within the Eastern edge of Kowloon Park. The purpose of the study is to better understand the value of studying public space and public life, and the opportunities of considering implications of a specific context in the field of landscape architecture. Analysis began with observations of public space use in Hong Kong, and then included a set of studies of “maids day off” and the physical characteristics of space allowing for this unique weekly rhythm of appropriation in the city, quality criteria of public spaces, needs of populations, and the structure of Kowloon Park, which resulted in a set of objectives for creating the spaces within the park edge site. The design process was worked on through a study model of the site, and iterative drawings for understanding the opportunities of specific spaces proposed. Anticipated results are a design vocabulary of the physical elements that offer opportunity for the appropriation of space, and a proposed set of public spaces for the Eastern edge of Kowloon Park along Nathan Road.

*Mentor(s): Cermetrius Bohannon (Landscape Architecture); Brian Katen (Landscape Architecture).*



**MICHAELA L. GOSTING**

HUMAN DEVELOPMENT

**LEAH J. HAN**

HUMAN DEVELOPMENT

### ***Service Learning: Head Start Program***

Head Start is a government funded program that assists at risk and low-income children and their families at the local level by providing childcare and early education. As volunteers at our local Head Start, we assist teachers in the classroom and build ongoing relationships with the children. We engage with the children in a play-based environment. This includes initiating open ended conversations that foster critical thinking and build vocabulary, playing and dancing to music, and teaching daily skills. Examples of these skills are promoting smart dietary decisions and learning the importance of brushing their teeth daily. The children eat a healthy breakfast at Head Start every morning to model what a balanced diet should look like, and then they follow breakfast by practicing the techniques of thoroughly brushing their teeth. In addition to teaching practical skills, our presence at the facility exposes the children to diverse ideas and backgrounds and presents potential future goals such as college and careers. As Virginia Tech students, we are able to introduce to them the benefits of continuing schooling and are able to act as role models. Early education is an important aspect of childhood development and prepares students for entry into elementary school. Through our service, we have and are still currently gaining first-hand experience relating to our major and potential future careers, as well as insight into our local community.

*Mentor(s): Matthew Komelski (Human Development); Mary Nedela (Human Development).*



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## FOFI. T GOULETAS

NANOSCIENCE

### *A Life of Service*

To support the community around me, and the world at large. To express the impact that volunteerism has had on my life. A method I used would be going out into the community and helping various organizations and institutions. As a result of completing all of this community service I feel more down to earth and I have realized that my life would be incomplete without service in it.

*Mentor(s): Amanda Macdonald (University Libraries).*



## BRENNAN D. GREENE

ENGINEERING

### ***Research Portfolium Presentation***

This project is put together as a research portfolio through the website, Portfolium. This project presents works from my senior year of high school as well as my freshman year of college. The major work being presented was from an internship in my senior year of high school. This work was an engineering design project where i was tasked with designing a sit-stand desk for a company named TMEIC. The desk was designed in Inventor and shows the full function of the desk as it would function in real life. The goal of the project was to create a low priced sit-stand desk that the company could manufacture in house and sell to clients. The company was not able to provide funding for the project.

*Mentor(s): Kayla McNabb (University Libraries).*



**JOSHUA F. GRIMSHAW**  
ENGINEERING

### ***My Eportfolio***

This presentation covers some of the work I have done my first year at Virginia Tech. It specifically covers a lot of the work I have done in my English class and how it has changed my views on my college experience.

*Mentor(s): Kyla McNabb (University Libraries) .*



**DAVID W. GRUHN**

UNIVERSITY STUDIES

**DEVIN FINNEGAN**

FINANCE

**DYLAN DOHERTY**

FINANCE

**JACOB BARKHOUSER**

FINANCE

### ***Hokies Against Hunger***

For our project, our aim is to raise awareness of hunger in the Blacksburg area. We will be holding a food drive in Payne Hall to reach out to students on Virginia Tech campus. We will incentivize students to participate by hosting a pizza party for the hall in Payne that contributes the most to our project. Similarly, we will be holding a food drive outside Kroger to interact with the local community. Our main objective is to collect as much food and useful items as possible for the Blacksburg Interfaith Food Pantry. Secondly, our aim is to raise awareness of hunger and spread our goals to others in the Blacksburg area. Our poster presentation will give listeners a strong background on our project as a whole. We plan on bringing in some of the food drive items to give people a hands on experience of the types of donations we received. Also, we will have a powerpoint scrolling through pictures of us throughout the duration of the project. Then, our poster will include some statistics on the Blacksburg Interfaith Food Pantry, food drive, and hunger as whole. Through this presentation, we hope to bring more attention to the Blacksburg Interfaith Food Pantry and the organization's goal. We feel that this project is important because Virginia Tech is a thriving institution that brings Blacksburg to life, yet some people in the local community go hungry each night. We feel that as students here in Blacksburg we can give back to the community through helping out the food pantry.

*Mentor(s): Mallory Foutch (Residential Leadership Community).*



**TASHI T. GYATSO**

POLITICAL SCIENCE

**ROBERT J. HANSON**

POLITICAL SCIENCE

**KATHRYN E. HAMPTON**

INTERNATIONAL STUDIES

**HANNAH R. PLEDGER**

NATIONAL SECURITY & FOREIGN AFFAIRS

**STEPHANIE LEMUS-ORTIZ**

INTERNATIONAL STUDIES

**MICHAEL Q. SIBILO**

BIOLOGICAL SCIENCES

### ***Diplomacy Lab: Evaluating India's Role in the Budapest Convention on Cybercrime***

The Diplomacy Lab program is a partnership between the US Department of State and various Universities throughout the country by which students develop research projects to be presented to and ultimately utilized by various departments or offices within the DoS. Our team was tasked with developing an independent assessment of the costs and benefits that India would face should they ascend to the Budapest Convention on Cybercrime, an international statement of cooperation in cybercrime prevention and response. Working alongside staffers at the US Embassy in New Delhi, our efforts will include perspectives from the Indian state and federal government as well as other stakeholders such as the United States. Our final project will be submitted to our contacts with the US Embassy in India to be used in their efforts to promote cooperation and communication with the Indian government in the realm of cybercrime.

*Mentor(s): Yannis Stivachtis (International Studies).*



**MADLINE R.**

ANIMAL AND POULTRY SCIENCES

### ***High School and Undergraduate Research Portfolio***

The purpose of this presentation is to create a research portfolio of a variety of works completed from high school through the first year as a Virginia Tech student. It displays the range of skills developed through these various projects and experiences.

*Mentor(s): Kayla McNabb (University Libraries).*



**JASON W. HADLEY**

POLITICAL SCIENCE

**ADAM D. GOLUB**

FINANCE

**MARY E. KENZAKOWSKI**

BIOCHEMISTRY

**BRYNN V. FREEMAN**

UNDECIDED

**HANNAH J. HAGAN**

HUMAN DEVELOPMENT

**JORDAN G. GILARDI**

**JORDAN G. LAIL**

### ***Paving the way for Higher Education in the New River Valley***

Through our project we hope to inspire the kids in the Boys and Girls club of the New River Valley to seriously consider higher education as an option post-highschool. The purpose of this project is to give kids the opportunity to experience college life firsthand. We plan to give them a tour of campus and play fun recreational activities on the drill field. We anticipate that they will leave knowing that Virginia Tech is a viable option if they work hard and excel in school.

*Mentor(s): Perry Martin (Leadership and Social Change) .*



## MARISSA C. HAHN

ENVIRONMENTAL RESOURCE MANAGEMENT

### ***Using camera trapping to assess distribution and diversity of Meso-mammals on the Hahn Farm Montgomery County, Virginia***

Camera trap studies have been successfully used in locations all around the world as a non-invasive technique for surveying meso-mammal species. The Hahn Farm, a private property near Blacksburg, Virginia, is a mosaic of forestland and open fields providing an ideal location to investigate camera trapping on a diverse rural farm. Thus, the overall research objective was to determine the distribution and diversity of meso-mammals on the Hahn farm using remote camera traps. We allocated 26 survey sites distributed among major land cover types on the property: non-forest/edge, forest interior, and riparian of water. Six camera traps were used and moved systematically across the landscape every two weeks from June 26th to August 22nd 2017 to maximize capture events. Frequency of species was calculated as capture events per 100 trap nights (events/100TN) and was determined for total captures and at individual survey sites. Overall, the highest frequency of species occurrence among all survey sites was white-tailed deer at 45.55/100 TN, and the lowest was the American mink and bobcat, both with a frequency of .28/100 TN. The habitat with the highest species richness for all species was riparian areas. The highest mean frequency of meso-mammals among all habitats occurred in the mixed-deciduous forest interior. Overall, the frequency and diversity of meso-mammals at the Hahn farm represented all of the common and some of the uncommon species found in the Southern Appalachians.

*Mentor(s): Verl Emrick (Conservation Management Institute).*



**THOMAS N. HALE**  
POLITICAL SCIENCE

### ***United States Af-Pak Strategy: Implications for Indo-Pakistani Conflict & Regional Stability***

This project seeks to understand the various “Af-Pak” strategies which have diverged from original conception under the Bush era to Obama and now the current Trump administration. In a global world, changes in our strategy have direct implications for the Indo-Pakistani conflict and rivalry. To better articulate and explain the plausible implications of the new strategy, this project will incorporate a historical and theoretical approach to assess how these regional actors have used Afghanistan as a major proxy for their rivalry and conflict, and the overlap of the war on terrorism that the United States has waged for seventeen years and counting. This holistic approach will assess how the new administration’s “Af-Pak” strategy will transform relations and security in the region. Implications of strategy failure in the region could have dire consequences between India and Pakistan such as conventional escalation, ethno-religious conflict, counter-terrorism, and nuclear escalation. Major setbacks in foreign relations between Pakistan and the United States will lead way to major power balance changes which could impact the influence of the United States in South Asia and prolong the war efforts in Afghanistan. Through a comprehensive assessment, policy decisions, foreign relation objectives, and conflict resolutions can better be planned and implemented in the region between India, Pakistan, and Afghanistan.

*Mentor(s): Yannis Stivachtis (International Studies).*



**THOMAS N. HALE**  
POLITICAL SCIENCE

### ***CVE Strategies and Youth Radicalization in Universities: Pakistan***

Militancy on university campuses in Pakistan is quickly becoming Pakistan's next major counter-terrorism challenge. The growing and dominant youth population in Pakistan is the future to the countries stability and success in the region. This project follows the United States Countering Violent Extremism (CVE) strategies and how they can be used to help promote youth development and counter-radicalization efforts. Through bilateral and local university efforts, the future of the Pakistani youth can be secured. This project lays out the various external and internal variables which promote or hinder successful policies, while suggesting youth programs and strategies to counter these issues and create a change on university campuses. Through studying statistics on Pakistani youth and government counter-terrorism policies, better strategies can be suggested and proposed. Looking at historical data, previous programs, and failed strategies can also shed light on the correct paths to take within the country. Working with the universities and local community members will allow for successful programs to be created which promote anti-radicalization narratives and a positive outlook on Pakistan's future in the region.

*Mentor(s): Allison Miller (Public and International Affairs) .*



JENNIFER M. HALL

BUSINESS MANAGEMENT

TRILBY R. BROWN

MARKETING

LEAH C. GLISSON

PSYCHOLOGY

KELLY N. WIEGAND

HISTORY

AASEN E. LAURA

PSYCHOLOGY

### ***Extreme Makeover: Radford Highschool Classroom Edition***

We hope to present our experience of working with Radford High School to remodel one of their classrooms. This venture was part of an experiential learning project in which our group sought to further the UN sustainability goal of Quality education. This sustainability goal strives to promote lifelong learning around the globe. As undergraduate students, this goal seems large and daunting. However, this project is a way in which we can help our immediate community in reaching the goal. Change always begins in your community. We are in the process of assisting Ms. Maria Grecco, one of the history teachers at Radford, in reorganizing her classroom. Currently, she has a traditionally structured classroom (rows of desks) with thirty students in regular attendance. Ms. Grecco felt that her classroom did not create an atmosphere that invited students to engage in learning. After discussion and research, we redesigned a classroom. We will be exchanging some desks for tables and couches to promote group work and conversation. As of yet, the project is still in progress. We hope that our work will result in the creation of a more inviting atmosphere in which students will be encouraged to appreciate and enjoy learning. Our presentation will serve as an example of how students can initiate momentum towards change through working directly with their local community, no matter how big or small their contribution is.

*Mentor(s): Lisa Moyer (Exploring Citizen Leadership).*

**CANDACE A. HARTWICK**

METEORLOGY

**PARKER S. HIGGINS**

GENERAL ENGINEERING

**ASHELY N. YANEGO**

AGRICULTURE AND LIFE SCIENCES

**NATHAN M. MCDONALD**

AGRIBUSINESS

**LUCIA A. PASTORE**

COGNITIVE AND BEHAVIOR NEUROSCIENCE

**DANA K. WERLICH**

INDUSTRIAL DESIGN

***HydroponTech***

The overall goal of our project is to make a connection with the future of agriculture through demonstrating and promoting sustainable and alternative methods of farming practices. The purpose of this project is to inspire the next generation to be passionate about suitability and how together can make agricultural itself a sustainable practice. Another goal is to incorporate the UN Sustainability goals and help to accomplish these locally. To accomplish this my group and I have designed a student friendly hydroponic system. We plan to bring the materials for the system to James River High School and help to enable the students there to build the system and begin growing produce through it. We also plan to write and leave lesson plans for these students so that they will hopefully be able to incorporate the system into their own curriculum and teach the elementary and middle school students, inspiring the use of the system in the future. The results we anticipate to occur is that the students will be able to build the system with our instruction and begin growing produce that will be able to be incorporated in the whole school with activities such as a salad bar made with lettuce grown from the hydroponic system. Another anticipated result is that as the high school students become more comfortable and passionate about the system they will be able to teach the younger students about it as well and inspire them to be passionate about agriculture.

*Mentor(s): Tim Miller (Sustainability, Mountain Castle Soil and Conservation District); Perry Martin (Agriculture, Leadership and Community).*

FIRST YEAR  
EXPERIENCE



GENERAL  
EDUCATION



OTHER  
EXPERIENCES



**MADI L. HAUN**  
ARCHITECTURE

### ***Madi Haun - First Year at Virginia Tech***

This is a presentation on the projects focused around design that I have completed throughout my first year here at Virginia Tech. The projects range from drafted drawings to handmade models.



**NASH A. HEMRAJANI**  
GENERAL ENGINEERING

### ***Payback of Sustainable Technologies Utilized in FutureHAUS Dubai: An ICTAS-Supported Project***

There is a need for a better understanding of the lifecycle economic value of sustainable housing components to aid in the home building, purchasing, and insuring processes. This case study attempts to solve the issue of which technologies can be integrated so that it balances sustainability and affordability. This single instrumental case study, utilizes the traditional economic theory of payback periods to analyze the cost effectiveness of sustainable technologies implemented in the development of the FutureHAUS Dubai Solar Decathlon home. This analysis compares efficiency based on location and considers the tradeoffs between Dubai and Blacksburg Virginia with findings of the studying being able to fit to any location. Research from previous studies, data from Blacksburg, and civil engineers from Dubai are used to gather data placed on cash-flow diagrams which show how the change of costs over time and is essential in determining payback period. Key contextual factors influencing the economic value, i.e. time, resource availability, and market contexts are identified and highlighted to increase the transferability of this study.

*Mentor(s): Frederick Paige (Civil and Environmental Engineering).*



**JULIA S. HILL**  
BIOLOGICAL SCIENCES

### ***Julia Hill's ePortfolio***

My ePortfolio is a place where employers, teachers, and peers can learn about me. Artifacts that are relevant to my major, future aspirations, and some of my quirks were added to my ePortfolio. This research portfolio represents my work from high school through my freshman year of college.

*Mentor(s): Kayla McNabb (University Libraries); Amanda MacDonald (University Libraries).*



**ROBERT HODGES** ASPECT POLITICAL SCIENCE

**CAROLINE FOUNTAIN** GEOGRAPHY/INT. STUDIES

**ANISA GAMBLE** HUMAN NUTRITION, FOODS, AND EXERCISE

**EMMA MORRIS** POLITICAL SCIENCE

**SPENCER MACLAY** POLITICAL SCIENCE

**CONOR CROTTY** INTERNATIONAL STUDIES

**CONNOR INGALSBY** INTERNATIONAL STUDIES

**RACHAEL DAWSON** POLITICAL SCIENCE

**LINDSEY LOZOSKI**

### ***Creating disengagement/defection from revolutionary/ militia groups***

This project was conducted to ascertain the possibility and actions necessary to create disengagement and/or defection from revolutionary and/or militia groups. The purpose of this project was to establish a research foundation for the US State Department as to provide shareable policy with governments around the globe. The rise of revolutionary or militia groups leads to prolonged conflict within a state. These conflicts range from local to state to regional actions that effect thousands, and possibly millions, of civilians. The US State Department was curious as to possibilities of dissolving anti-government military movements without military engagement. To promote this concept, research was conducted as to what avenues of opportunity the US State Department could offer suggestions towards changing the minds of those set on governmental overthrow. The use of families, counter ideologies, truth in purpose, and eliminating resource flows were investigated. This research was a purely qualitative endeavor that illuminated reasons for the rise of revolutionary and militia groups, their recruitment tactics and population that joined, and the interior plus exterior avenues for money and supplies. The project provided a detailed report with substantiating research on how to counter revolutionary and militia organizations of varying styles, ideologies, and region. The US State Department is filing this report for future analysis.

*Mentor(s): Chris Price (Political Science).*



## CASEY L. HOFF

ENVIRONMENTAL HORTICULTURE

### ***Seeding Explorers: Expanding Educational Opportunities at the Hale-YMCA Community Garden***

The Seeding Explorers project expands the Hale-Y Garden use as an educational workspace for Blacksburg community children grades K-4. The project goal is to enhance the space where experiential structured garden-based education occurs. Nature-based education creates a sense of place and ownership, fostering a connection between children and nature that can greatly benefit the health of the community's youth. The completed project will encourage young minds to explore and learn in the garden. Research has shown that the lack of time outside contributes to issues such as childhood obesity and children's dislike of the outdoors that contact with nature "may be as important to children as good nutrition and adequate sleep" (Rosenow 2008). Online resources such as the Edible SchoolYard will support garden based curriculum that utilizes inquiry-based learning strategies and hands-on experience providing children the opportunity to explore the garden. This project emphasized collaborative teaching and experiential learning by using a place-based education model to "create a learning space that educates and inspires." Through these educational methods the project aims to promote healthy people and communities' cornerstone by providing opportunities to connect children (and their parents) to their food system in creative and exciting ways.

*Mentor(s): Susan Clark (Horticulture); Jenny Schwanke (Virginia Tech YMCA Garden Coordinator).*



## BROGAN E. HOLCOMBE

ANIMAL & POULTRY SCIENCE

### *Co-Existence Ecology of Large Predators within Belize*

Jaguars, pumas, and ocelots are the main large predators within Belize that co-exist together and compete for resources. This study focused on determining if occurrence and/or detection of smaller predators (ocelots and pumas) is influenced by larger, more dominant predators (jaguars). Additionally, within this study we examined the influence of habitat-type and species sex on co-existence ecology utilizing data collected from non-invasive trail cameras in Belize in 2016. We formatted raw photo data into “capture histories” for three target species at each camera station across four study sites, and used co-occurrence modeling in program PRESENCE to calculate interactions. Data analysis is currently on-going, but from the first of four study sites we have found that detection rates between jaguars and pumas and pumas and ocelots have a strong positive co-detection. The detection rate between sexes within species had variable results. For jaguars both sexes had lower detection at sites with the opposite sex, which is not what we expected for males. For pumas, results were mixed with two models showing male detection increased with females present, while two other models showed the opposite. Ocelots interactions matched our expectations, with male detection increasing when females present and female detection decreasing when males present. We expect our results to provide insight into how competing species coexist and how sex within species influences these interactions.

