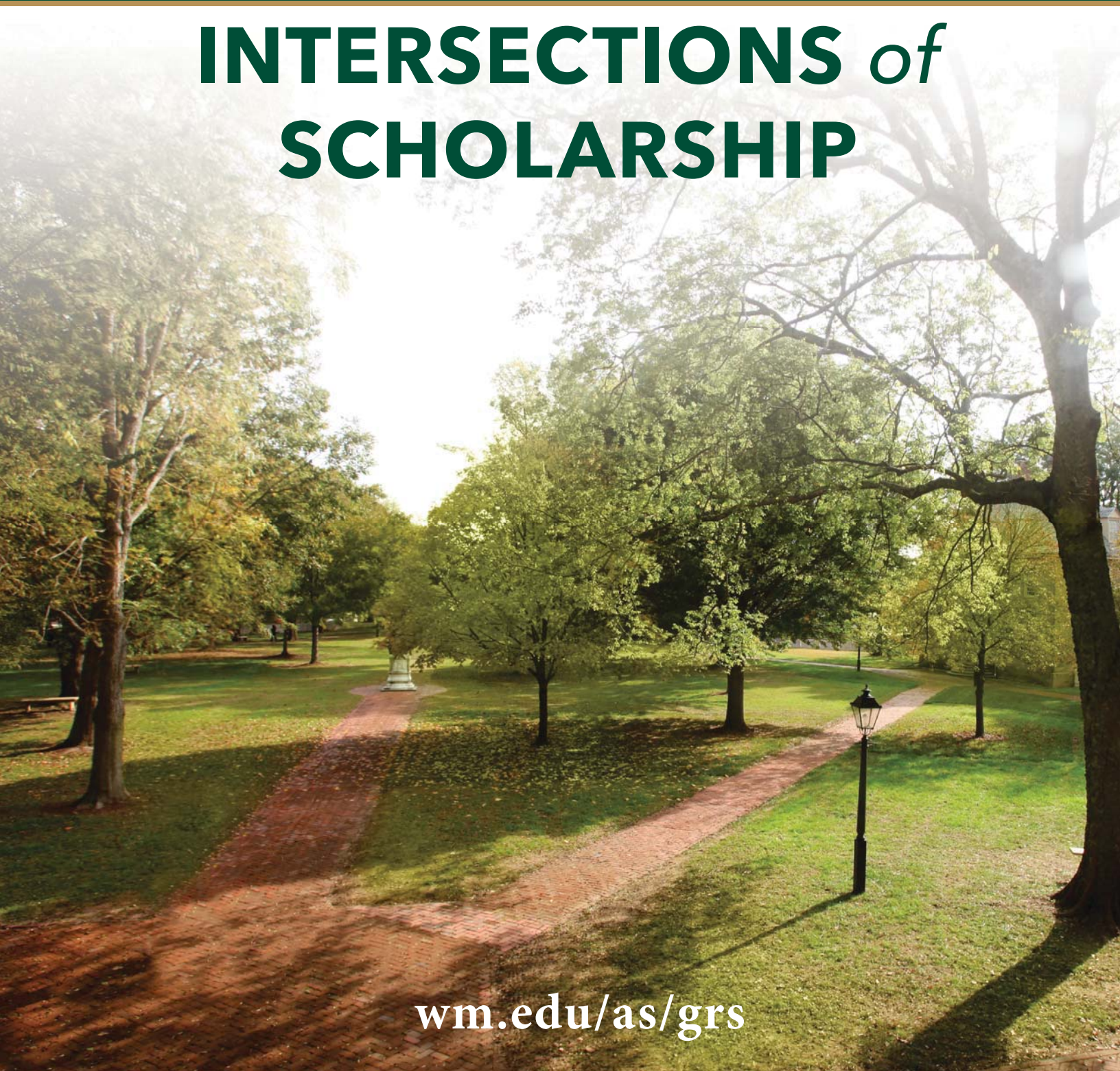
William & Mary
Graduate Arts & Sciences

17th Annual Graduate Research Symposium

MARCH 16-17, 2018

INTERSECTIONS *of* SCHOLARSHIP



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William & Mary
Graduate Arts & Sciences

17th Annual Graduate Research Symposium
Schedule at a Glance

Thursday, March 15, 2018 -- Sadler Center

6:30 pm - 8:00 pm	Annual Raft Debate *Commonwealth Auditorium*

Friday, March 16, 2018 -- Sadler Center

8:00 am - 8:30 am	Registration *Second Floor Lobby*
8:30 am - 9:30 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, York Room, Colony Room*
9:45 am - 10:45 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, York Room, Colony Room*
11:00 am - 12:00pm	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, York Room, Colony Room*
11:45 am - 1:00 pm	Luncheon *Chesapeake AB*
1:15 pm - 2:15 pm	Concurrent Sessions *Tidewater A, Tidewater B, James Room, York Room, Colony Room*
2:30 pm - 3:30 pm	Concurrent Sessions *Tidewater A, Tidewater B, James Room, York Room, Colony Room*
3:30 pm - 6:00 pm	Poster Presentations/ Professional Development and Networking Reception *Chesapeake ABC*