*Mentor(s): Marcella Kelly (Fish & Wildlife Conservation); Ben Augustine (Fish & Wildlife Conservation) and Christopher Rowe (Fish & Wildlife Conservation).*



## KALEY D. HOLLOWAY

HUMAN NUTRITION, FOODS, AND EXERCISE

## DELANEY C. BEATTIE

NATURAL RESOURCES CONSERVATION

### *VT Engage in Peru*

In summer of 2017, a group of 11 students, two student leaders, and one faculty member traveled to Peru on a three-week service-immersion trip. The first week was spent in the Peruvian Amazon working with the Alliance for Research and Conservation in the Amazon (ARCAmazon). Here, the service consisted of activities to aid in the development of the Las Piedras Amazon Center, as well as a day of work at a nearby cacao farm. The second week took place in and around the city of Cusco and was focused on learning about Andean culture. The group visited Incan ruins, including Machu Picchu, and had lectures on healthcare, education, and culture in Peru. The group traveled to Markuray, a rural village in the Andes that can only be reached by foot, for the last leg of the trip. Llipin Yahuar focuses on empowering women and children in high Andean communities. Here, VT Engage helped construct a water reservoir to improve quality of water in the community. The purpose of this trip was to learn about the distinct social issues affecting different locations in Peru through service work. In the Amazon, the group learned about the difficulty of finding a balance between human livelihood and nature. In the Andes, we saw how complicated the relationship between culture and development can be.

*Mentor(s): Eliza Wethey (Division of Student Affairs).*



## JONATHAN G. HOLLOWAY

PSYCHOLOGY

### *The Tracy Chapman Project*

This installation represents the collective efforts of students enrolled in the Spring 2018 Black Aesthetics course to bring Tracy Chapman to our classroom to share insights about her experiences as a Black artist working in spaces that are not typically recognized as “Black”. Tracy Chapman is a singer-songwriter best known for her 1988 hit song “Fast Car”. Chapman exemplifies a tradition of Black political artistic expression but her particular style, acoustic-alternative folk, is not usually associated with Black expression. The installation documents the class’ efforts to bring Chapman to class (possibly in person but more likely via skype), including: the origin of the project, initial brain-storming sessions, and a series of sustained activities. The Tracy Chapman Project was not initially part of the course design, it emerged organically through class discussion. Accordingly, the installation features a collection of scrap paper notes that represent the longstanding tradition of notes passed between students during class time. Such notes represent a form of student agency and class-room dialogue that exists outside of the formal curriculum. We do not know if we will be successful in bringing Tracy Chapman to our class. As an exercise in problem-based experiential learning (how do we get Tracy Chapman to come to class?), the pursuit of the goal is as important as the ultimate outcome. Nevertheless, we hope to be successful.

*Mentor(s): Anthony Kwame Harrison (Sociology) .*



## WILLIAM L. HOM

GENERAL ENGINEERING

### ***Will Hom- Seeking Knowledge and Adventure by Engaging with the World Around Me***

The goal of this project is to showcase my development as a student, learner, Engineer, and human being. I have used artifacts from high school through my first year here at Virginia Tech to create a Portfolium ePortfolio. It conveys to colleagues, instructors, mentors, and potential employers my interests and aptitude in the classroom and other relevant settings. To enhance my ePortfolio, I've taken time to reflect upon the most significant artifacts to date, which demonstrates my understanding of where I've been and how I intend to grow in the future. The selection of artifacts, ranging from International Affairs to General Engineering, reflects my aspiration to become a VT-shaped student-not only fluent in my chosen profession, but conscious of how other fields that intersect with my own. So far, I've collected and analyzed over a dozen artifacts that reflect my maturation in and out of the classroom over the past several years. I hope that I get this opportunity to share with others the progress I've made, and where I intend to go from here.

*Mentor(s): Kayla McNabb (University Libraries), Gary Downey.*



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## LAUREN V. HUGHES

HUMAN DEVELOPMENT

### *Self-Discovery through Extended Orientation*

The goals of my project are to show how extended orientation programming helps students be successful in their first year in higher education. The purpose of this is to outline the contributions that Hokie Camp has made to Virginia Tech and how it is guiding students to live by the aspirations for student learning, principles of community, and motto of the university. The creative aspects of this project will include personal testimonials, growth and statistics over time, and orientation data from other universities. The results will show the positive impacts on retention and student success that extended orientation provides to first year and transfer students.



**KATHLEEN E. HUIE**  
BIOLOGICAL SCIENCES

### ***Tumor Microenvironment Changes Following H-FIRE Suggest Suitable Treatment for Triple Negative Breast Cancer***

Breast cancer is among the most common malignancies affecting women in the US. Triple Negative Breast Cancer (TNBC) accounts for about 20% of all breast cancer cases, and is more difficult to treat due to lack of efficacy of targeted therapies that are successful for other subtypes. A novel form of ablation therapy has recently been developed, termed high frequency irreversible electroporation (H-FIRE). H-FIRE is a non-thermal focal technique that is thought to destabilize the cell membrane and nucleus of cancer cells, inducing cell death. The goal of this study was to determine underlying cellular mediators and influences of the tumor microenvironment following application of H-FIRE to 4T1 TNBC tumors in vivo. The effects of H-FIRE were assessed by tumor size, end of study tumor burden, histopathology, and expression of over 150 genes from the tumor microenvironment. In vivo, we have observed that H-FIRE is capable of ablating the primary tumor and metastatic burden. Here, we report that H-FIRE has the capacity to reduce the ability of the tumor to escape immune recognition in TNBC, and is due to the upregulation of genes associated with cancer inflammation and immune system activation. These changes in gene expression in the tumor microenvironment are dependent on both H-FIRE dosage and responder status. We are able to conclude that H-FIRE may work to stimulate the immune system to unmask immunosuppressive tumors, and future work will determine the specific mechanism.

*Mentor(s): Irving Coy Allen (Biomedical Sciences and Pathobiology).*



AMELIA R. HULSHULT  
LANDSCAPE ARCHITECTURE

### ***Revitalizing Bluefield, Virginia: An Asset Based Community Design Approach***

The project, “Revitalizing Bluefield, Virginia; An Asset Based Community Design Approach,” explores an emerging process to community planning and design using a combination research and analytical methods; community capital assessments, and asset-based-community-design. Exploring the application in Bluefield, VA, engagement methods included flyers, interviews, surveys, and a series of community meetings to discover the essence of Bluefield, hear local stories, and to discuss the downtown revitalization planning. As an undergraduate student my goals for the project included, learning and exploring ways of implementation of these the methods, design to revitalize downtown Bluefield by maximizing its resources, utilizing assets, to build capital, ultimately assisting in the community’s sustainability, and lastly to mobilize the community’s capacity by successfully engaging with the community through various methods. The project is currently in progress, as there is another community meeting set up to discuss design. The anticipated deliverable is to offer a final visionary design of the downtown to the community that encompasses the input they have shared with me through this community engaged design process.

*Mentor(s): CL Bohannon (Landscape Architecture).*



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**CHELSEA A. INFANTE**

COGNITIVE AND BEHAVIORAL NEUROSCIENCE

**KAREN S. BUYNAC**

HUMAN, NUTRITION, FOODS, AND EXERCISE

**SANA AHMAD**

ECONOMICS

**SARAH S. PAK**

ANIMAL AND POULTRY SCIENCE

**LAUREN N. PETERS**

PSYCHOLOGY

**JORDAN N. JENSON**

FASHION MERCHANDISING AND DESIGN

***It's On Us***

Most Virginia Tech students are unaware that the Women's Center provides students, faculty, and staff free counseling, educational programs and events that raise awareness of women's issues. The Women's Center's mission is to promote a Virginia Tech community that is safe, equitable, and supportive for women and that celebrates the experiences, achievements and diversity. In partnership with Virginia Tech's Women's Center, our group plans to implement an It's On Us pledge drive by going door to door in Payne Hall and/or other dorms. We intend to help end sexual assault on campus. While spreading awareness of the Women's Center, our goal is to spark a conversation about gender-based violence and change the culture around sexual assault at Virginia Tech. As students it is our responsibility to step up to end the stigma around sexual assault and realize that the conversation changes with us. Our group aims to encourage students to play a role in gender-based violence prevention by creating a culture of safety, equality, and respect on campus. As students take a pledge, we plan to give them cards about the Women's Center, so they know where they can go for help or information regarding gender-based violence. The outcome of our project is to survey and evaluate if students became more familiarized with the Women's Center and gained a more proactive mentality about sexual assault.

*Mentor(s): Mallory Foutch (Women's Center).*



**CHUNG T. JASON**

BIOLOGICAL SCIENCES

**RACHEL Z. CAMPBELL**

MICROBIOLOGY

**RACHEL E. SZYMANSKI**

ANIMAL AND POULTRY SCIENCES

**JACK STAPLES**

WATER RESOURCES POLICY AND MANAGEMENT

**NICK A. DILORENZO**

ENVIRONMENTAL POLICY AND PLANNING

**YUDIAN WU**

CHEMISTRY

**MATTHEW WILFORD**

COMPUTER SCIENCE

### ***Social Outreach to Youth in Giles County Focused on Positive Development***

As community oriented students at Virginia Tech, when we were made aware of the Focus project in Giles county we saw tremendous potential to address the community's needs. Our outreach project endeavors to connect with at-risk youth in low income communities in order to create positive attitudes toward college, and to inspire the students about the prospect of college and how it can be the right option for them. In order to accomplish these goals, we had a series of four activities. We started by having a "Fun Friday" and got to know these students from Giles with icebreakers and an ice cream social. In addition, we took them on a tour around Payne Hall in order to introduce them to different dorm styles and college living. For our next activity day, we along with many other VT clubs, plan to participate in the Giles County "Ramps and Roads" project. This project aims to engage the kids with the nearby community in their county-wide cleanup day. Another day we will take the kids on a hike of the cascades, and show them one of the major scenic areas that Tech offers. Although, this hike is tremendously popular for its natural beauty we believe that it provides a good opportunity encourage environmental awareness and elicit a sense of community. Through these activities, we hope to create lasting impressions on the students that also foster positive relationships. As students only a few years older than our focus group we hope to reach out as peers and provide mentoring.

*Mentor(s): Jennie Layton-Dudding (Giles COOP Extension).*



## DANIELLE E. JEFFERS

MULTIMEDIA JOURNALISM

### *Student Entrepreneurship*

Student entrepreneurship is a learning experience that requires a student or group of students to build a revenue-generating entity. As a freshman at Virginia Tech, I took my first step into the world of student entrepreneurship by founding Dough 4 Degrees, LLC. Dough 4 Degrees is a scholarship coaching company that teaches students how to earn scholarships to go to college and graduate debt-free. I founded the company after earning over \$100,000 in scholarships in five months as a high school senior. To date, we have helped more than 50 students and their families earn over \$160,000 in scholarships. The company has developed to serve students all across the United States with the help of supportive individuals and organizations. Key opportunities to test assumptions and projected outcomes as a student entrepreneur include conferences, workshops, mastermind groups, and on-campus student clubs. As a student entrepreneur, my problem-solving skills and communication strategies have developed tremendously through this out-of-the-classroom experience. This opportunity forced me to create functioning solutions in the midst of ambiguity and doubt. This year, Dough 4 Degrees is raising funds to build the Dough 4 Degrees app that will impact every student's college funding experience. The goal is for more students to earn scholarships, eliminate loans, and explore life as debt-free students and debt-free college graduates.

*Mentor(s): Howard Haines (Apex Center for Innovation and Entrepreneurship).*



## JORDAN N. JENSON

FASHION MERCHANDISING & DESIGN

### *Freshman Year Undergraduate Portfolio*

The goal of this portfolio is to showcase my work that I have done at the end of my high school career and into my freshman year of college. It shows my hands on experience through past jobs and projects, while showing what it is like for me to pursue a degree in a creative field.

*Mentor(s): Kayla McNabb (University Libraries).*



## WILLIAM H. JOHNSON

ART - THEATER

### *Life as a KIND soul*

The goals of my project include re-understanding of our community and the struggles that unfortunate people may have in the Christiansburg/Radford/Blacksburg Area. How do you afford food? How do you pay increasing electric bills? How can you afford Health Insurance if you work in the Restaurant Industry? (for example). I would like to start an organization dedicated to my mother Pam Johnson. She passed away last year of ALS. She was a physical education teacher in Farmville, Va for 35+ years and the second she retired she felt ill. Insurance (in all facets of life) is the number one thing I look for when I am interviewing for jobs. If my mother did not happen to have insurance, how would we pay hospital bills? With the increasing costs associated with medical care these days, very few people can afford good health insurance. I know I can't. I am currently uncovered when it comes to my health. Our Class - Social Entrepreneurship - MGT 3074 will be working on a large scale project that I am unsure where it will take us, but I am excited and unsure where it may lead us. I am sure we will use all sorts of experiential/creative/analytical research methods along the way. My group was just formed over the weekend. Our Target City is Boulder, CO. I anticipate getting the PAMFoundation up and running by the Summer of 2018.

*Mentor(s): Lisa Fournier (Business) .*



**CAMILLA E. JOHNSON**  
CHEMICAL ENGINEERING

### ***The use of cornhusk for engineering the microstructure of cobalt to improve its magnetic hardness***

The goal of this research is to engineer the microstructure of cobalt through the use of cornhusk, a waste material, to improve cobalt's magnetic hardness. Hard magnets are desired for their ability to attain and hold onto applied magnetic forces. The best hard magnets are cobalt-based and are usually alloyed with scarce and expensive rare earth metals to assist in altering physical properties to achieve desired behaviors for various applications. Microstructural engineering leading to an increase in mechanical hardness does improve the magnetic hardness of a magnet. Powder processing techniques including mechanical alloying (MA) are used in the synthesis of this material, and spark plasma sintering (SPS) is used. The cornhusk carbonizes during sintering and some of the carbon dissolves in the cobalt and the rest refines the macrostructure. Results from magnetic measurements, X-ray analysis, density measurements microscopy, and mechanical hardness will be discussed.

*Mentor(s): Alex Aning (Materials Science and Engineering).*



## SYDNEY N. JONES

ACCOUNTING AND INFORMATION SYSTEMS

### *My Portfolio*

My goal with this project is to collectively display artifacts and accomplishments from high school through my first year here at Virginia Tech in an ePortfolio. The compilation is a resource available to those who are interested in my work.

*Mentor(s): Kayla McNabb (University Libraries).*



**TREVOR W. JONES**  
COMPUTER SCIENCE

### ***Design and Development of a Virtual Reality Application Showcasing LEWAS Environmental Monitoring Lab***

The Learning Enhanced Watershed Assessment System (LEWAS) is a real-time environmental monitoring system located at Virginia Tech that collects weather quality and water quality and quantity data using different sensors and equipment. In order to represent and showcase the LEWAS stream monitoring site and enhance information representation, the virtual reality (VR) team initiated a project to develop a virtual environment for research and educational purposes. This presentation will demonstrate how VR has allowed LEWAS to better present data and information. Representations such as 3D graphs supplemented with interaction create an effective way to communicate the findings. In addition, this presentation will highlight the opportunity of hands-on experience for an undergraduate researcher. I will present the major steps in designing and development of a virtual environment. Learning 3D game engine software, in this case 3D Unity, combined with virtual reality plugins from Google has allowed me to experiment with the technology. Experimentation even gave me the ability to learn and make assumptions about how the backend systems were working. This understanding of the system then allowed me to implement changes that were necessary for achieving the effects we wanted to see within the application. Working with the LEWAS team has allowed me to work with motivated students, research new technology, and expand my horizons about other projects involving computer science.

*Mentor(s): Vinod Lohani (ICTAS/Engineering Education) .*



**LEILA KAMAREDDINE**  
BIOLOGICAL SYSTEMS ENGINEERING

### ***Limb Symmetry in Control and ACL Reconstruction Subjects***

Stop jumps tasks are often used in the field of biomechanics to investigate kinetic and kinematic in both healthy and pathologic subjects. During data collection, the subject decides which limb to take-off of before landing on the force plates for each trial. However, current research does not dictate whether the take-off limb should be dictated or controlled for when analyzing such tasks. Therefore, the purpose of this independent study was to investigate whether limb symmetry during a stop jump landing would be affected by the take-off limb. Previously collected force plate data from 25 control subjects and 61 ACL reconstruction subjects was included in this study. Subjects were split into 3 groups: those who consistently jumped off of their dominant limb (Group 1), those who consistently jumped off of their non-dominant limb (Group 2), and those who switched between jumping off of their dominant and non-dominant limb during consecutive stop jump trials (Group 3). A limb symmetry index (LSI) was calculated for peak knee flexion angle (pKFA) and vertical ground reaction force (vGRF) for the subjects in Group 3. No difference in pKFA or vGRF symmetry was found based on take-off limb, indicating that limb symmetry during landing is not affected by the push-off limb. Based on this data, take-off limb does not need to be dictated during kinetic and kinematic data collection and take-off limb does not need to be accounted for during data analysis.

*Mentor(s): Robin Queen (Biomedical Engineering and Mechanics).*



ANNIE KARTA  
FINANCE

### ***Innovate Living Learning Community for Entrepreneurs***

A panel discussion of student entrepreneurs and their experiences as a part of the Innovate Living Learning Community and the Apex Center for Entrepreneurs.

*Mentor(s): Howard Haines (Management).*



**CONOR KELLY**  
BIOCHEMISTRY

### ***Differences Between the Structures of Amyloidogenic and Non-amyloidogenic Islet Amyloid Polypeptide (IAPP) Variants***

The goals of this project are to find quantitative differences between the structures of amyloidogenic and non-amyloidogenic IAPP. The purpose of this project is to find structural differences between amyloidogenic and non-amyloidogenic IAPP variants that could lead to insight into new therapies for degenerative diseases, specifically Type 2 Diabetes and Alzheimer's. Molecular Dynamic simulations were run with Gromacs (Gromos 53A6 force field). Quantitative analysis was performed on output files. This analysis includes H-bond analysis, secondary structure percentage and solvent available surface-area analysis. RMSD and RMSF plots were generated using QT Grace and cluster images were generated using PyMol. 6 different species' dominant IAPP variant was tested in 150mM and 0mM salt concentration to observe any differences related to the dielectric constant of the environment. Each of the 12 variants in solution had 3 replicates (or trials) and data was taken from each replicate. We have seen differences in how amyloidogenic and non-amyloidogenic strands behave in the different solutions. Non-amyloidogenic strands tend to be more compact in solution with a higher dielectric constant. This could be related to why they are less prone to interact and aggregate into the toxic oligomer species. Amyloid oligomer species have been found to be the toxic agent in Type 2 Diabetes and Alzheimer's disease. We expect to find more after a closer analysis of the clusters.

*Mentor(s): Anne Brown (Biochemistry); David Bevan (Biochemistry), Nikki Lewis (Biochemistry).*



**TREY KING**

ARCHITECTURE

**ELYSE SMITH**

ARCHITECTURE

**DOMINICK VALENTI**

ARCHITECTURE

**KATIE WALDNER**

ARCHITECTURE

### ***2017 Architecture Fall Travel Program***

An almost semester-long journey through Europe exposes students to some of the most important works of architecture, both historical and contemporary. The journey for many architecture students is their first in-depth-encounter with the actual substance, namely space, buildings, and exemplary urban environments. While under the protection of the university in Blacksburg, learning tools consist of drawing, model making, and simulations, accompanied by thousands of projected images which aim to relay the multi-dimensionality of architecture. Yet, the experiential learning on site, with the real artifact is an irreplaceable expansion of the base-knowledge acquired in Blacksburg. It allows students to develop an expertise that connects the abstract representation of architecture in plan, section or photograph with the three-dimensional reality. The presence in the space shapes the perceptive capacities and upon return turns into much more informed development tool for research at the home base. The presentation introduces a series of experiential learning research conclusions, with a few selected sketches, drawings, and photographs, offering the tip of an iceberg of a volume of material acquired during their journey. The immense physical and experiential collection serves as a continuous reservoir for architectural inspiration far beyond graduation.

*Mentor(s): Heinrich Schnoedt (Architecture).*



**SARAH E. KIVIMAKI**

BIOLOGICAL SCIENCES

**EVAN S. LITTLETON**

BIOLOGICAL SCIENCES

### ***Molecular Basis of Phosphatidylinositol 5-Phosphate by the Endosomal Adaptor Protein TOM***

Evan Littleton<sup>1</sup>, Sarah Kivimaki<sup>1</sup>, Wen Xiong<sup>1</sup>, Anne Brown<sup>2</sup>, and Daniel G. S. Capelluto<sup>1</sup> - <sup>1</sup>Protein Signaling Domains Laboratory, Department of Biological Sciences, Biocomplexity Institute, Virginia Tech, Blacksburg VA, <sup>2</sup>University Libraries Department, Virginia Tech, Blacksburg VA. In eukaryotes, Tom1 is a protein involved in trafficking of proteins (cargo) through the early endosomes for their degradation. During bacterial infection, Tom1 is recruited to signaling endosomes, rather than early endosomes, leading to a delay of the maturation of early endosomes and halting the protein degradation pathway. This occurs because bacteria produce phosphatidylinositol 5-phosphate (PI5P) in the host cell, increasing the intracellular levels of PI5P about ~200-fold. It is proposed that, in order to keep the host cell alive, bacteria cause this increase in PI5P to prevent the degradation of Tom1-mediate host proteins required for bacterial survival. Tom1 possesses a N-terminal VHS domain followed by a central GAT domain. Nuclear magnetic resonance (NMR) data revealed that Tom1 VHS interacts with PI(5)P following a fast-exchange regime, involving residues located at the C-terminus of the protein. The NMR data was further confirmed from molecular dynamic simulations of PI5P binding to Tom1 VHS. Utilizing the software suite GROMACS and the Charmm36 force field, simulations were run for 300 ns in triplicate, with the lipid positioned on a groove of Tom1 VHS, involving residues located on helices 6 and 8 in all replicates. Mutagenesis data on Tom1 VHS further defined the PI(5)P b

*Mentor(s): Daniel Capelluto (Biological Sciences/Biocomplexity Institute).*



## LEA M. KOEHLER

BUSINESS INFORMATION TECHNOLOGY

### *Perspectives around the World*

Through the social justice themed Austin Michelle Cloyd Honors Odyssey Fellowship and a spring break study abroad service trip in Belize with the Pamplin College of Business, different issues and opportunities arose to learn a new perspective and start understanding the world outside of one's own original opinions and perspectives. A deeper understanding of what travel and service work actually makes a positive difference was realized. Methods of approaching this were through a combination of technology and human interaction - and the importance of using both was realized. The importance of expanding one's perspective and immersing oneself in worldwide issues was proven vital and a key component of growth and learning. Life-long lessons were learned that can be implemented in business and everyday life to approach a world full of complex problems and opportunities. Come and learn a new perspective by exploring this presentation!

*Mentor(s): Lance Matheson (Business Information Technology), Robert Stephens (History).*



**CARRIE KROEHLER**

CENTER FOR COMMUNICATING SCIENCE

**ELLEN GARCIA**

BIOLOGY

### *Learning to Listen and Listening to Learn*

In this workshop, participants will tune up their listening, communicating, and empathizing skills by engaging in improvisational exercises and games from the theatre arts. Facilitators will provide information about TA 2404 (Introduction to Applied Collaborative Techniques, or I-ACT) and about the Center for Communicating Science. Please join us for some fun and playful learning!



**WILLIAM M. KYLE**

NATURAL RESOURCES CONSERVATION

**REAGAN N. MEYERS**

NEUROSCIENCE

**MARY K. LEEPER**

PSYCHOLOGY

### ***Fundraising Mentorship for Radford Students***

We wish to document our year long project of achieving the UN Sustainability Goal of quality education. We will explain how we went about to assist Radford High School students and their fundraising efforts for a school trip to Europe. We will discuss why we are helping these students and will explain how we did not raise the money for them, but instead gave them the resources and knowledge to earn this money on their own. Our presentation will tell of how we worked with these students, and the outcomes of our work with them this past semester. We gave the students advice and mentorship on how to earn money, and we want to be able to show the various techniques and skills used for the fundraising effort.

*Mentor(s): Lisa Moyer (Engineering Education).*



**ALEX JONES**

POLITICAL SCIENCE

**MCDONALD MEGHAN**

POLITICAL SCIENCE

**BOCHNA ALLIE**

POLITICAL SCIENCE

**KATIE STUMP**

APPLIED ECONOMIC MANAGEMENT

### ***Hokies on the Hill Undergraduate Internship Program***

The Virginia Tech Hokies on the Hill (HOH) Undergraduate Internship Program provides students with an opportunity to work on Capitol Hill, learn firsthand about the U.S. Congress and politics, and gain real-world experience in the nation's capital -- all while earning credit for a full-time course load. During the panel discussion, previous HOH interns will speak about their internship experiences and discuss how the opportunity helped shape their educational experience at Virginia Tech and potential career paths. Interested students are encouraged to attend the panel to learn more about the program and ask questions about working and living on Capitol Hill.

*Mentor(s): D'Elia Chandler (Government Relations).*



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**JULIANNA L. JONES**

GENERAL ENGINEERING

**DARBY S. GARNER**

INTERNATIONAL STUDIES

**DAVID A. CAMPOS**

GENERAL ENGINEERING

**KAYLEE N. CANALES**

BIOCHEMISTRY

**ALEXIA ESTRADA**

HUMAN DEVELOPMENT

**EMME P. SEALE**

BUSINESS MANAGEMENT

***Today a Reader, Tomorrow a Leader***

According to data from the National Center for Education Statistics, “nearly 10 percent of adults 16 years and older in Montgomery County are functionally illiterate”. As a part of the UN Sustainability goals, Quality Education has been recognized as an area to improve. This includes “ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all”. Our experiential learning experience allowed us to take local action in response to a global issue. In particular, we have found that we can make an impact by working with a local preschool program. This organization is doing great things to prepare young children for a lifetime of successful educational experiences. We have chosen to further the mission of Head Start by dedicating our time to an experiential experience. At Head Start, we have taken action by developing a reading program in addition to fostering a relationship between college and pre-school students. Reading discovers new things and develops the mind. In addition, we have helped to cultivate Head Start’s mission to promote bilingual households. We have donated bilingual books and created labels in several different languages that are placed around the classroom. We have applied our understanding of the lack of quality education in America, and ultimately around the world. We strive to promote the issue surrounding quality education while developing local solutions to make even a small impact in response to a global issue.

*Mentor(s): Meghan Weyrens Kuhn (Leadership Education Collaborative) .*



## COLIN J. LAGATOR

COMPUTATIONAL MODELING AND DATA ANALYTICS

### ***A Meta Analysis of Censorship's Effects on Well Being***

Determine the effects censorship has on the well being of individuals in certain countries. Compare the effects of censorship between the countries selected. This project aimed to shed light on the importance of self and artistic expression in relation to the well being of individuals. It is hoped that more research will be conducted to bring the detrimental effects of censorship to the attention of those who create it. This project used meta-analysis to pursue its goals. Assumptions were made about the effects of censorship, countries with trends of censorship were selected, and data analysis of multiple metrics was used to tie censorship to well being. It was concluded that when the evidence of censorship in a country is low and the support of art is high, individuals' experience greater well being. It was also concluded that further research is required of each country to further clarify results. Additional factors are suggested for further research, these include economic systems, political systems, and religious practices.

*Mentor(s): Stephanie Lewis (Honors College).*



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## JORDAN C. LAW

POLITICAL SCIENCE

### ***My Portfolium***

My goal is to highlight my experiences throughout my freshman year at Virginia Tech. I will be presenting my Portfolium portfolio through artifacts that I have curated throughout my first two semesters in Blacksburg, VA.

*Mentor(s): Kayla B. McNabb (University Libraries).*



VINCENT V. LE  
COMPUTER SCIENCE

### ***OMNI-NGS-Simulator: A web-based suite of tools to simulate NGS data***

With the advancement of Next Generation Sequencing (NGS) technology, computational tools are being developed enormously to process a large amount of data and decipher the underlying biological information. This development of computational tools has raised the need for benchmarking and assessment. Although validation using real data is essential, the assessment can be hindered because (1) the “ground truth” of different genomic features such as the mutational landscape is not completely known and (2) the real data may not be publicly available due to donor privacy. As an alternative, simulated data allows the user to generate the desired amount of data with the predefined setting and under controlled scenarios, thus making it suitable for the assessment. While numerous simulators are currently available, they are very diverse in functionality, parameter settings, and input methods. With the objective of assisting researchers to select an appropriate simulator according to their need, in this paper, we propose OMNI-NGS-Simulator, an all-in-one tool that houses widely used NGS simulators for human genome and metagenome. This web-based user-friendly tool provides the user with an interactive decision tree to select the best suitable simulator according to their need. It also lets the advanced users change the parameters to better reflect their use case. In addition, it performs validation of the generated data to guarantee its quality.

*Mentor(s): Liqing Zhang (Computer Science); Xiaowei Wu (Statistics).*



**JONG WON LEE**

BIOLOGICAL SCIENCE

**EMILY WILLS**

NEUROSCIENCE

**KELLY CORSANO**

PSYCHOLOGY

### ***Right hemisphere specific stress recovery and sex differences***

To observe possible sex difference on how fast can general college population male and female recover from the stress that is specifically targetting right hemisphere. The purpose is to observe and think critically about the concept of sex differences and gender. We used cold pressor test on the left hand to create a lightly stressful state on Virginia Tech male and female student. We used Ruff Figural Fluency test to observe the cognitive function change and Heart rate variability to observe. Contrary to our original hypothesis, the stressor we used wasn't strong enough to cause a decrease in figural cognitive ability but was strong enough to increase the figural cognitive ability. Still, the experiment is ongoing and further examination is necessary.

*Mentor(s): Kelly Harrison (Psychology) .*



**EDWARD J. LIU**  
COMPUTER SCIENCE

### ***Computer science and Android Development***

The goal of the projects included in the ePortfolio is to acquire and demonstrate the knowledge gained to implement new functions and abilities within the Android Integrated Developing Environment for a mobile application. From connecting to the internet, to parsing a JSON data file, the projects have a purpose of demonstrating my steadily increasing ability to develop more advanced Android applications. These projects are all from an online course I was accepted into as a Google-Udacity scholar provided by a partnership between Google and Udacity. The results of all these projects are a final, executable application with features that can be demonstrated on my mobile device.

*Mentor(s): Kayla McNabb (University Libraries).*



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**IRA LONG**

POLITICAL SCIENCE

### ***Dean's Semester: A Plan to Decrease Campus Plastic Use***

The problem of plastic pollution in the world's oceans is increasing and could, among other concerns, have a toxic effect on the world's food chain. Our Dean's Semester study abroad group developed a plan to combat plastic waste on our Blacksburg campus, which would provide Virginia Tech with a promising opportunity to help achieve its existing sustainability goals. We examined the principles of economics and the leading causes of plastic waste. We propose three measures involving the use of plastic in campus dining halls and plastic disposal for Virginia Tech to implement. This will reduce the campus plastic footprint and layout a framework for possible future initiatives to further curb campus plastic use. We propose that the university continue to distribute reusable Ozzi to-go containers for incoming students to encourage alternatives to single use plastic utensils. Additionally, we urge the university to partner with a sponsor such as Nalgene, Camelbak, or S'well to provide each incoming class with customizable water bottles to incentivize alternatives to single-use water cups. Finally, we support raising the price of single-use water cups from 10 cents to 75 cents to further disincentivize the use of single-use water cups. We believe these measures will lead to a significant decrease of plastic use on campus. The measures proposed are achievable and require modest investments for potentially worthwhile long-term benefits.



## CHRIS J. LOWER

APPLIED AGRICULTURE MANAGEMENT

## BRADLEY A. COLE

APPLIED AGRICULTURE MANAGEMENT

### ***Pasture renovation and interaction with Giles County Land Lab***

The purpose of our research is to improve the overall nutrition and pasture performance at the Giles County Land Lab. Because of the nature of the Land Lab, and the students involved we have also had the chance to share our knowledge and experiences as we progress with the next generation interested in agriculture. We began our project by conducting a soil test to check for nutrient deficiencies. While taking our samples we identified the weeds found in our pasture and researched how to combat them. We applied pesticides to control the nuisance species before winter, with great success. After the weeds began to break down we realized the need to fill these bare spots. We decided to frost seed both a ladino, and red clover into our pasture to add variety, fixate nitrogen, and add more dry matter intake while helping to manage fescue toxicosis. We have plans to apply lime this spring once the co-op has time to help meet the requirements of our soil report. Although this is an ongoing project and we will not see the true benefit of our time until our clover germinates, we have seen some pasture improvements. After applying pesticides, we were able to eradicate almost all of our weed species while not affecting our grasses. As we keep managing pasture height through grazing intensity and timing we expect for our clover species to flourish and add the largest improvement to our pasture.

*Mentor(s): Wesley (AT).*



**SEAN P. LOWNEY**

COMPUTATIONAL AND SYSTEMS NEUROSCIENCE

**CHRIS B. LEE**

CLINICAL NEUROSCIENCE

### ***Insights into Amyloidogenicity: Molecular Dynamics Simulations of Amyloid In Varying Environments***

Alzheimer's Disease (AD) is a neurodegenerative disease characterized by a buildup of cytotoxic Amyloid Beta ( $A\beta$ ) proteins that aggregate to form plaques in the brain. It has been hypothesized that the  $A\beta$  peptides produced in AD patients are the primary molecular species behind cytotoxic fibrillization and subsequent apoptosis. As such, understanding the mechanisms responsible for the pathogenesis and progression of AD is key to developing treatments for AD patients. The goal of this project is to gain insight into membrane-molecule interactions that may be responsible for this cytotoxicity. Atomistic molecular dynamics (MD) simulations were utilized to assess the effect that oligomerization of  $A\beta$  monomers has on a membrane environment. These simulations tested the aggregation of four  $A\beta$  monomers into a tetramer with and without a model raft membrane present. The stability of the aggregated tetramer was also considered and assessed using steered MD and subsequent umbrella sampling and data analysis. The resulting tetramers are expected to display different structural conformations based on the presence of the membrane. Early data analysis shows greater aggregation near the model membrane than near the other monomers. As such, the presence of the a membrane appears to affect the aggregation tendency of  $A\beta$ . This experiment provides insight into a primary causal factor behind the pathology

*Mentor(s): Anne Brown (Biochemistry).*



## JAKOB A. LYONS

GENERAL ENGINEERING

### *Portfolium ePortfolio Showcase*

I will be presenting a research portfolio documenting my artifacts/works/accomplishments from the end of high school through my first year of college at Virginia Tech. Examples of my artifacts include group and individual research projects, term papers/essays, and description of my internship at the Naval Surface Warfare Center, Dahlgren Division.

*Mentor(s): Kayla McNabb (University Libraries).*



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**ANKIT MALHOTRA**

COMPUTER ENGINEERING

**AHMAD AZRAAI ROSLLY**

CHEMICAL ENGINEERING

**AKSHAY NARAYAN**

MECHANICAL ENGINEERING

***Energy Blast Off***

Our project is to demonstrate the effects off different energy sources on the height traveled by a model rocket. The purpose of this project is to possibly integrate to commercial lower atmospheric rocket launches. This will help save a lot of energy and money and also be as environmentally friendly as possible. We are using the standard scientific methods; researching, designing, manufacturing, and testing. It is possible that we found a better energy source but we are still testing other energy resources. The overall goal is to develop a environmental friendly practical energy source for rockets.



SEAN MALLOY

PHYSICS

ANTONIO DE CECCO

ENGINEERING

### ***Investigation of Water Withdrawal and Glacial Isostatic Adjustment on Land Subsidence in the Hampton Roads Region***

Here, we investigate land subsidence drivers in the Hampton Roads region. As sea levels rise, there is an increasing risk to the built environment as most of the region sits less than 12 feet above the current sea level. The Hampton Roads area is experiencing larger relative sea level rise rates compared to other points along the East Coast of the United States. This difference is thought to be caused by increased subsidence from local compaction and glacial isostatic adjustment (GIA). This local subsidence is largely caused by water withdrawal by two local paper mills, but the extent is not well defined. To investigate the effects of water withdrawal, we compiled existing absolute vertical velocity data determined from Global Positioning System (GPS) observations. We then remove an estimated  $-2.4$  mm/yr of GIA signal to evaluate surface motions due to compaction based on an existing model. Our study finds possible land subsidence due to compaction centered on Newport News, but is limited by a lack of data. To fill in the gaps in the data, we installed and measured, for the first time, two GPS campaign sites in Hampton, Virginia. These GPS sites will be remeasured over the course of several years to allow for more accurate mapping of subsidence rates in the Hampton Roads area. The subsidence maps produced from this future work could be of critical importance for area leaders as they plan and prepare for the effects of sea level rise on their communities

*Mentor(s): D. Sarah Stamps (Geosciences); William Moore (Atmospheric and Planetary Sciences, Hampton University).*



## RONALD G. MANIECE II

PUBLIC RELATIONS COMMUNICATIONS

### *Opportunities in Understanding*

Spring 2017, I created a 25-page proposal of an informative social diversity program, to be implemented at the beginning of the Fall 2018 semester. Throughout my time creating the class I met with many faculty, staff and various historically minoritized community student organizations. The class was created to remedy an issue I see on campus and experience every day. The majority of dominant population, at VT, I argue is uneducated on the problems that minorities, who aren't in a similar position of privilege, face. The majority of students here aren't required to take courses on privilege, race, or class before they get here and because of that I feel as though there is a divide between the students who understand common problems faced by historically minoritized communities and those who don't. The goal of the plan was to provide first year students with education on the realities of the abundance of diverse cultures of the students around them, the multicultural social opportunities available on this campus, and to create/nurture a culture of respect and safety for all students at Virginia Tech regardless of privilege, race or class. If the dominant population is ignorant to the problems that minorities face on a daily basis, and not negligent, then this course will attempt make sure that they are knowledgeable enough in basic areas of culture and courtesy to have a conversation with someone of a different lifestyle and not attack their identity unknowingly.

*Mentor(s): Anthony Kwame Harrison (Africana Studies) .*



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# ALYSSA MARSHALL

POLITICAL SCIENCE

## *My Portfolio*

My goal is to show basically a synopsis of who I am and what I have done in the past in high school and one or two artifacts of things I have done so far as a freshman. To show some of my skills from past events.

*Mentor(s): Kayla McNabb (University Libraries) .*



**CARLISLE A. MARTIN**

ECONOMICS

**THOMAS M. LARGEN**

CROPS SOILS AND ENVIRONMENTAL SCIENCE

**ALY M EGAN**

ACCOUNTING AND INFORMATION SYSTEMS

**EMILY A. EMERSON**

BIOLOGICAL SCIENCES

**ROYSTON PILLAI**

FINANCE

**LAUREN A. HOYNS**

LITERATURE AND LANGUAGE

**MICHAEL B. ANDREWS**

BIOLOGICAL SCIENCES

**EVAN J. MCNEAL**

COMPUTATIONAL MODELING AND DATA ANALYTICS

### ***Students of the Undergraduate Honor System***

Honor Council Delegates are student leaders within the Undergraduate Honor System (UHS) that exemplify the VT-shaped student. These students volunteer their time to aid and assist in the resolution of alleged violations of the honor code while developing a sense of self-awareness, enhancing disciplinary depth, gaining confidence in communicating and utilizing their creativity to plan campus-wide events. The purpose of this panel would be to discuss the Honor Council Delegate experience, as well as speak to the process and procedures, and the educational outreach, within the UHS. UHS cases are often resolved through administrative meetings, which are one-on-one meetings between a Delegate and the student accused of an alleged violation. Every case received by the UHS must go through this stage of the process, and as a result, these meetings comprise a large amount of the time put in by Delegates. In some cases, within an administrative meeting, students may choose to move to a hearing panel in order to resolve their case. Delegates then serve as the Chair of the hearing panel. In addition to case resolution, Delegates are responsible for ensuring that their fellow students, as well as faculty members, are informed about the honor code itself. With events ranging from Understanding the Code sessions to Academic Integrity Week, the UHS commits itself to preserving academic integrity through education, so that we may prevent academic missteps before they occur.

*Mentor(s): Jeremy Hall (Undergraduate Honor System); Sarah Orren (Undergraduate Honor System).*



## NICCOLO S. MARUCCHI

BUSINESS INFORMATION TECHNOLOGY

### ***An investigation into online videos as a source of safety hazard reports***

As consumers, we often find ourselves affected by products, more specifically the safety quality of these available products. As society unlocks different means to improve technology, it should be expected for products to improve not just in performance but safety as well. Shockingly however, many notable studies have discovered that the number of defective or dangerous products that have been recalled from the market in the last few years has increased a noticeable rate. Because of the lack of coherence between improved technology and product safety quality, the opportunity for research opened up. We focused on the concept of online video-based product reviews with the objective of detecting potential safety hazard issues. The goal of the research project was to create a new, efficient way of detecting safety hazards in products. We utilized two powerful text mining methods: sentiment and smoke words. Both of these methods were utilized to detect safety issues in products mentioned in videos from YouTube, the world's most visited video sharing platform. From the two methods stated above, 15,402 product review videos from YouTube were flagged as potential safety issues. Out of these flagged videos, 496 (3.2%) true safety hazards were found through the use of manual viewing of these videos. Out of these results, we concluded that smoke words were a more accurate predictor of safety hazards in video-based product reviews than sentiment words.

*Mentor(s): Alan Abrahams (Business Information Technology).*



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**RACHEL MAWN**

BIOLOGICAL SCIENCES

**ALEXIS THEUT**

BIOLOGICAL SCIENCES

**CALLIE DONOVAN**

BUSINESS UNDECIDED

**MIA TAYLOR**

GENERAL ENGINEERING

**STEPHANIE FLEAR**

GENERAL ENGINEERING

**SARAH BRESNAHAN**

GENERAL ENGINEERING

**GREER WILKINS**

GENERAL ENGINEERING

***Craig County Outdoor Classroom***

All members of the Residential Leadership Community, this group of students have embarked on a service learning project to refurbish a courtyard in the center of the Craig County K-12 school campus and transform the space into an outdoor classroom. In conjunction with their coursework in LRDS 1015-6, these students framed their project with the United Nations Quality Education Sustainability Goal in mind. They hope this space will encourage interest in natural sciences and develop a sense of environmental responsibility in the youth of Craig County. The process of updating the courtyard has included the addition of birdhouses, bird feeders, benches, flower seed, and more. The students have also developed a variety of lesson plans to offer to educators to engage students with the space. The group aspires for this outdoor classroom to be fondly adopted by the students of Craig Country themselves and maintained for years to come.

*Mentor(s): Tim Miller (Mountain Castles Soil & Water Conservation District); Perry Martin (Agricultural, Leadership, and Community Education/RLC).*



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**REBECCA A. MCCORD**

NATIONAL SECURITY AND FOREIGN AFFAIRS

**PATRICK CARELLO**

NATIONAL SECURITY AND FOREIGN AFFAIRS

**JOHN MARIN**

INTERNATIONAL STUDIES

**ROBERT BEAUCHAMP**

INTERNATIONAL STUDIES

**ALLISON SIEBER**

INTERNATIONAL STUDIES

**AMY HENSLER**

NATIONAL SECURITY AND FOREIGN AFFAIRS

***Diplomacy Lab: Countering Russian Propaganda and Increasing US Appreciation in Germany***

This Diplomacy Lab will seek to answer the question of why Russia and United States have the same standing amongst the German public, despite the fact that the values and history of the United States and Germany are much more positive than Russo-German values and history. Furthermore, the project will seek to determine how the United States can highlight the fact that Russia poses a much more significant threat to Germany's interests and security. Additionally, this lab will examine how the United States can better reach 18-35 year old Germans with messages that demonstrate America's commitment to its long standing ally in terms that will distinguish the United States as a more beneficial partner for the Germans going forward. The goal of the Diplomacy Lab is to answer these questions in the form of an "Options Memo" or data analysis project, each with a corresponding presentation to State Department officials at the end of the semester.

*Mentor(s): Ray Thomas (International Studies); Chris Price (International Studies).*



**REBECCA A. MCCORD**

NATIONAL SECURITY AND FOREIGN AFFAIRS

### ***The 100th Anniversary of the United States and the Czech Republic***

2018 marks the 100 year anniversary of diplomatic relations between the United States and the Czech Republic. A digital compilation of our bilateral history would be the perfect means of highlighting this major anniversary. The project would be to gather historic details on the bilateral relationship over the past 100 years, including photos, audio, and videos, and organize it into an visually engaging narrative on a digital platform. The content should be both policy oriented and relational, directed at the general public. It will be used as a public outreach tool and so the intent is to be both educational and engaging. The Diplomacy lab team designed a website documenting this special centennial anniversary to be used by the Prague Embassy as part of the State Department's Public Affairs Section to be used as a public outreach and informational platform to both US and Czech citizens. The team compiled research combing multiple sources for significant cultural and historical events, figures in order to present a digital database including an interactive timeline, sister city relations, diplomatic relations and celebrated Czech individuals who have contributed to the United States' prominence. <https://rebeccalinem.wixsite.com/mysite>

*Mentor(s): Chris Price (International Studies); Brett Netto (International Studies).*



## KAYLEIGH H. MCKENZIE

LANDSCAPE ARCHITECTURE

### *(re)lations; shaping the future, honoring the past*

Midnite Mine is an inactive Uranium mine on the Spokane Tribe Reservation in Eastern Washington state. The Mine has been inactive since 1981 however the impacts on the Tribe are something they deal with daily. From the health effects due to exposure to uranium, to the conflicting values as they relate to the treatment of the landscape, the mine holds a powerful presence over the community. My project originated from this idea of (re)claiming this landscape through creating meaningful relations to the land, the animals, and to each other. The goal of this project is to shine a light on the power of the land to enact and facilitate the storytelling of the Spokane tribe as a means of healing the space and perpetuating their traditions. The definition of re means again, or anew. Throughout this project, this idea of re has forced me to think critically about processes such as reclamation that we have generally accepted as routine and think about them from a new perspective. In the case of the Spokane Tribe, applying this idea of re throughout all aspects of my design process enabled me to address the treatment of the landscape through a different set of eyes in order to create a place the tribe could truly reclaim as their own. This research explores how post-industrial design can create opportunities to reconnect with the land through a new way of seeing and understanding the people, processes, and stories that have shaped this landscape.

*Mentor(s): Terry Clements (Landscape Architecture) .*



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## SHANNON M MCSHEA

HUMAN NUTRITION, FOOD & EXERCISE

## RACHAEL TROTMAN

HUMAN NUTRITION, FOOD & EXERCISE

## MIKAYLA THOMAS

HUMAN NUTRITION, FOOD & EXERCISE

### ***CKVT Dry Soup Program***

We participated in a service learning project with Campus Kitchen at Virginia Tech by working on their dry soup program, which is a partnership through the Agency on Aging. They primarily serve senior citizens, but also some qualifying adults with disability. The participants are able to enjoy fresh soups at friendship cafes each weekday, but this leaves many of them hungry on the weekends. Our job was to re-envision how the service currently works on the weekends, and come up with and design some alternatives that are sustainable and that the participants would enjoy. We added variety to the meals that they currently serve, and came up with some new healthy recipes that they can use that follow specific nutrition guidelines from the Agency on Aging. We analyzed each of these recipes to generate a nutrition facts label so that those who are enjoying the meals know exactly what is in it, giving them assurance that it is a healthy meal. Throughout the process, we encountered numerous obstacles that forced us to think critically to develop meals that are appropriate for the elderly population. Each of the recipes that our team developed was accepted by the Agency on Aging, and they will soon begin to incorporate them into their program.

*Mentor(s): Mary Case (VT Engage- Campus Kitchen), Mary Case (VT Engage- Campus Kitchen), Lester Schonberger (Campus Kitchen).*



## JESSICA MEEKS

HUMAN DEVELOPMENT

### *Jess Meeks's Presentation of Her Capabilities*

My eportfolios goal was to present different skills that I have attained throughout my life. These are portrayed by different artifacts that I have published on my site. Each of the different artifacts that I have published portray different types of skills that I believe I have. This can be anything from people/communication skills to knowledge of how to conduct experiments. For some examples, I have used both lab reports and research papers as artifacts in my portfolio. Overall, this is a site where I have gather different things that I have published or done and put them all together to portray different aspects of my skill abilities.

*Mentor(s): Kayla McNabb (University Libraries).*



**ASTRID I. MEENAN**  
BIOCHEMISTRY

### ***The Physiological Role of a Putative Plant Phytase***

Goal: Further understand the how inhibition of a putative 3-phytase gene alters the phenotype of *Arabidopsis thaliana*. Hypothesis: The gene encodes a putative 3-phytase that produces the inositol phosphate ligand required for jasmonic acid (JA) signaling, which serves as a plant defense hormone. Purpose: Determine if the inhibition of putative 3-phytase alters plant growth and development relative to Wild Type. Methods: We used two homozygous lines with knockdowns of our gene, then grew them on soil and on plates. We recorded the rosette diameters, time to bolting, and time to germination relative to Wild Type. Results: Relative to Wild Type, mutant lines show smaller plant rosette diameters, as well as early germination and bolting. This indicates that our putative 3-phytase gene plays a major role in plant growth and time of development.

*Mentor(s): Phoebe Williams (Biochemistry)*



**BRYANNA J. MENELEE**

HUMAN DEVELOPMENT

**JULIA STRANG**

HUMAN DEVELOPMENT

**ELIZABETH HAUGDAHL**

HUMAN DEVELOPMENT

**KELSEY MCGREGOR**

HUMAN DEVELOPMENT

**PAIGE ATHERTON**

HUMAN DEVELOPMENT

### ***Discourse on Mentorship and Literacy Outcomes in Primary Education***

As a service learning experience for our Principles of Human Services class, we chose to work in classrooms at Harding Avenue Elementary School as teachers aids and tutors for students who benefit from additional support. Service learning identifies a need in the community and then works to help the issue through direct and indirect service. By actively reflecting on community needs and looking for solutions, service learning students gain problem solving experience, and perspectives on their future professions (Lavery). We intend to pursue careers involving child development, education, and youth engagement, so our experiences at Harding Avenue Elementary provide essential knowledge and tools for engaging with children. Our choice to complete our service learning in this setting reflects our desire to experience early education first-hand, in addition to building meaningful relationships and acquiring skills that apply to human services. In Harding Avenue Elementary, students on a broad spectrum of intellectual levels are an active part of the classroom in an inclusive education system. Without an inclusive education system, students may develop a sense of exclusion that risks the child not wanting to engage in learning, and leads to a lack of knowledge (Yardley). This system has many social and psychological benefits, but certain students require extra help with class activities. As helpers, we guide students, while allowing them to be active participants in the classroom.

*Mentor(s): Mathew Komelski (Human Development & Family Science); Mary Nedela (Human Development and Family Science).*



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## KAMERON A. MIZE

GENERAL ENGINEERING

### *Learning to Reflect and Improve*

This presentation covers the opportunities presented to me during my first year at college to reflect on my past work and cultivate my academic and professional abilities. It contains reflections, projects, and presentations that came about as a result of my first-year classes. This showcases the influence Virginia Tech has had on my ability to self-evaluate and learn through long-term projects and assignments. As a result of these opportunities, I believe I have become a better student, community member, and person.

*Mentor(s): Kayla McNabb (University Libraries).*



**AMAR MOHANTY**  
MECHANICAL ENGINEERING

**TAI JELLA**  
MECHANICAL ENGINEERING

**MCCARTHY JACKIE**  
GENERAL ENGINEERING

**LUCAS MUN**  
COMPUTER ENGINEERING

**BRANDON WALKER**  
COMPUTER ENGINEERING

**GRANT MCMILLAN**  
BIOLOGICAL SYSTEMS ENGINEERING

**JIMIT BHATT**  
GENERAL ENGINEERING

**ALEX DEJONG**  
GENERAL ENGINEERING

### ***Robotic Arm with Machine Vision***

In 1964, the robotic arm was created in the to do dangerous and monotonous tasks in the car manufacturing industry. Today, robots are becoming integrated in our daily lives with autonomous vacuum cleaners and self-driving cars. This project aims to expand the potential of the robotics arm to be used in the business store fronts, continuing the trend of integrated technology. To do so, the team designed and manufactured a 5-axis robotic arm that would wave to people using machine vision. The team combined ideals of mechanical, electrical, computer science, and computer engineering into a single synthesized project that showcases each of the separate branches of engineering. The design was modeled using computer aided design (AutoDesk Inventor) and features the shoulder down to the hand. Machine vision was accomplished using a wide lens camera programmed with Python scripts on an Arduino Mega, and is designed to determine if someone is facing the robot. Once a face is recognized, an output signal is delivered to the motor controllers. Then the motor controller sends signals to the motors, and triggers the robotic arm to wave. The team succeeded in creating a robotic arm that is able to wave to a person that is looking at it and has multifarious use in stores. The team plans to further develop the robotic arm with a separate claw-hand that will be able to hold and move objects.



**HISYAM BIN MOHSIN**

CIVIL AND ENVIRONMENTAL ENGINEERING

**RUSTY ROUILLIER**

CIVIL ENGINEERING

### ***Proactive Potable Water Corrosion Control Investigation in Santa Cruz, California***

To better manage groundwater (GW) resources, the Soquel Creek Water District in California is planning to buy treated surface water (SW) from the Santa Cruz, CA Graham Hill Treatment Plant. The goal of this study was to proactively investigate the corrosion potential if switching from GW to SW. Two phases of experiments were conducted to examine the corrosivity of GW and SW to pipelines and plumbing fixtures and potential corrosion control strategies. The first phase examined the corrosivity of GW and SW to zinc and iron wires, representing new and aged galvanized iron pipe (GIP). The 5.8 cm long zinc and iron wires were epoxied to the center of 125 mL glass jars, which was filled completely with SW at pH 7.2 and 7.8 or GW at pH 7.5. Water in each jar was replaced every 2-3 days and collected once a week for metal analysis on an Inductively Coupled Plasma-Mass Spectrometer. The preliminary results indicate that SW and GW had similar corrosivity to new and aged GIP. Specifically, after 8 weeks of exposure, the zinc and iron leaching with GW at water pH 7.5 were 4.5 mg/L and 1.8 mg/L, respectively. Similarly, the zinc and iron leaching with SW at water pH 7.8 were 1.7 mg/L and 1.5 mg/L, respectively. The second phase is being conducted to examine the corrosivity of SW and GW to harvested galvanized iron pipe, cement pipe and lead solders and potential corrosion control strategies (pH adjustment and addition of orthophosphate corrosion inhibitor).

*Mentor(s): Min Tang (Civil and Environmental Engineering); Jeffrey Parks (Civil & Environmental Engineering), Marc Edwards (Civil & Environmental Engineering).*



**SARAH E. MORGAN**  
MATHEMATICS

### ***Influence of Tectonic Deformation on Active Volcanism in Central America***

Active volcanoes throughout the world provide risk to local populations, their property, infrastructure, and the broader economy. This study involves testing the influence of tectonic deformation on active volcanism and seismic potential in Central America with a particular focus on the Middle America Trench. We investigate the recently active Arenal and Santa Maria volcanoes in Costa Rica and Guatemala, respectively. The approach is to evaluate a tectonic strain rate model to assess and calculate the seismic potential in areas with active volcanoes (Arenal and Santa Maria). The influence of the tectonic deformation can be studied by applying the Seismic Hazard Inferred from Tectonics (SHIFT) hypothesis. This hypothesis allows for calculating the long-term seismic moment rate of deforming zone from the coupled seismogenic thickness and the long-term earthquake production of the region from its moment rate using the frequency-magnitude distribution of the most comparable type of plate boundary. Our preliminary results suggest that the seismicity in Central America will increase in the long-term contributing to the continued hazards of the Arenal and Santa Maria volcanoes.

*Mentor(s): Sarah Stamps (Geoscience) .*



## ABIGAIL R. MORRIS

AGRICULTURAL SCIENCES

### ***Development of education and agriculture in Slovenia since 1991***

RQ's: What does effective education look like for community development in Slovenia? How has Slovenia's agriculture industry changed since breaking away from the USSR? The purpose of this project was to look for effective teaching methods and community development work in agriculture, using the context of Slovenia and its rich history. This was a qualitative case study using interviews as the means for data collection. The process began by conducting general literature review on effective pedagogy and international community education. An interview guide was developed before the researcher went to Slovenia with 14 open ended questions to ask small-scale farmers in Slovenia. Four interviews with six participants were conducted in the field using an audio recorder and then transcribed verbatim. Data was coded and themed to find commonalities in the transcriptions. Three main themes emerged from the data: education, community and family structure, and the economy. The participants were dissatisfied with their prior education and economic support from the government. Data revealed that the historical context of Slovenia impacts the participants view and values on family structure in agriculture, self-sufficiency, and independence from other countries.

*Mentor(s): Tiffany Drape (Agricultural, Leadership, and Community Education).*



## TYLER J. MORRIS

CROP AND SOIL SCIENCES, TURF MANAGEMENT OPTION

### ***Experiences with the Virginia Tech Athletics Grounds Crew***

This presentation will explore the many different opportunities offered to me within the Virginia Tech Athletics Grounds Crew that have allowed myself and others to grow as a groundskeeper in the Turfgrass Management industry. Through experiences with the football, soccer, baseball, softball, lacrosse, cross country, and track and field teams this presentation will explore some of the duties and responsibilities that I have taken on with the grounds crew. This presentation will be used to inform the public about the Crop and Soil Sciences major, the Turfgrass Management option, the opportunities that the Virginia Tech Athletics Grounds Crew offers, and how my responsibilities with the grounds crew have helped me grow in my profession. The presentation will explore why I chose to take up a major in Turfgrass Management, including that it creates memories for others and that I knew I wanted to be a partner in the sport. This meaning having a big role in sports as a whole and perfection of the visual aesthetics that spectators see. Also to be covered will be how I have used the experiential learning opportunity with the Virginia Tech Athletics Grounds Crew to help others in the community and give back to those schools and organizations that may not be as fortunate as others when it comes to their outdoor facilities.

*Mentor(s): Mike Goatley (Crop and Soil Environmental Sciences).*



## NAJLA MOUCHREK

HUMAN CENTERED DESIGN

## JARRODD DAVIS

URBAN AFFAIRS AND PLANNING

## DANIELLE JEFFERS

MULTIMEDIA JOURNALISM

## SUNNY MURTHY

BIOCHEMISTRY

### ***Design thinking workshop on Student-Led Experiential Learning***

The workshop is a hands-on activity proposed by the University Innovation Fellows at VT within the group's ongoing project to support a student-centered culture of experiential learning. Design thinking methods are applied to promote interdisciplinary collaborative ideation around the question: "How might we design student-led experiential learning at VT?" Design thinking is an important way to engage participants to craft solutions with empathy and user experience in mind. Both as co-designers and users, students will experience the design process, and offer their perspectives about experiential learning, why it is important in their academic and personal trajectories, what are their needs, and potential barriers to participate. The purpose of the project is gathering information from diverse groups of students (capturing multiple perspectives), supporting a culture of collaboration (including students), and building community around experiential learning at the university. The workshop follows an adapted version of the design thinking process as proposed by IDEO & RCSchool (2012), focusing on the ideation phase. The anticipated results are a report compiling the information; developing a vibrant experience of critical engagement and creative problem-solving; and starting an enduring collaboration with students willing to continue as an advisory/planning group associated with UIF-VT and the Office of Experiential Learning.

*Mentor(s): Leigh Lally (University Planning).*



## DANA J. MOURITZEN

NATIONAL SECURITY AND FOREIGN AFFAIRS

## MARIA BETANCES-KOEGLE

POLITICAL SCIENCE

## KELLY GUTHRIE

CRIMINOLOGY

## KAT GOEBEL

LITERATURE AND LANGUAGE

## QUINTON COOKIS

HISTORY

## ANDREW SCHURR

THEATRE ARTS

### ***You can do what with that major?***

Proposal - Student Panel Presentation/Discussion: Internship Experiences for Liberal Arts Undergraduates. Goal - Showcase Experiential Learning opportunities such as internships for majors in the college of liberal arts and human sciences. Students will describe how their unique experiences has shaped their career goals. Purpose - Creating awareness of multiple career paths within majors. Internship experiences help shape future career goals, course selections, and future Experiential Learning opportunities at Virginia Tech. Method- Panel participants will describe how they prepared, secured, and reflected their experiential learning opportunity. Summary of results- students will discuss how their unique experiences has shaped their career goals. The panel will encourage students to think broadly about the diverse experiences available in the College of Liberal Arts and Human Sciences. Abstract - Curious about how to get an internship? Interested in learning what you can do with a liberal arts major? Come to this student panel discussion to learn about the process for finding and getting internships. Hear from current students about their internship experiences with law firms, non-profits, NASA, Accenture, and on-campus opportunities. Discover how they found these experiences as students share information on the available opportunities for undergraduate students to gain knowledge of the 21st century workforce.

*Mentor(s): Monica Kimbrell (College of Liberal Arts and Human Sciences).*



**LUCAS C. MUN**

COMPUTER ENGINEERING

**BRANDON A. WALKER**

COMPUTER ENGINEERING

**DEAN E. CONTE**

### ***Learning about Bat Biosonar by Designing a Biomimetic Robot - Overview***

Horseshoe bats navigate and track down their prey amid dense vegetation. This poses enormous challenges for sensing and maneuverability and no man-made system has ever been able to achieve anything similar so far. However, while some of basics of how the biosonar system of horseshoe bats functions are known, it remains unclear how these principles are used to accomplish the animals' extraordinary performance. To explore this feat, a biomimetic robotic sonar head has been developed to replicate the functional properties of the biosonar. Key components of the biomimetic head are the ultrasonic pulse emitter and echo receiver. The emission baffles of the bats ("noseleaves") and their outer ears were modeled physically with silicone. An actuation scheme has been devised to change the ear shape similar to what the bats do. A waveguide was created to convey sonar chirps to the biomimetic noseleaves. The signals were generated using using electrostatic transducers. Echoes were recorded using MEMS microphones embedded into molded ear canals. Creating the signal waveforms, coordinating emission, reception, and the deformations of the physical interfaces within the context of a carefully planned experimental requires a control architecture with integrated hardware and software components. The biomimetic sonar head has already been used successfully to study the encoding of information on target direction. Work on biomimetic target identification is currently underway.

*Mentor(s): Rolf Mueller (Mechanical Engineering).*



DOUGLAS W. MURRAY  
BIOLOGY

***Interrogating mechanisms of connexin43 translation through alteration of ribosomal protein expression using CRISPR/Cas9 technology***

Gap junctions are essential for maintaining synchronous electrical coupling of cardiac muscle cells necessary for every heartbeat. Connexin43 (Cx43, gene name GJA1) is the main ventricular gap junction protein, facilitating intercellular communication in many cell types. The GJA1 mRNA undergoes alternate translation initiation to yield N-terminally truncated Cx43 isoforms, termed GJA1-20k, capable of modulating gap junctional coupling. Past work by our lab shows levels of GJA1-20k are subject to dynamic regulation by the cell and thus regulate gap junction formation, but the mechanism by which internal translation of GJA1 is regulated remains unknown. The ribosome is a complex of ribosomal RNAs and proteins that translate mRNA. Ribosomal ability to confer specificity to mRNA translation and to regulate the cellular proteome is becoming increasingly known. The subunit ribosomal protein rps25 has been identified as a piece of the ribosome able to regulate translation initiation in eukaryotic cells. To determine if rps25 governs translation of the GJA1 mRNA and expression of GJA1-20k, we are using CRISPR/Cas9 to generate human cells lacking rps25. We designed guide RNAs flanking rps25 gene to result in excision of the gene using CRISPR/Cas9. Guide RNAs were cloned into a Cas9 expression vector and transfected into human keratinocyte cells to generate a clonal cell line harboring deletion of the rps25 gene. These cells will be a tool to investigate rps25's role in GJA1 translation.

*Mentor(s): James Smyth (Biological Sciences).*



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## MARYBETH C. MYERS

BIOCHEMISTRY

### *Marybeth Myers-Portfolio*

My portfolio contains projects from both my high school education and the first semester of my freshman year and college. These projects are all science based and I believe they show my growth in understanding of the science curriculum. My portfolio showcases the different works I have completed so far and reflects on how they have helped me.

*Mentor(s): Kayla McNabb (University Libraries).*



**RIYA P. NAG**

PSYCHOLOGY

**KAYLA WATSON**

PSYCHOLOGY

**NICHOLE WHEELER**

PSYCHOLOGY

**KYRA PARKER**

PSYCHOLOGY

## ***Hemispheric Asymmetry through Autonomic Nervous System Responses to Visual Stimulation***

The objective of this study is to investigate hemispheric laterality using the effect of monocular bright light exposure on measures of sympathetic arousal. Light exposure has been used to study the autonomic nervous system, and has been shown to cause an arousal of the sympathetic nervous system, due to contralateral retinocollicular projections to the right hemisphere. However, few studies have assessed hemispheric asymmetries of autonomic responses to monocular light stimulation in humans. In order to provide more data on the selective activation of one hemisphere through bright light exposure, this study seeks to implement a straightforward method. Monocular light stimulation will be used to study the effect on sympathetic nervous system activity. Blood pressure, skin conductance, and electrocardiography measures will be monitored throughout the procedure. After being given 90 seconds of rest to acclimate to the room, a bright light stimulus will be presented in the periphery of the left eye for 3 minutes and then again for 3 minutes after a short break. A fluency task will be given before and after each light stimulation in an effort to further support sympathetic arousal information. We predict that participants will show an increase in sympathetic arousal following bright light stimulation presented to the left eye, indicated by enhanced performance on the fluency task and physiological responses.

*Mentor(s): Kelly Harrison (Psychology).*



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**TABITHA N. NGO**

GENERAL ENGINEERING

**TYLER PUGH**

GENERAL ENGINEERING

**PATRICK WIRTH**

POLITICAL SCIENCE

**TAKARAI FORD**

PSYCHOLOGY

**CONRAD BRILES**

POLITICAL SCIENCE

**JESSICA CALVERT**

CREATIVE WRITING

***Drive For Dreamers***

The Drive For Dreamers, is a group initiative to raise awareness and collect school supplies for those that are less fortunate. Through donation boxes set up throughout the community, we plan on spreading the word about schools in need of materials. Given the current political climate, we believe it is essential to reconnect people under one common goal: giving back to the community. We plan on displaying this through a poster that will summarize the project as well as illustrate the creativity needed to propel the project forward. On this poster, the dates, locations and necessities of the project will be clearly displayed and legible. Our expected outcome is an increase in school supplies that we can give to Coalition of Refugee Resettlement group as well as an increase in community spirit. One of the best things about our project is that it does not have a specific audience, but rather targets people from ages 3 to 103. Our outcome, therefore, is not just to collect school supplies, but to instill a sense of community that may have diminished in the past few years surrounding the subject of immigration.

*Mentor(s): Hillary Klovacs (Leadership).*



## JULIA T. NGUYEN

BIOMEDICAL SCIENCES

## MICHAEL P. GEARY

WILDLIFE CONSERVATION

### ***Virginia Tech Rescue Squad: Ut Prosim since 1969***

The Virginia Tech Rescue Squad is an all-collegiate Rescue Squad on campus. Our goal is to provide emergency care and respond to 911 medical emergencies. We have been committed to serving the University community with the best possible emergency medical care available. Today, the agency operates with 40 members trained in basic and advanced life support procedures to give every patient the best possible care. The Rescue Squad operates a fleet of four advanced life support equipped ambulances, one advanced life support quick response vehicle, a communications interoperability command, and control unit, a support truck, special operations unit, mass casualty response unit, and a Cycle Emergency Response Team. In addition to response to 911 calls, we:

- Provide routine transport service from Schiffert Health Center to hospitals throughout the region.
- Provide comprehensive incident/event management for all large-scale planned events.
- Supply routine standby services to affiliated and non-affiliated organizations as requested.
- Manage the University Public Access Defibrillation (AED) program.
- Administer CPR/AED, first aid, and EMT-Basic courses.

Our main talking point is on “MCIs,” or Mass Casualty Incidents, and to provide insight on how our Rescue Squad will logistically perform in regards to a campus incident. Education on MCIs is very important for the public! Examples of MCIs: shootings, building collapse, hazardous materials, etc.

*Mentor(s): Richard F. Hirsh (History).*



**KATHERINE L. OLSON**  
ENVIRONMENTAL SCIENCE

### *Exploring the environmental industry in China*

Research question: Is China's environmental situation as bad as the media and stereotypes make it out to be? What efforts are being made in the government, in companies, and in citizen-run organizations to combat environmental issues? Purpose: China is a major partner of the US from an economic standpoint, but there is a lot of information that can be exchanged in STEM fields as well. They can learn from us, and there are things we can learn from them as well, especially considering we are highly economically dependent on them. Improving the global environmental situation is something everyone needs to work together on. Method: Internships, involvement in environmental NGOs, interacting with and facilitating discussions with people from env. organizations and companies. I also had a lot of conversations with everyday citizens about China's environmental situation. Summary of results: I have spent 2 summers in China, so I've only scratched the surface. I will be getting much more involved next year as a Masters student at Nanjing University. have seen a lot of incredible citizen-based environmental movements going on in some areas, while in others, people walk their dogs next to rivers of sewage and don't even bat an eye. Some treatment plants are extremely advanced, and some cities have installed floating wetlands and mobile water treatment devices to deal with rivers polluted from upstream. It's an extremely complicated, challenging, and exciting field to be involved in.



**MICHAEL P. ORCUTT**

ACCOUNTING

**IAN P. BESKIN**

ACCOUNTING

### ***BASIS (Bond and Securities Investing by Students)***

BASIS is a student-managed bond fund investing \$5 million of the Virginia Tech endowment. We have a dual mandate of providing a unique educational experience for all of the members while generating competitive returns for the Virginia Tech Foundation. We manage the largest completely student-run fixed income portfolio in the country. Students graduating from BASIS find that the fixed income background they acquire is invaluable as they start their future careers. Our students have an advantage when competing in the job market in financial firms. With a \$5 mm portfolio on behalf of the Virginia Tech Foundation, Bond And Securities Investing by Students (BASIS) provides students with the opportunity to graduate from Virginia Tech with a real-world understanding of fixed income, investments, and macroeconomic trends around the world that is applicable to any career, whether that be investment banking, sales & trading, consulting, corporate finance, and anything in the field of business. BASIS has a history of strong job placement and provides members with the resources to find a career in the field of their interest.

*Mentor(s): George Morgan (Finance) .*



**JOSEPH M. PAOLETTI**  
BIOLOGICAL SYSTEMS ENGINEERING

### ***Irrigation Cost Benefit Analysis Tool***

The purpose of this research project is to develop a cost-benefit analysis tool for Virginia farmers. Farmers will be able to use this tool to determine whether or not it is economically advantageous to install an irrigation system on their farms. To accomplish this, investment costs and operating expenses had to be determined using scientific papers and extension documents. Once this was finished, it was necessary to determine crop water response for each of Virginia's main crops to determine how insufficient water would affect their yield. This was done by utilizing the crop-modeling program AquaCrop. AquaCrop was used to determine the yield of various crops for different amounts of water and lengths of drought. This information was then put into MATLAB to determine a regression equation that could be applied to all climate conditions. In order for the tool to be accessible for a wide audience, Microsoft Excel was used as an interface. Users enter information about their farm along with basic financing information and the tool will tell information about increased expenses of operating an irrigation system and increased revenues due to crops having ideal water requirements.

*Mentor(s): Julie Shortridge (Biological Systems Engineering) .*



## PATIENCE D. PARRY

BUSINESS INFORMATION TECHNOLOGY

## KIRA RIDDLEMOSER

MARKETING

## ALLIE AHN

POLITICAL SCIENCE

### ***Thrive Living-Learning Community***

The goal/mission of Thrive is to foster a community of diverse individuals and bring them together on the basis of a shared first year experience, strengths, and the Aspirations for Student Learning. The purpose of Thrive is to help students discover their individual strengths (via Gallup's Strengths Finder Assessment) and teach them how to properly harness these strengths and utilize them in their every day life, careers, extra-curriculars, and beyond. The way in which we achieve these goals is through hosting events that bring the community together, invite speakers to share with Thrivers what life is like beyond college, including how they use their strengths everyday, and by actively engaging students in planning the direction of the community by implementing "committees." So far, Thrive has been doing tremendously well. Bumps in the road have included logistical errors and lack of effort on the part of both our Peer Mentors and students. However, with collaboration and cultivation of more positive attitudes, we have been able to overcome these issues slowly and steadily. In the future, we hope to see increased commitment from our leadership team and more engagement from our community members.

*Mentor(s): Taran Cardone (Office for Learning Partnerships, Student Affairs) .*



**AINSLEY K. PATRICK**

PSYCHOLOGY

**TYLER J. CUOMO**

COMPUTER ENGINEERING

### ***Cultural Exchange with the Maasai Community Through Construction Collaboration***

This experiential learning project aims to assess and address the needs of the Maasai community in Engaruka, Tanzania. Primarily, this study focuses on a partnership between Virginia Tech's Service Without Borders, an interdisciplinary, student-led service organization, and a Maasai community to construct and operate an English medium of instruction primary school to educate Maasai youth. The presentation will articulate how the Tanzania project was initiated and discuss the first phase of the project construction the school's first classroom building. Students will provide insight into the process of planning and implementing this project. In addition, the students will explain the cultural exchanges that occurred during travel including engaging in a week-long safari, experiencing a cultural coming-of-age ceremony, and collaborating with local men and women to construct the school. Students will reflect on their experiences and explain how this opportunity has impacted their professional and personal goals. Lastly, the presenters will provide an overview of possible future collaborative activities between Service Without Borders and the Engaruka Maasai community.

*Mentor(s): Theo Dillaha (Biological Systems Engineering); Brian Benham (Biological Systems Engineering).*



**MAYANK PERIWAL**

CONSTRUCTION ENGINEERING AND MANAGEMENT

***Leadership in Construction: A quantitative analysis in leadership competencies across generations***

Do perception of leadership vary across generations? This study looks to quantify a reason for various perception of leadership across the construction industry by looking at the age of construction professionals with the leadership competencies. Construction professionals in the industry value some particular leadership competencies more the other, this quantitative analysis would help us understand the correlation between age of the construction professional and their perspective of leadership competencies. Through the analysis, it would be clearer whether the difference in leadership perception varies due to the difference in the values and opinions of different age group, and the generation gap. Quantification of this analysis would allow for better understanding of present leadership senario in the construction industry.

*Mentor(s): Denise Simmons (Construction Engineering Management) .*



## AUBREY N. PHARES

COGNITIVE AND BEHAVIORAL NEUROSCIENCE

### ***Restrictive and Repetitive Behavior Endorsement Number as a Predictor of Behavior Severity***

Individuals with Autism Spectrum Disorder (ASD) typically display restrictive and repetitive behaviors (RRBs), yet the relationship between the number of RRBs exhibited and their reported severity is relatively uninvestigated. In order to examine this correlation, participants including 47 individuals with ASD and 17 individuals without ASD age 18 and under were recruited from the Virginia Tech Autism Clinic database. RRB number and severity scores were computed using the Repetitive Behaviors Scale-Revised (RBS-R). It was hypothesized that children with ASD would demonstrate significantly more RRBs and greater RRB severity scores. Additionally, it was hypothesized that among children with ASD, number of RRBs endorsed would be predictive of overall RRB severity score on the RBS-R. An independent t-test was used to confirm that individuals with ASD endorsed significantly more RRBs ( $t=2.96$ ,  $p=.005$ ) and experienced them at greater levels of severity ( $t=2.90$ ,  $p=.006$ ). A linear regression showed that number of RRBs endorsed predicted RRB severity score on the RBS-R ( $F(1,45)=482.81$ ,  $\hat{\rho}=.956$ ,  $p<.001$ ). Exploratory analyses were conducted to examine whether the number of different RRBs endorsed on the RBS-R predicted RRB severity on the Autism Diagnostic Observation Schedule (ADOS). However, there was no significant relationship ( $F(1,42)=.488$ ,  $\hat{\rho}=-.107$ ,  $p=.488$ ). This could be due to inherent differences in the appraisal methods, suggesting that RRB severity varies with assessment type.

*Mentor(s): Ashley Muskett (Psychology).*



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**TAYLOR E. PHELPS**

ENVIRONMENTAL HORTICULTURE

**FRANCESCA V. LIONETTI**

HUMAN NUTRITION, FOODS, AND EXERCISE

**NICOLE P. SALINAS**

FOOD SCIENCE AND TECHNOLOGY

**MOLLY S. AUSTIN**

ENVIRONMENTAL HORTICULTURE

**BAILEY G. PETTIT**

ENVIRONMENTAL HORTICULTURE

***Farming for the Future***

Our project aims to showcase a collaborative research effort exploring the relationship between organic farming and health economics. From our research, we gained valuable insight into the history of organic farming, the legal use of the term “Organic,” the system of permaculture, the consumer cost difference between organic and conventional foods, and the benefits of organic and conventional farming techniques. For the project, each team member conducted independent research related to his or her field of study. The independent research was presented to and analyzed by the team, allowing for connections to be drawn which were then strengthened by a collaborative research effort. The culmination of our independent and collaborative research is a poster and presentation providing a comprehensive overview of organic farming and health economics.

*Mentor(s): Linda A. Granata (Food Science & Technology).*



## KATHLEEN E. PIERCE

RESIDENTIAL ENVIRONMENTS AND DESIGN

### ***Residential Environments Spring Housing Study Tour***

In the Spring of 2017, the Apparel, Housing and Resource Management Department took students in the Residential Environments and Design major on a Housing Study Tour. The style tour was organized by two RED faculty members and we visited historic homes, museums, and businesses to learn more about our major and the history of the residential design industry, and learn through hands-on experience and close observation. Through my poster presentation in the Student Experiential Learning Conference, I would be able to show, discuss, and share what my classmates and I were taught throughout the trip and the entire experience. We travelled to Washington D.C. and Richmond, VA from April 5th to 7th, touring historic sites like the Pope-Leighey House and Gunston Hall. Our group was also given the opportunity to visit nine different businesses within the industry, including but not limited to: Ferguson, Reico, and EA Holsten. We also had the privilege to visit the National Building Museum and their House & Home exhibition. This showcased methods and materials used in residential construction, and models of famous buildings and homes throughout the United States. This experience was very rewarding and we all felt as though we learned so much more throughout the trip than we would have just through a lecture in a classroom. It was a trip that none of us will forget and I can't wait to share it with you.

*Mentor(s): Eunju Hwang (Apparel, Housing, and Resource Management).*



**MELISSA A. POLETTI**  
BUSINESS UNDECIDED

### *My ePortfolio*

I am putting together an ePortfolio with some of my work from high school and my freshman year at Virginia Tech.



## SHAIFALI PRAJAPATI

WATER: RESOURCES, POLICY, AND MANAGEMENT

## DANIELLE CURTIS

WATER: RESOURCES, POLICY, AND MANAGEMENT

### ***Household Water Treatment and Sanitation Project in Usisya: Follow-Up Study of the SAFI Water Filter***

The project focuses on behavior change for household water filter usage in Usisya, Malawi which is a community near Lake Malawi that went through a try and buy system six months prior through the CCAP SMART Centre and Temwa, organizations which carried out public health awareness, filter usage and distribution. The goal of the system is to allow households to be able to make their own choice on using the SAFI filter, which provides household water treatment. The team conducted a follow-up survey in both the Livuwu and Thandati villages where a baseline survey was carried out in February 2017 to determine the impacts of the household water filter pilot project. The follow-up survey team comprised of two Virginia Tech students, two recent Mzuzu University graduates and one CCAP SMART Centre team member. While most households adopted the filters and were continuing to use them in both village, gaps in communication were noted among the community, committee members, and organizations involved through payment disparities and lack of repair for broken filters. However, people overall demonstrated an in-depth understanding on the significance of filter usage in promoting their health, reporting a reduction in symptoms of diarrhea and water-related diseases like cholera that cause it in questions related to health.



NAIRE L. POOLE  
THEATRE

### ***Act Normal: an improvisational workshop***

In youth, the great majority of children up through their adolescent years, spend 6 hours of 5 days of their week in school, while also spending more time than that in other public spaces. As adults, we spend a great deal of our time in public spaces as we drive, work, socialize, or handle bills and maintenance tasks. The goals of Act Normal: an improvisational workshop are to develop communicative skills, develop creative critical thinking, develop empathy, and open a public dialogue concerning vulnerability in public spaces through the use of theatrical improvisation practices. The interactive presentation would ask its participants to by physically, mentally, and emotionally present while addressing the creating work at hand. The workshop would open with an introduction to the work and the intent of the practices. The relevance of vulnerability and bravery in public spaces will be addressed before starting an exercise referred to as The Machine and followed by a practice of partnering work to allow the opportunity for personal connections during the workshop. Usually, after participating in these practices, participants recall feeling more open and in touch with their creative side. I am anticipating that the participants of this workshop experience the same results, but in the context of professional and public spaces. This opening up would allow the participants to appreciate theatrical practices as well as develop their interpersonal empathy skills.

*Mentor(s): Bob Leonard (Theatre).*



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## CARLY M. PORTER

COGNITIVE AND BEHAVIORAL NEUROSCIENCE

### *Research Portfolio*

Included in my portfolio are two research projects I completed between the years 2015 and 2017. This research was done when I was in high school and displays the work I was interested in prior to college.



## AMANDA POWERS

BIOLOGY

### ***Metals in suspended sediment of a drinking water reservoir***

In many lakes and reservoirs, naturally occurring metals such as manganese (Mn) and iron (Fe) can be released from the sediments to the water column during periods of thermal stratification when the hypolimnion (bottom water) of the reservoir is anoxic (DO  $\leq$  2 mg/L). These metals are regulated as secondary drinking water contaminants, and thus understanding their cycling in drinking water reservoirs is important for improving drinking water supplies. I analyzed suspended sediment samples that were collected from a drinking water reservoir in Vinton, Virginia, owned by the Western Virginia Water Authority, for Fe and Mn concentrations. The suspended sediment samples were microwave digested using trace metal grade nitric acid. The resulting digested solution was analyzed for Fe and Mn concentrations using an ICP-MS. The collected data was then used to calculate the particulate metal fluxes over time using RStudio. The Mn and Fe fluxes increased during the stratification period beginning in July with a peak flux in September. These results will inform the Western Virginia Water Authority about metal cycles in the water column so that they may properly treat the water for consumption. This research has societal importance as high quality drinking water is a necessity for healthy communities.

*Mentor(s): Madeline Schreiber (Geoscience); Kathryn Krueger (Geoscience).*



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**ASHLYN PUGH**  
GENERAL ENGINEERING

### *Ashlyn's Portfolium*

I'm putting together a research portfolio documenting my academic work from high school through college.

*Mentor(s): Kayla McNabb (University Libraries), Amanda MacDonald (University Libraries).*



## DANNY J. PURCELL

BIOLOGICAL SCIENCES: BIOMEDICAL OPTION

### ***The Role of Connexin43 in TGF-Beta Induced Epithelial to Mesenchymal Transition***

**Purpose:** The goal of this research is to analyze the role of the gap-junction protein connexin-43 (Cx43) during epithelial to mesenchymal transition (EMT). **Background:** Approximately 39% of all men and women will be diagnosed with cancer at some point during their lifetime. In the United States alone, there was an estimated 1.7 million new cancer cases for 2017 alongside an average death rate of 36% for the 15 million people already living with the disease today. The genetic controls and biochemical mechanisms underlying a cancer cell's ability to invade surrounding tissues and subsequently spread malignant tumors throughout the body have been areas of intensive research. In many of these studies, activation of epithelial to mesenchymal transition (EMT) has been proposed as the critical mechanism for this metastatic process. Connexin-43 (Cx43) is the most ubiquitously expressed human gap junction protein and is known to act as a tumor suppressor during the early stages of carcinoma development. We question whether the presence of Cx43 gap junctions is required to facilitate EMT in the NMuMG cell line and therefore responsible for cancer metastasis. **Methods:** Western blot densitometry was initially used as a quantitative analysis in knockout vs wild-type cells, followed by two functional tests: a wound-healing assay to determine migration ability and invasion assay to study membrane permeability. **Ongoing Results:** Knockout of GJA1 Reduces Expression of Mesenchymal Markers.

*Mentor(s): Jamie Smyth (Biological Sciences/VTCRI), Michael Zeitz (Cell and Molecular Biology/VTCRI).*



**SOSHIANT A. RAEESIAN**  
BIOCHEMISTRY

### ***Investigating the role of connexin43 in actin cytoskeleton dynamics during epithelial-mesenchymal transition***

Epithelial-mesenchymal transition (EMT) is activated during development, wound healing, and pathologies including fibrosis and cancer metastasis. During EMT, epithelial cells remodel cellular junctions and cytoskeletal structures to undergo a trans-differentiation to a motile and invasive mesenchymal phenotype. The gap junction protein, connexin43 (Cx43) has non-junctional functions in cytoskeleton remodeling and is associated with cancer metastases. We hypothesized that Cx43 plays a role in regulation of actin dynamics in mesenchymal cells during EMT. To test this Cx43 knockout cells were generated using CRISPR/Cas9 technology and subjected to TGF- $\beta^2$  induced EMT. The actin cytoskeleton was assessed at the nanoscale level using stochastic optical reconstruction microscopy (STORM). To measure actin dynamics, LifeACT-GFP was ectopically expressed in cells and live-cell confocal microscopy performed. Image analysis was performed using Vutara SRX and ImageJ software to measure changes in actin stress fiber formation and movement. Targeting Cx43/actin interactions may represent a therapeutic target for metastatic disease.

*Mentor(s): James Smyth (Virginia Tech Carilion Research Institute).*



**SHALINI RANA**  
CREATIVE WRITING

## ***An Aesthetic Appreciation of Copenhagen's Cycling Culture***

Based on my own experience of cycling for a week in Copenhagen, Denmark, I analyzed how the unique history and infrastructure of Copenhagen's cycling culture shape an individual's perception of moving through an urban environment, in ways different from the traditional transportation experience. While this is a research paper, I consider it to be a creative work that traces and makes sense of my own experiences in a new cultural setting. I learned that by engaging with our senses and the world around us, afforded by the experience of cycling in an urban environment, we become a part of the "city's organism."

*Mentor(s): Jane Wemhoener (English).*



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## ANGELA DOMINIQUE S. RARA

SUSTAINABLE BIOMATERIALS

## DYLAN HARRIS

SUSTAINABLE BIOMATERIALS

## BRIAN J. WERNECKE

SUSTAINABLE BIOMATERIALS

### ***The Wood Enterprise Institute-Beer Flights***

The goal of the Wood Enterprise Institute is for a group of students to design, manufacture, and sell a wood product, and in the process learn how to structure and run a business. The purpose of the organization is to provide an opportunity for students to experience an entrepreneurial venture -- specifically in a consumer-facing product manufacturing context. The organization is actually a structured course for credits that is offered through the Department of Sustainable Biomaterials (SBIO 3445 and SBIO 3446: Entrepreneurial Wood Design and Innovation). During the first semester, students were able to gain a general understanding of woodworking process, done by completing a hands-on manufacturing project; complete the product ideation phase; and form teams and define each team's function, as well as individual roles; complete multiple product design iterations. During the second semester, students are to market their product; receive orders from customers and start on production; create a continuous improvement plan for manufacturing operations; and practice financial reporting to the "Board of Directors." By the end of the year, students will have experience in creating and implementing a business plan; marketing and selling a product; creating multiple design prototypes based on feedback; honing the manufacturing process; and compiling data into a final report.

*Mentor(s): Earl Kline (Sustainable Biomaterials) .*



## JACK REAUME

GEOGRAPHY

### ***Habitat suitability model for non-timber forest products at the Hahn Farm Montgomery County, Virginia***

In this study, our research objective was to determine habitat requirements for 7 common NTFP species and identify available habitat for the native NTFP species on the 660 acre Hahn Farm located just outside Blacksburg, VA. Non-timber forest products (NTFP) play an important role to small-scale landowners by providing additional income. The 7 native species are Ginseng (*Panax quinquefolius*), Blue Cohosh (*Caulophyllum thalictroides*), Goldenseal (*Hydrastis Canadensis*), Black Cohosh (*Actaea racemosa*), Bloodroot (*Sanguinaria Canadensis*), and Ramp (*Allium Tricoccum*). The first step was a met-analysis of available literature to develop a detailed description of habitat characteristics for each NTFP. Subsequently we created two geospatial datasets in order to identify suitable habitat for NTFPs chosen. Initial geospatial model parameters were derived from the literature review of each species. Next, individual habitat models were developed in a GIS and field validated. Field validation measurements collected included: groundcover, PH, soil chemistry, canopy cover, over story species composition by height class, species, and diameter breast height of canopy trees. Final models were then created and applied to the property to identify acreage with geographic location of potentially suitable habitat for each NTFP. Total suitable habitat area for each species by acreage was: Ginseng 31 ac, Blue Cohosh 23 ac, Goldenseal 42 ac, Black Cohosh 38 ac, Bloodroot 33 ac and 33 acres for Ramp.

*Mentor(s): Verl Emrick (Conservation Management Institute).*



## EMMA J. RHODES

HISTORY

### ***Tweeting an Epidemic: The Spanish Flu in 140 Characters***

This poster will address the experience I gained in an independent study this semester. The first half of the study, which lasted until March 1, required me to use Twitter (@1918FluSeminar) to publicize an academic enrichment seminar for K12 teachers on the 1918 Spanish flu pandemic. I had to encapsulate bits of history into 140 characters or less, which proved to be no small task. Almost all of the tweets included pictures, usually from 1918. My poster will cover both the process of finding relevant images and how I connected them to the seminar in just a few short sentences. I will include examples of tweets that covered various aspects of the flu pandemic, from newspaper headlines to daily life. One tweet begins “Artist Gustav Klimt died of causes related to the flu on February 6, 1918”, and includes a picture of a painting by Klimt. Another states “Medical science with a bit anti-German propaganda”, in reference to its image of the headline “Medical Science’s Newest Discoveries About the Spanish Influenza: How the First Real Epidemic of the World War Spread from the German Trenches”. Others contain images of people wearing flu masks, a practice made mandatory in certain cities. I will also include the websites, such as Chronicling America, that were most useful in finding images. Overall, the poster will explain the analytical research process and the creative process of writing the tweets, and how tagging was used to reach the maximum number of people.

*Mentor(s): Tom Ewing (History) .*



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**KIRA A. RIDDLEMOSER**

MARKETING

**PATIENCE A. PERRY**

BUSINESS INFORMATION TECHNOLOGY

**ALLIE J. AHN**

POLITICAL SCIENCE

***Thrive Living Learning Community***

Thrive Living Learning Community is a tight-knit group of all years and majors who learn and develop their strengths to be the best they can be. Thrive is a fantastic first year experience, where members can put forth the strengths they have discovered into problem solving and group work. We do so through community wide team building events, strengths based workshops, and educational speakers who share their experiences and how to use strengths in the workplace. Within the community, we have committees that keep Thrive thriving. I am the Recruitment committee lead and I am in charge of educating and recruiting future members of the Thrive Living Learning Community. My job is extremely important to the development and success of the community as a whole, and one thing that fellow member, Patience Parry and I created was a recruitment video to educate the campus and future Thrive members what we are all about. This project shares many aspects of Thrive that make us unique and valuable to the Virginia Tech community and Patience and I want to be able to explain our creative and analytical processes to creating the video. Thrive is still a new community to the VT campus but has the potential to be one of the most beneficial to the first year college experience, and we hope to express this to you all.

*Mentor(s): Taran Cardone (Thrive Living-Learning Community); Hayley McIlvaine (Division of Student Affairs).*



**ARTURO ROMAN**  
MICROBIOLOGY

### ***Effect of location on wheat seed microbiomes in Virginia***

Wheat is a globally important crop that has several major fungal diseases that appear to be increasing in spread and virulence. Traditional wheat breeding can select disease resistant strains for planting, and this can also be based on genetic screening for the presence of disease resistant forms of genes. However, microbial endophyte communities, the plant ‘microbiome’ that resides in plant tissues, may also contribute to host disease resistance, and constitutes a relatively unexplored area for crop improvement. To begin to explore the potential for these endophytes to impact disease resistance, we completed a culture-independent analysis (based on the bacterial DNA present inside the seeds) of bacterial wheat endophytes from the seeds of three wheat varieties grown at three different sites in Virginia. We found that the bacterial taxa in these wheat varieties grown in Virginia are consistent with other published studies. For example, the most dominant bacteria we found was in the genus *Pantoea*, which has also been found in other studies of wheat seeds. Second, the amount of variation in the bacterial endophyte community within a wheat variety at a site (i.e. across our 3 subsamples) was substantial, and as great as the variation among varieties and among site. We hypothesize that it is the interaction between host genetics and bacterially-contributed genes that ultimately result in higher disease resistance.

*Mentor(s): Lisa Belden (Biological Sciences).*



**RYAN J. ROSNICK**

GENERAL ENGINEERING

**RAQUEL G. SMITH**

MARKETING MANAGEMENT

**OLIVIA T. WOOD**

HISTORY/CLASSICAL STUDIES

**KYLE A. MASTRACCI**

GENERAL ENGINEERING

**CHRISTIAN J. SMUCKER**

COMPUTATIONAL MODELING AND DATA ANALYTICS

### ***Mentoring SOAR Virginia Students at Radford High School***

Our presentation will be highlighting our efforts in mentoring and helping SOAR Virginia students with preparing for life after high school. We will describe our goals of informing the students about scholarship and volunteer opportunities and guiding them in these endeavors, using the knowledge that we already have from being through the same process just last year. We will also share our experiences in college and try to shape a positive image of college for the students to get them excited about applying. We will describe our process in learning about the students and their goals for the future and helping them decide on which colleges would meet their goals. We will show how we communicated with the students through Remind 101 to keep an open line of communication for the students to ask us questions whenever they thought of them. We will help them reach their community service requirements for the program they are in by providing them information on local volunteering opportunities. We also will explain how we helped teach them the proper method to email their superiors to prepare them for any future endeavors in the future. We hope to have an outcome that creates a mentoring program between future Residential Leadership Students and the SOAR Virginia program in Radford High School.

*Mentor(s): Lisa Moyer (Leadership Studies).*



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**SHEA RUFFIN**

ENGINEERING SCIENCE AND MECHANICS

**DANIEL CUSUMANO**

ENGINEERING SCIENCE AND MECHANICS

**COREY SPOHN**

ENGINEERING SCIENCE AND MECHANICS

**BRYAN FINN**

ENGINEERING SCIENCE AND MECHANICS

**ANDREW MARINO**

ENGINEERING SCIENCE AND MECHANICS

***Jawsdropping Crowd Dynamics***

Our goal is to model human-robot dynamics in a crowd panic situation and validate the model with a multi-pursuer multi-evader experiment. It is not well understood how a human reacts to a mobile robot, particularly in a rushed situation. Robots could be used in evacuation scenarios to help move people in the right direction and it would be beneficial to have an experimentally-validated model before building robots for this purpose. Our multi-pursuer multi-evader experiment will use a game to simulate a rushed scenario and use robots as players in order to collect data on the social force dictating how a human reacts to a robot. Social forces approximate how a person responds to information surrounding them. We will use motion tracking to analyze how far the humans stay from the robots, giving us a way to measure the social force between humans and a robot.

*Mentor(s): Nicole Abaid (Engineering Science and Mechanics).*



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**MATTHEW J. SALERNO**

ENGINEERING UNDECLARED

**ZACH A WUSK**

MECHANICAL ENGINEERING

**JILL E STREAMER**

ENGINEERING UNDECLARED

**JANE NUNN**

NATIONAL SECURITY AND FOREIGN AFFAIRS

**BEN J. JOHNSTON**

BUILDING CONSTRUCTION

**CHRIS HOMERE**

BUSINESS INFORMATION TECHNOLOGY

**EVAN CLARK** ELECTRICAL ENGINEERING***Outreach to Youth in Giles County***

We are one of two groups in the Residential Leadership College working with the FOCUS program in Giles county. The FOCUS program works with at risk youth in middle and high school in Giles County to reduce the strain on emergency services and improve the future prospects of these students. Both our group and our partner group have been working to form relationships with these students and to show them the many possibilities in their future if they decide to go to a college or university. Our group has been doing this by providing tours of certain university features while the other group is focused on organizing fun social events. While we are responsible for the planning of our events we often receive help from our partner group in executing them and vice versa. Our first event was called “Lab Day” where we and the kids toured three of Virginia Tech’s engineering labs. Our next event is “VT Day” where we are focusing on showing the students college life by taking them around campus. Our overall objective is to expose these students to the prospect of going to a college or university. Unfortunately, many of the adults in Giles county did not attend a university so many kids in this area feel locked into their position in life. They are not aware of or have not considered the options available for them to climb the socioeconomic ladder. So our goal is to, at minimum, show them future possibilities. Hopefully, this will then encourage them to pursue a college education.

*Mentor(s): Jeannie Layton-Dudding (Giles Cooperative Extension SVC).*



**NIRALI M. SATASIA**

BIOCHEMISTRY

**KEVIN M. JAMIESON**

GENERAL ENGINEERING

**JOEY J. TROIA**

GENERAL ENGINEERING

**KAILEY BLAYLOCK**

BUSINESS UNDECIDED

**ANDREW GROSS**

BUSINESS INFORMATION TECHNOLOGY

**CHRISTIAN YOON**

POLITICAL SCIENCE

### ***Awareness of Water and Electricity Usage in Peddrew Yates Hall***

Our goals of this project are to raise awareness of water and electricity usage. We hope to conserve this usage by encouraging students to think consciously when making decisions about water and electricity use. The purpose of this project overall is to bring recognition to this topic and overall reduce electricity and water use. Our methods to execute our goal are to place stickers and fliers throughout Peddrew Yates Hall. The fliers and stickers have quotes and sayings that encourage electricity and water reduction and encourage those viewing them to act rationally. We hope this allows the students living there to see our fliers and act on what they see. Our anticipated results are to see that the students became aware of this topic and reduced their energy and water consumption. We are conducting a post survey to analyze the results.

*Mentor(s): Tim Filbert (Leadership).*



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## GRACE E. SCHAEFFLER

GENERAL ENGINEERING

### *Grace Schaeffler Portfolium*

To display previous work that I have included in my portfolio. The big picture for my portfolio is to get a job in the future to allow for a job that I am passionate about. I am putting together a research portfolio documenting my academic work from high school through college.

*Mentor(s): Kayla McNabb (University Libraries).*



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## KATRINA J. SCHMID

CIVIL ENGINEERING

### ***General EPortfolio Experience***

During my freshman year, I worked to culminate an EPortfolio as part of a pilot course on portfolio development. This work highlights various papers and projects I worked on throughout my coursework as a Civil Engineer at Virginia Tech and assignments from high school. This is a research portfolio documenting my academic work from high school through college.

*Mentor(s): Kayla McNabb (University Libraries).*



## DAVID M SCHMIDT

NATIONAL SECURITY AND FOREIGN AFFAIRS

## MICHAEL GISH

POLITICAL SCIENCE

## HANNAH PLEDGER

NATIONAL SECURITY AND FOREIGN AFFAIRS

## AMANDA ROBINSON

FINE ARTS

## ANNA SADOWSKI

PACKAGING SYSTEMS AND DESIGN

## NICOLE ROMAGNOLI

POLITICAL SCIENCE

### ***How to Get the Next Generation Interested in Strategic Stability and Countering Weapons of Mass Destruction***

This Diplomacy Lab research team met weekly for three months with the overall goal of producing an outreach strategy demo for the Bureau of Arms Control, Verification, and Compliance so that the Bureau could better educate people, aged around the college student and young professional demographic. Managed by one faculty member, the team was comprised of five Political Science students, a Graphic Design student, and a Marketing student. The team quickly came to the realization that this project was in much greater degree a marketing project rather than research on national security and foreign affairs, and did their best to meet the challenge. To inform their outreach strategy, the team wrote and shared a 15 question survey on news consumption and social media habits, as well as opinions on understanding of the proliferation of weapons of mass destruction (WMD). Based on the results, it was decided that an interactive news app paired with a social media and campus-based promotional campaign would likely be the most effective and cost-efficient way to reach the target audience with messaging concerning WMD. Additional suggestions on formatting guidelines for social media posting and writing of articles are included. To reach the youngest generation, messaging must engage them, and be written in terms they understand. Lastly, a mockup of a DoS news app has been created by Amanda Robinson, our graphic design major.

*Mentor(s): Chris Price (Political Science).*



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**YEJIN SEO**

BIOLOGICAL SCIENCES

**ANDREW BISCARDI**

BIOLOGICAL SCIENCES

***Disabled-2's Role in Inhibiting Tumor Cell Extravasation  
by Competitive Binding with Sulfatides***

Disabled-2 (Dab2) is an anti-coagulant protein that blocks platelet-platelet and platelet-professional cell interactions. To proceed with extravasation, cancer cells require to sequentially interact with platelets and endothelial cells at the blood vessels. Preliminary data indicates that Dab2 also impairs platelet-leukemia cells interactions. To make Dab2 druggable, we are designing a Dab2-derived peptide with maximal stability and high affinity to sulfatides, a class of lipids that favor extravasation. A Dab2 peptide will be isolated and assayed for sulfatide binding as well as for blocking platelet-cancer cell interactions.

*Mentor(s): Daniel Capelluto (Biological Sciences).*



**SARAH A. SHAVER**

HUMAN DEVELOPMENT

**SYDNEY M. AUSTIN**

HUMAN DEVELOPMENT

**ASHLEY UY**

HUMAN DEVELOPMENT

### ***Service Learning Experience with Local Elementary School***

Our experience is in a local elementary school in Blacksburg, Virginia, with a third grade class. We helped the teacher and his students with classwork in subjects including science, math, history, and literature offering support individually and in groups. We supported the classroom academically and socially, during class time and recess. We were presented with this opportunity through our Principles of Human Services class (HD 2335) from the Department of Human Development and Family Services at Virginia Tech. We chose to participate in this assignment option for the potential challenges and applicable experiences. We wanted the experience of being in the classroom without the responsibility of leading. This became apparent to us in an article by Gentry in 1990, where they wrote that students take away more from the experience when they are helping in the environment without having the added pressure of being the authority figure. During this experience, we welcomed the challenge of “messiness” in the classroom to develop our adaptability in engaging with people (Gentry, 1990). “Learning by doing” allowed us to learn beyond the constraints of lectures (Gentry, 1990). We connected these inspirations to content from our Principles of Human Services class like the need to practice open-mindedness and adaptability. We have taken these encouraging lessons from class about how to interact with people and applied them to real-world situations.

*Mentor(s): Matthew Komelski (Human Development and Family Services); Mary Nedela (Human Development and Family Services).*



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**NOAH M. SHORB**

COMPUTATIONAL MODELING AND DATA ANALYTICS

**ALEXANDER S. MERJIAN**

ENVIRONMENTAL SCIENCE

**JOSHUA K. HARRELL**

BUSINESS

***Radford Culinary Arts Project***

We are working with the Culinary Arts directory at Radford High School to improve their quality of education. We are doing this by providing resources to help continue lessons throughout the fall semester. Resources such as money, food, and equipment.

*Mentor(s): Lisa Moyer (Education Consultant).*



**JACOB S. SLAGLE**  
MECHANICAL ENGINEERING

### ***Oxidation Testing of Colloidally-Processed UHTCs***

Ultra-high-temperature ceramics (UHTCs) are a class of advanced materials designed with the ability to survive in extreme environments; thus, they have been proposed for applications such as leading edges for hypersonic aircraft, where temperatures reach over 2000 °C. Currently, most UHTCs are fabricated using high pressure techniques like spark plasma sintering. While effective, these processes are incapable of creating components with complex geometries. Consequently, parts must then undergo costly machining processes to meet requirements. Alternatively, colloidal processing+pressureless sintering techniques have been found to successfully produce complex near-net shaped parts with physical and mechanical capabilities comparable to that of the high pressure methods. However, the oxidation resistances of colloidally-processed UHTCs has not yet been evaluated. This collaborative study with the University of Virginia is designed to develop samples of UHTC materials, ZrB<sub>2</sub> and TiB<sub>2</sub>, using conventional spark plasma sintering methods as well as more-novel colloidal processing. Samples derived from each of the manufacturing processes will undergo oxidation testing. These samples will then be carefully examined via SEM, to evaluate and compare their respective oxidation resistances. Currently, in the processing stage, SPS and colloidal methods have yielded TiB<sub>2</sub> samples with theoretical densities of up to 89% and 87%, respectively. Oxidation testing will begin in the upcoming weeks.

*Mentor(s): Carolina Tallon (Materials Science and Engineering), Elizabeth Opila (Materials Science and Engineering, University of Virginia).*



**CAROLINE E. SLOCUMB**

HUMAN DEVELOPMENT

**NATALIE G. LOGAN**

HUMAN DEVELOPMENT

**CARLY L. RETTIE**

HUMAN DEVELOPMENT

### ***Learning How to Learn at Gilbert Linkous Elementary***

We have been volunteering at Gilbert Linkous Elementary School to complete our experiential learning. Our presentation will describe the work we do in the classroom and in the homework club. While working in the classroom we are able to observe the teacher as well as work with students one on one who need extra help. This experience is helpful to see how a classroom is run and different strategies for teaching and classroom management. Homework club is a chance for students who fall behind easily to get their homework done in a setting that provides appropriate help. We provide aid to the students by keeping them on task, helping with tough problems and encouraging them to focus and work hard. Our presentation will also depict how we are able to help students as well as what and how we learn from our experiences. While we are able to make an impact on the students we are helping, our experiences are also helping us apply material we have learned in classes to real world situations. We hope that our presentation is able to express how important experiential learning has been to our college experiences specifically being Human Development majors. While working with the students at GLES we are able to gain experience in future career fields and engage with the community. By presenting we hope to also further our own understanding of the work we are doing as well as how it will help us and the students in the future.

*Mentor(s): Matthew Komelski (Human Development).*



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**DARREN SMALL**

FINANCE

**EYRN PETERS**

PSYCHOLOGY

***The Tale of Two Chairs***

The current and former Chairs of the Student Budget Board will share our experiences from our time running the board. The presentation will be centered around stories that illustrate experiences that helped us grow ways you may not be able to in the classroom. We will talk about our transitioning from a board member to the chair, the challenges of running an organization/board, managing relationships while in a leadership position, navigating a complex university, moments where we learned and applied coursework, the power of teamwork, and having fun while taking on challenging tasks through a dynamic leadership position. We really want to convey the message of how much any leadership role can really help you develop into a well-rounded person through a fun and informative presentation.

*Mentor(s): Gina Tamburro (Student Engagement and Campus Life).*



**EBONE D. SMITH**  
COMMUNICATION STUDIES

### ***Observing and Analyzing Variations of Daily Precipitation: The Impact of the El Niño/Southern Oscillation on Kiritimati Island***

In 2016, a very strong El Niño increased the amount of precipitation measured on Kiritimati Island (2 °N, 157.4 °W) during the El Niño Rapid Response (ENRR) field campaign. ENRR collected surface meteorological data on Kiritimati Island from January through March 2016. This project focuses on the daily precipitation data collected from 1971 through 2016 during the time of year when ENRR took place and it evaluates how the El Niño/Southern Oscillation (ENSO) influences the daily rainfall distribution on Kiritimati Island. We analyzed daily rainfall measurements from the freshwater lens automated weather station, Decca, and the official Kiribati Meteorological Service station at Cassidy International Airport (PLCH). The long-term data from PLCH provides a historical context from 1971-1990, 1996-2003, 2015-2016, which allows for the study of the distribution of daily rainfall on the island, i.e. how much rain falls into different categories with respect to the total amount of rain measured. We investigated the distribution of daily rainfall on the island during different phases of the ENSO phenomena by generating and analyzing two types of plots: time series and histograms. The plots were made from the three data collection sites (PLCH, Decca, and CXENRR - the Kiritimati Island ENRR location.) This presentation will explain how rainfall on Kiritimati Island during an El Niño differs from rainfall during a La Niña and the neutral phase of ENSO.



**ABEL Z. SOLOMON**

BIOCHEMISTRY

**BRETT J. SMITH**

PHYSICS

**MICAELA I. ALBRIGHT**

CRIMINOLOGY, SOCIOLOGY

### ***WWII: From VT Classroom to the Battlefield***

As part of its commitment to developing Global, Ethical Leaders, the Virginia Tech Corps of Cadets established the Global Scholars program. Focusing on the events surrounding Operation Overlord of World War II, the program features a semester of classroom studies in the spring followed by an expedition to Normandy and Paris, France in May. Cadets analyzed historic and current leadership challenges at the tactical, operational, and strategic levels; analyzed causes and sequences of the conflict and national and military objectives; discussed various instruments of national power in relation to national security; and immersed in the cultures of France. Cadets gained an in-depth appreciation of these issues, from which they can leverage in future leadership roles in the Corps or in their careers as business leaders or military officers.

*Mentor(s): Lt Col Donald Russell (Virginia Tech Corps of Cadets).*



**TYLER S. SPIERS**  
BUSINESS MANAGEMENT

### ***First Year Experience***

My goal of my ePortfolio presentation is to create a research portfolio documenting my experiences as a freshman at Virginia Tech.

*Mentor(s): Kayla McNabb (University Libraries).*



**JACOB D. STEFFEY**  
ENGINEERING

**JARED T. STEELE**  
ENGINEERING

**OLIVIA J. NITOWSKI**  
BIOLOGICAL SCIENCES

**KUSH V. PANDIT**  
ENGINEERING

**FRANCISCO J. PEREZ**  
ENGINEERING

**MANASHA BHETWAL**  
INTERNATIONAL RELATIONS

### ***Go Green!***

The goal of our project is to reduce waste caused by the overuse of paper take-out food containers used in dining halls. We want to raise awareness of the green to go boxes provided to every student and how they can reduce waste. Unlike the paper take out containers, the green to go boxes are reusable and washable, and greatly reduce the amount of waste we produce. We plan to put up fliers around Payne hall that briefly explain what the green to-go boxes are, how they work (the process of checking them out), and the benefits of using them. Recently, the team sent out a survey to the RLC asking how many times a week (if any) people used the green to go boxes. At the conclusion of our project, we will send out a follow up survey to see if our efforts raised awareness of the boxes and led to an increase in their usage. We hope that our project will lead to more people using the green to-go boxes which will in turn decrease the amount of waste produced from paper containers. We will be able to determine our success by examining the results of both surveys at the conclusion of the project.

*Mentor(s): Tim Filbert (Citizen Leadership).*



**MARILYN J. STEINBACH**

BIOLOGICAL SCIENCES

**MARIAM N. OUATTARA**

PSYCHOLOGY

**SAREENA A. PATEL**

NEUROSCIENCE

**NIKITA THADANI**

PSYCHOLOGY

### ***Neurophysiological Underpinnings of Boredom***

Boredom is a misunderstood and under researched phenomenon. Boredom is a neurological and psychological phenomenon that afflicts everyone in various forms. Additionally, boredom has been associated by researchers with several serious psychological and medical health issues, such as ADHD/ADD, depression, and anxiety, as well as plays a crucial role in the recovery from traumatic brain injury. By means of this research study, we hope to better understand boredom and the neural correlates of this state. Developing a physiological definition of boredom could elucidate psychiatric conditions, contribute to the development of new therapeutic techniques, and contribute to the overall understanding of the human condition. We will measure autonomic arousal using skin conductance and cardiac measurements taken during a vigilance task, during which the subject is forced to focus while bored. The purpose of using the skin conductance is to extract the current that flows when an individual is physiologically aroused. The purpose of the CNAP monitor is to extract cardiac related measures in order to determine changes in physiology when an individual is in a state of boredom. We expect to find an increase in sympathetic arousal evidenced by decreased heart rate variability and increased skin conductance.

*Mentor(s): Kelly Harrison (Psychology), Brad DeVore (Psychology).*



## CAYLIN O. STEWART

AGRICULTURAL SCIENCES

### ***Weedin' with Purpose: Inspiring Awareness of Ecological Practices at the Hale YMCA Community Garden***

The "Weedin' with Purpose" Community Action Project seeks to develop sustainable methods of weed management at the Hale YMCA Community Garden through the creation of multilingual weed manuals and supplemental signage. This capstone was a partnership between the Civic Agriculture and Food Systems Minor and the Hale YMCA Community Garden. The resources developed by this project utilized existing literature and plant evaluations to identify key weed species at the garden and to better understand their ecological significance, such as their ability to reduce erosion and improve soil quality. Long-term, this project aspires to develop an ecological standard of weeding, promote healthier soil, water, and crops, and encourage an inclusive space for diverse populations to thrive at the garden. Through these measures, this project relates to the Ecological Stewardship, Health People and Community, and Food Security/Sovereignty Civic Agriculture Cornerstones.

*Mentor(s): Susan Clark (Horticulture), Jenny Schwanke (Hale YMCA Community Garden, Blacksburg).*



## ANDREW P. STILES

CHEMICAL ENGINEERING

### *Small Scale Hydrogel Bioreactor*

Hydrogels are type of material that can soak up water like a sponge, but is much more useful to science then cleaning glassware. Hydrogels are used in tissue engineering to support and guide a culture of cells into a full-fledged organ. This Bioreactor, sparked by the Virginia Tech Entrepreneurship Challenge, explores the hurdles of developing a chemical reactor and working with hydrogels. Some interesting components of the project are the use of feedback loops. These feedback loops control everything from maintaining a constant heat, to the flow rate of nutrients. These controls are processed though a microcontroller and can be easily manipulated on a laptop. This reactor also shows the potential of small-scale reactors as a useful tool for modeling large scale reactors. Troubleshooting a process on a small scale is much cheaper than fixing large scale components that suffer from the same issue.



# JONATHAN D. STROUD

## ENGINEERING

### ***Research Portfolio***

The goal of these projects is to present a more well-rounded view of the work I have accomplished. The project is an important way to give employers and researchers a better view of myself. With this e-portfolio, my resume will be backed up and there is a greater chance of being recognized. I will describe my project using the descriptions and reflections I have written, as well as additional information that I gather on the artifacts. I hope to gain a better understanding of experiential learning and other people's work.

*Mentor(s): Kayla McNabb (University Libraries); Amanda MacDonald (University Libraries).*



## SARAH E. STURM

BIOCHEMISTRY, PSYCHOLOGY

### *The MUSIC Model of Motivation*

The MUSIC Model of Motivation is a research-based instrument to help motivate students to engage and learn. The MUSIC Model is a multidimensional approach that focuses on eMpowerment, Usefulness, Success, Interest, and Caring in learning. It can be used regardless of the subject being taught or type of course, and is designed to help instructors motivate students, diagnose problems and research factors for motivating learners. Under the guidance and collaboration of instructor David Lally and Music Model creator Dr. Brett Jones, I have spent the last two years helping implement the MUSIC model into the Biochemistry First Year Experience course as an assessment tool of student perceptions. I will be briefly explaining this model, how it was used, how others can use it, and how it has changed my views on learning. Through careful planning, the MUSIC model was implemented to evaluate students' perceptions about learning and subsequently revise the class to better meet their needs. This was a real-time process where students' feedback was used to make changes such as lengthening in-class discussions and improving assignments. Their ideas benefited not only their class, but were also used to develop a better class for the following year. We plan to develop a richer system of learning that meets the needs of each incoming class and boosts student motivation to succeed. My hope for this presentation is to show how beneficial the MUSIC Model can be for instructors and students.

*Mentor(s): David Lally (Biochemistry); Brett Jones (School of Education).*



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## SARAH E. STURM

BIOCHEMISTRY

## HANNAH M. JAMES

BIOCHEMISTRY

## MARISELA A. MARTINEZ

BIOCHEMISTRY

### ***Biochemistry Peer Mentors' Learning Experiences***

We are three students who have served as peer mentors in the VT Department of Biochemistry. For the past two years, we have been partners in the planning and implementation of many new ideas in the Biochemistry First Year Experience (FYE) course. Our objective is to describe, through our shared experiences, what experiential learning means to us. Under the mentorship of instructor David Lally and the help of a dedicated group of peer mentors, the FYE class has evolved from an undervalued requirement to a favorite for many students. It is an interactive class where we challenge our peers to not just listen, but to engage with ideas, to tackle bigger issues and to connect with other students to achieve their goals. By combining social and academic support, we are rethinking the standard classroom format and envisioning a learning community that engages students in active learning, effective team building and creative problem solving. Some of the outcomes we hope to achieve are to provide a better understanding of what we do, and the relevance of the approach we take. Based on our stories, we hope to explain why people should value experiential learning and the differences it can make inside and outside the classroom. Using a similar approach to the FYE class, we hope to engage the audience and change the way they think about learning. We want to showcase what we do in this course and how it has impacted our learning experience in a meaningful way as students at Virginia Tech.

*Mentor(s): David Lally (Biochemistry); Molly Wilson (Biochemistry).*



## ANTOINE SUHAS

INDUSTRIAL SYSTEMS ENGINEERING

## NATHALIE UNICO

CHEMICAL ENGINEERING

### *Engineers Without Borders*

We are the Engineers Without Borders Chapter at Virginia Tech. We help 3rd world communities build sustainable engineering solutions to their problems. These include installing solar panels in Uganda, Building water sanitation solutions in Guatemala, and improving agricultural fields in Nicaragua. This is an opportunity for outreach and general information for new students to understand our mission.



**JULIA TANI**

ENVIRONMENTAL SCIENCE

**BRYANNA VACCA**

BIOCHEMISTRY

**LINDSEY DONOVAN**

HUMAN NUTRITION, FOOD, AND EXERCISE

## ***The Overlap of Traditional and Western Medicine in Ecuador***

Research questions: To what extent is Western medicine integrated into traditional medicine in Ecuador? How does the Ecuadorian medical system compare to typical systems of western medicine? How has the spread of western medicine impacted indigenous people? What is the process of becoming a healthcare professional in both traditional and western settings? How is the environment connected to traditional healing practices? Purpose: Our purpose was to be aware of the cultural differences between Ecuadorian and Americans. We interacted with tour guides and our trip organizer throughout our experience in order to be informed on cultural norms as well as the conditions of the environment. This semester, we have been asked to make a poster to report on a topic that was of our personal interest. Processes used: Our method for recording information on this project was by personal experience and tours of each area described, later recorded in daily journals and pictures. Summary: We discovered how traditional and western medicine systems operate by touring the facilities and learning about all of treatments offered. We observed a clinic that combined western and traditional medicine treatments.

*Mentor(s): Matthew Eick (Crop and Soil Environmental Sciences); Renee Eaton (Human Nutrition, Food, and Exercise).*



**HANNAH TARR**

HUMAN DEVELOPMENT

**MARIAM OUTARRA**

NEUROSCIENCE

### ***Controversial Conversations in a Cross Cultural Community***

We were living in Mozaiko, a global living learning community, and we were trying to figure out how to increase engagement from other members and we also wanted to start a dialogue to learn from each other. We created this event called “Controversial Conversations” where we meet biweekly and discuss different controversial topics. We always have people from several different cultures, countries, and backgrounds in attendance and we have all been able to learn from each other. Our attendance has increased dramatically and people have told us that they enjoy this safe space, love debating, and have learned from their peers. We will be demonstrating how these Controversial Conversations function with an interactive experience.

*Mentor(s): Lia Kelinsky (Cranwell International Center & Mozaiko).*



**EMILY N. TAYLOR** UNIVERSITY STUDIES  
**HALEY M. CLARK** BIOLOGICAL SCIENCES  
**SOPHIA G. TROUT** MULTIMEDIA JOURNALISM  
**HALEY M. FUGATE** UNIVERSITY STUDIES

### ***Adopt Don't Shop***

We decided to volunteer with our local animal shelter because of our interest in the UN Sustainability Goal, Partnership for the Goals. This goal comprises the partnership between members of the community in order to achieve a common goal; in our case this common goal is the support and adoption of animals. We want to not only support the animals at the shelter by volunteering to help them, but also raise money for the shelter so that the animals have a better way of living during their (hopefully short) stay at the animal shelter. We also hope to raise awareness about animals at shelters, and do our best to influence the philosophy of “adopt don’t shop” among others. We hope to do this by posting on our social media accounts about it, and by posting flyers throughout the Blacksburg area. With our groups influence with the animal shelter, we hope to create a better environment for all animals and influence our society to adopt animals that need homes before buying an animal from a breeder or store. This is a goal that not only we want, but also those supporting the animal shelter and the animals desperately in need of homes.

*Mentor(s): Mallory Foutch (Women’s Center).*



**JAMES E. TAYLOR**

COMPUTER SCIENCE

**TREVOR W. JONES**

COMPUTER SCIENCE

**LEE K. CHEA**

COMPUTER SCIENCE

### ***Improving Microservice Infrastructure and Operational Reliability of a High Frequency Environmental Monitoring System***

The Learning Enhanced Watershed Assessment System (LEWAS) lab is a high-frequency, real-time environmental monitoring lab located on the Virginia Tech campus. The lab monitors and provides real-time environmental data to evaluate impacts of the Webb Branch Watershed for research and educational purposes. An interdisciplinary group of undergraduate and graduate students are responsible for keeping high-frequency data collection operational, and continuing the improvements of the LEWAS. Recently, the team has made improvements towards a simpler microservices-based architecture. This simplification of existing tools has allowed for better maintainability and scalability of the system, which will be presented in this poster. A new RESTful API along with database optimizations and sensor parsing scripts are among the improvements which will be discussed. These improvements were essential and they benefited other areas of the lab: writing scripts which monitor instruments, aggregate data, and analyze illicit discharge events. The work involved with the maintenance and development of the system very closely complements (and augments) a course of study focusing on systems and networking. Each of these experiences solidified and built upon authors' engineering learning experiences. The authors will also reflect on the value of mentorship from graduate mentors in enriching their learning, due to the diverse academic backgrounds present in the lab.

*Mentor(s): Vinod Lohani (ICTAS/Engineering Education); Debarati Basu (Engineering Education).*



**JAMES E. TAYLOR**

COMPUTER SCIENCE

**ARIANA S. HERBST**

COMPUTER SCIENCE

### ***Building a Kernel in Rust for the Raspberry Pi: An Experimental Course on Operating Systems***

The objective of this independent study is to evaluate the feasibility of teaching operating systems by programming actual hardware (Raspberry Pi 3) using Rust, an innovative systems language. We utilized resources from Stanford's course CS140e: An Experimental Course on Operating Systems. We gained understanding of a variety lower-level systems and hardware concepts, including drivers, file systems, virtual memory subsystems, and hardware registers. The majority of development occurred in Rust: a language that is intended as a systems programming language that runs fast, prevents segfaults, and guarantees thread safety. During the course, we became familiar with the Rust development toolchain and the hardware on the Raspberry Pi 3. We expect to discuss how the curriculum at Virginia Tech compares to various topics from the course. So far we have determined that, while Rust has a large learning curve, the process of explicitly specifying lifetime and ownership of data allows for greater protection against typical data race bugs commonly found in other systems programming languages such as C (which is used in CS 3214). The projects for CS 3214 at Virginia Tech has several abstractions for data structures, while students in CS 140e must implement several data structures with limited standard libraries, as limited resources are available on initial booting.

*Mentor(s): Godmar Back (Computer Science).*



**MARIA-FE S. THIELMAN**  
MECHANICAL ENGINEERING

### ***Conservation of Momentum and Elastic Fins - Movement in a Fluid***

The purpose of the research was to study how elastic fins, set at an angle at the bottom of a boat could be used to move a boat forward. The goal was to understand the relationship between average speed of the boat forward motion and the elasticity, shape, number, and size of the fins. This project applies in understanding physical relationships between the drag force on an elastic fin and conservation of momentum. A mechanism that moves a weight back and forth was installed on a small boat. Because of conservation of momentum, there is no net movement forward or backward, and the average velocity is zero. By attaching elastic fins at an angle at the bottom of the boat of varying stiffness, size, shape, and quantity, movement can be made forward. The four aforementioned variables are compared against the dependent variable, average speed of the boat. Currently, we are entering the testing phase and are awaiting results. We anticipate being able to compare the results of varying stiffness, size, shape, and number of fins to determine the optimal setup that would achieve the highest average speed.

*Mentor(s): Sevak Tahmasian (Biomedical Engineering and Mechanics) .*



ZORIAN THORNTON  
STATISTICS

### ***Modeling the Transmission Rate of Bluetongue***

Bluetongue is an insect-borne disease contracted by mainly by sheep, but also deer, cattle, buffalo, and other ruminants. Bluetongue is transmitted by biting midges, mainly *Culicoides imicola*. This study strives to model  $R_0$ , the basic reproductive number, by building predictive models for bluetongue using various factors pertaining to the vector and environment.

*Mentor(s): Leah Johnson (Statistics).*



## PHILIP TSOI

BUSINESS INFORMATION TECHNOLOGY

### ***Business and Culture in Italy***

The goal of this project is to allow students or interested parties to learn and understand how experiential learning is utilized at the Pamplin College of Business; Business and Culture in Italy, Winter Study Abroad Program. The purpose of this program: - Provide students with an understanding of business in Italy, and by extension, Europe. - Provide students with knowledge and understanding of the driving forces in the Italian economy: food and wine industries, luxury industries, and culture and art. - Help students gain cultural and international competence, so that they feel confident in an international setting. - Give students an understanding and appreciation of cultural differences and how other societies operate. Unlike traditional study abroad programs that operate in a conventional classroom setting, this experimental study abroad program utilizes business visits and historical tours to immerse the student in the country and their business practices. Example of such would be visits to the Lamborghini factory, a vineyard in Tuscany, and also Radio Vaticano. This allows students to gain real-world experience of concepts instead of being taught in classrooms. This program will allow students to immerse themselves in the Italian culture while also learning about how business industries work in Italy. Students will come out of this program with a worldly perspective and will be able to understand how business practices are different across the world.

*Mentor(s): Jennifer L. Clevenger (Pamplin College Of Business).*



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## SARAH UMBARGER-WELLS

HIGHER EDUCATION ADMINISTRATION

## JOHN T. ADDAIR

UNIVERSITY STUDIES

## MAGGIE TURBYFILL

BUSINESS-FINANCE

### ***Being First-Generation***

Students will talk about their experiences being a first-generation college student and bring awareness to the barriers that are present and impact success. This roundtable discussion will give first-generation students an opportunity to bring awareness to their lived experience identifying as first-gen.

*Mentor(s): Sarah Umbarger-Wells (Outreach and International Affairs).*



**JESSICA L. VISHNESKI**  
HUMAN DEVELOPMENT

### ***Finding Integrative Fulfillment at Warm Hearth Village***

Many college students want to be able to help in the community but do not know what options they have. Those who can find an avenue see the volunteer hours promote better relationships between the community and the university that they are representing. I personally wanted to assist those in my area and when offered the option in my Principles of Human Services class I saw it as the perfect opportunity. I was able to work with Warm Hearth Village supporting activities and exercise with older adults. Warm Hearth is a retirement village found just outside of Virginia Tech that offers services from active adult housing to care for Alzheimer's patients in their memory care center. I was fortunate enough to work with those in the active adult and independent living programs. I am passionate about this because older adults can be a well of knowledge and experience that may remain untapped. There is an emphasis on "integrative fulfillment" (Kolb, 2014) that can be found through service learning, many are able to have a more enjoyable college experience through their involvement with service learning. The skills that are learned and practiced from engaging in volunteer services can be beneficial because it gives hands on experience for classes within my major and my future anticipated career. My hope is to foster this feeling of fulfillment while doing service learning and leave a lasting contribution while also promoting a spirit of Ut Prosim within the community that I worked with.

*Mentor(s): Matthew Komelski (Human Development).*



## NATHAN J. WAGNER

GENERAL ENGINEERING

### ***First Year Galileo and InVenTs Studio Experience***

The purpose of this presentation is to give information and insight into the experiences of an involved first year student living in the Galileo Engineering Community. This experience includes making close friends, participating in volunteering events, enrolling in a professional development course, attending social and academic events, and getting involved with club sponsored by CEED. This presentation will be through ePortfolio giving artifacts of events, projects, and reflections on experiences through Galileo. There will be both visual and literal descriptions for various experiences as well as insight on their impact. I will discuss the many benefits of the program, what I got out of it, why I recommend it to first year students, and why I am returning to the community as a leader next year.

*Mentor(s): Patrick Brew (CEED, Galileo).*



**AYRON WALKER** HUMAN NUTRITION, FOOD & EXERCISE

**SUSAN CHEN** HUMAN NUTRITION, FOOD & EXERCISE

**ABBY D AUGUST** GEOGRAPHY

**RUIJIE CHANG** STATISTICS

**HEMBY ABBY** AGRICULTURAL SCIENCES

**CASEY HOFF** ENVIRONMENTAL HORTICULTURE

**NATHAN HUYNH** CIVIC ENGINEERING

**MINGKAI LI** PACKAGING SYSTEMS & DESIGN

**SOPHIE NIKOLAKOS** HUMAN NUTRITION, FOOD, AND EXERCISE

**ROXI SITH** FOOD SCIENCE AND TECHNOLOGY

**JUZNZHI ZHU** ANIMAL AND POULTRY SCIENCES

### ***Community Foodshed Lexicons from the Concepts in Community Food Systems Class***

The Community Food System (CFS) is multidimensional, complex, and forever changing. Everything from its vocabulary and definitions, to what we know about it, to how we understand and practice it is evolving. Students in the Concepts in Community Food Systems course gain service learning experience through a community partner to better understand the dimensions of the community food system. In this course students are given space to synthesize and share their collective learning through critical and creative thinking about the dynamic intersections, meanings, disciplinary influences, realities, challenges, and possibilities surrounding CFS initiatives or issues (food access, justice, democracy, sovereignty, equity, etc). The Community Foodshed Lexicon was an assignment within this course that afforded students the opportunity to each express themselves while practicing critical reflective writing around what they are learning related to the many dimensions of a community food system through the development their own individual Community Foodshed Lexicon. In this class panel presentation, students will present their translation of their iterative cumulative written CF Lexicon into a scholarly, creative “visual” that integrates your collective learnings about dynamic catalysts that frame CFS issues, as well as their personal and professional convictions, core beliefs and values about their CFS lexicon central topic/issue(s)/themes.

*Mentor(s): Susan Clark (Horticulture); Vivica Kraak (Human Nutrition, Food & Exercise), Jenny Schwanke (YMCA).*



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**NATHAN H. WALKER**

PHYSICS

**RADEN P. BOWERMAN**

ENGINEERING

**KYLE REYES QUIAMBAO**

BIOCHEMISTRY

**PETER J. RUPKEY**

ARCHITECTURE

**AADARSH NAIR**

BUSINESS INFORMATION TECHNOLOGY

***EmPOWERing the next Generation***

The purpose of our project is to educate the next generation in renewable and sustainable energy. This goal is based upon the UN sustainability goal regarding affordable and clean energy. We used various tools to teach the elementary aged students about solar, wind, hydro, nuclear, and nonrenewable energy production. We also wanted the elementary aged students to experience a hands-on activity, so we had them build small turbines out of everyday materials. The objective of the presentation is to show the importance of educating the next generation, so that they can invent the future. We want the audience to realize that nonrenewable resources are truly harmful the environment and should be phased out. The models; such as a working turbine, water wheel, solar panel toy, and sample of coal, will be present during our presentation. They will help the audience understand a bit more about sustainable energy and the characteristics of each type. We hope that as more children learn about energy and power production, the potential for more inventors, innovators, and scientists in the next generations will increase. As our group presents on our learning experience, we strive to display the effectiveness and importance of inspiring young minds. Our group truly hopes that we have made an impact on the elementary aged students of the community and the people of the Student Experiential Learning conference alike.

*Mentor(s): Meghan Weyrens Kuhn (Leadership Studies).*



**BRANDON A.**  
COMPUTER ENGINEERING

**LUCAS C. MUN**  
COMPUTER ENGINEERING

### ***Learning about Bat Biosonar by Designing a Biomimetic Robot - Control***

The intriguing dynamics of the horseshoe bat echolocation system has inspired the creation of a biomimetic sonar head. Through the emission and reception of ultrasonic pulses that are inaudible to humans, bats can not only navigate complex foliage, but also categorize their prey. To better understand the mechanisms behind these capabilities, a complete sonar head platform has been designed that includes waveform generation, transduction for ultrasonic emission and reception, and a dynamic periphery that mimic the emission and reception baffles of horseshoe bats. To operate all these components in an integrated fashion, a control architecture has been devised: A microcontroller (Arduino) and FPGA device (NI sbRIO) were responsible for achieving the real-time constraints of movement and digital signal processing. An additional Linux device (Raspberry Pi) served to provide wireless connectivity. On demand, the FPGA generated and dispatched a synthesized chirp, simultaneously triggering the microcontroller to move the actuators for deforming the baffles. The FPGA then sampled the microphone and returned the data back to the Linux host. In the interest of expanding capabilities whilst reducing complexity, a new platform architecture is proposed where the FPGA component can be completely replaced: the microcontroller performs its tasks just as well, and with even more control. This single-board solution reduces the complexity of synchronizing motor control and chirp synthesis.

*Mentor(s): Rolf Mueller (Mechanical Engineering).*



BIOLOGICAL SCIENCES

**NATHAN QUAN**

BIOCHEMISTRY

**TAYLOR OLYMPIA-JAMES**

NEUROSCIENCE

**RYAN MOWREY**

BIOLOGICAL SCIENCES AND WATER

### ***Engaging the community in environmental education and nature appreciation***

Each team member has held an internship and lead volunteer position at SEEDS - Blacksburg Nature Center. Noah co-designed and constructed a 3D Blacksburg watershed model and the augmented reality sandbox for the nature center. Taylor and Nathan are both currently interns at the nature center where they supervise volunteers, are in charge of animal care, and develop weekly activity themes to engage the public in experiential active learning at the nature center. Ryan began as a SEEDS camper in 2005 and as a VT senior in Biological Sciences and Water has worked with Dr. Mike on engaging peers and area youth in watershed education and stream clean-up activities.

*Mentor(s): Mike Rosenzweig (Biological Sciences) .*



**KATHERINE A. WILDE**

MATHEMATICS

**EMILY N. WRIGHT**

MATHEMATICS

**ZACHARY J. CREWS**

COMPUTER SCIENCE

### ***Assessing and Promoting Systems Thinking through Educational Application - An ICTAS-Supported Project***

Our presentation focuses on pilot testing an application that is intended to evaluate and encourage systems thinking in students. The goals of our research are to observe the game play of students and teachers and to identify a way to incorporate the game into math instruction to further promote systems thinking. Systems thinking is a necessary component in several fields of study. By promoting systems thinking at an early age through an engaging application, students will develop systems thinking skills that will aid in their problem solving. Through our research, we are using a sample of middle and high school students and teachers, and we will be presenting the application to them to observe their game play. We will also gain insights from the teachers regarding the incorporation of this game into math instruction and the feedback this game will provide to teachers. Through this project, we will collect observations of teacher and student game play as well as receive feedback on the value this game would hold in math instruction.

*Mentor(s): Alejandro Salado (Industrial and Systems Engineering); Anderson Norton (Mathematics).*



**LINDSEY S. WINDHAUSEN**

HUMAN DEVELOPMENT

**OZIOMACHUKWU CHINAKA**

HUMAN DEVELOPMENT

**NOOR HAMEED**

HUMAN DEVELOPMENT

### ***CDCLR: Experiential Learning***

The course Principles of Human Services challenges us to practice what we are learning in the classroom through experiential learning. We have chosen to have the CDCLR as our experiential learning site. Our goal is to attain a better understanding of the development of young children by interacting with them in various settings. It is our hope that through experiential learning, we will be able to acquire new skill sets that can be applied in work environments of the same nature. Our days will consist of giving our attention to children as they engage with each other during their snack/lunch times, playtime, and reading/independent activities time. In the environment in which we are working, experiences and reflections will yield learning (Fowler, 2008). In helping the teachers, we are better able to understand the roles of human services professionals in the childcare field. With this we are able to make meaningful connections to the concepts and theories we are learning in class about human services. Through participating in this experiential learning, we hope to use this knowledge in our future endeavors in the human services sector.

*Mentor(s): Matthew Komelski (Human Development).*



**MARJORIE J. WOODS**

BUSINESS MANAGEMENT

**CLAIRE E. SUTTON**

POLITICAL SCIENCE

### ***Linking Lives: Personal and Professional Growth through Cultural Exchange and Service Learning***

While on the Linking Lives: Creating Sustainable Social Change study abroad program through the Pamplin School, students had the opportunity to participate in experiential learning through cultural exchange and service learning. Students spent nine weeks in Lugano, Switzerland taking classes in marketing and psychology, preparing for their time in Rwanda, and traveling Europe on the weekends. Students then went to Rwanda for four weeks, where they taught basic English skills and worked with local NGOs. This expanded their personal and professional growth, while allowing them to reflect on their own values and outlook on life.

*Mentor(s): Kim Daniloski (Marketing); David Brinberg (Marketing).*



**JACOB J. WOODY**  
GENERAL ENGINEERING

### ***Portfolium ePortfolio Presentation***

This presentation is an electronic research portfolio. It consists of various projects completed during my senior year of high school and thus far through my first year at Virginia Tech.

*Mentor(s): Kayla McNabb (University Libraries).*