Saturday, March 17, 2018 -- Sadler Center

8:00 am - 8:30 am	Registration *Second Floor Lobby*
8:30 am - 9:30 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, York Room, Colony Room*
9:45 am - 10:45 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, York Room, Colony Room*
11:00 am - 12:00 pm	Awards for Excellence in Scholarship Presentations *Tidewater A*
12:00 pm - 1:30 pm	Luncheon & Awards Ceremony *Chesapeake AB*

https://www.wm.edu/as/grs

Dear Members of the William & Mary Community, Visiting Presenters, and Guests,

On behalf of the Graduate Research Symposium organizing committee, we would like to welcome you all to the 17th Annual Arts & Sciences Graduate Research Symposium at William & Mary! Over the past 17 years, well over 1,000 graduate students from across the country have presented their research to thousands of attendees. This year, 160 graduate students from William & Mary and 20 visiting institutions will add to this distinguished record of presenting excellence in graduate student research.

This year, we have two special events to kick off the 17th Annual Graduate Research Symposium. The first is an Academic Job Market Workshop, which will be held on Wednesday, March 14th from 5:00pm-6:00pm in the Commonwealth Auditorium. This will allow graduate students to ask recent post-docs about their experiences after grad school and exploring the academic job market. The Raft Debate will be held the following evening on Thursday, March 15th at 6:30pm. It will be located in the Commonwealth Auditorium of Sadler Center, and is an engaging blend of debate and comic relief.

The theme of this year's symposium is "Intersections of Scholarship." This theme highlights our ongoing goal of encouraging dialogue between graduate students who specialize in different disciplines. As a way to promote interactions across disciplines, we are holding this year's Poster Session jointly with the Networking Reception. This year's Reception will also include a Professional Development Fair, to help students develop the skills and networks that will serve them well into their professional careers. The joint Poster Session/ Professional Development Fair and Networking Reception will be held on Friday, March 16th from 3:30pm-5:30pm in Chesapeake ABC. This event will give attendees the opportunity to polish their resumes, develop successful course syllabi, learn the ins and outs of academic CVs, and find out more about the services offered by the Graduate Writing Resources Center.

The success of the Graduate Research Symposium over the past seventeen years depends on all of the participants and volunteers who make this great symposium happen. We would especially like to thank the William and Mary graduate faculty, staff, and administration, and the Graduate Studies Advisory Board for their commitment to graduate students and graduate research. Last, but certainly not least, we would like to personally thank all of the members of the Graduate Research Symposium committee for all of their hard work and dedication that went into making this year's symposium better than ever!

Best,

Summer Moore and Alexis Ohman
2018 Graduate Research Symposium Co-Chairs

WILLIAM & MARY
CHARTERED 1693

OFFICE OF THE PRESIDENT

Dear Students and Friends,

Welcome to the seventeenth annual Graduate Research Symposium at William & Mary! It's grand to have you here.

Our students contribute seriously to human understanding on their way to advanced degrees. They then continue to do so as teachers and scholars. The Symposium provides an opportunity for our graduate students and their peers from other schools to present their work and receive comments from people in other departments and schools, as well as the greater William & Mary community. This year's theme, "Intersections of Scholarship," reflects the Symposium's aim to encourage scholarly growth leading to excellent scholarly results.

You have my best wishes for an enjoyable and rewarding time together.

Cordially,

W. Taylor Reveley, III
President

2018 Graduate Research Symposium

Program Co-Chairs
Summer Moore*, Anthropology*
Alexis Ohman, *Anthropology*

Graduate Student Committee
Nick Belluzzo, *Anthropology*
Adrienna Bingham, *Applied Science*
Cheng Li, *Computer Science*
Erin Schwartz, *Anthropology*

Office of Graduate Studies & Research
Dean Virginia Torczon, *Graduate Studies*
Chasity Roberts
Wanda Carter
Sarah Glosson
Vicki Thompson Dopp

Sponsors
A&S Graduate Student Association
Graduate Studies Advisory Board

Special Thanks To:
Rachel Follis, Creative Services
Session Chairs
Volunteers and Room Proctors

Judging Panel
Graduate student poster and oral presenters were eligible to submit a paper for award consideration in the disciplinary category of their choosing. The names and institutions of the students and advisors were removed from the submissions prior to evaluation by the judging panel. Advisors whose students submitted papers recused themselves from ranking those papers. All W&M students were eligible for the Corporate Awards and the W&M Awards for Excellence. Only W&M Master's students were eligible for the Carl J. Strikwerda Awards.

Humanities & Social Sciences
Dr. Alan Braddock, *American Studies*
Dr. John Burton, *Graduate Studies Advisory Board*
Dr. Gerard Chouin, *History*
Dr. Danielle Dallaire, *Psychological Sciences*
Dr. Jim David, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Dr. Neil Norman, *Anthropology*
Dr. Susan Rawles, *Graduate Studies Advisory Board*
Dr. Betsy Sigman, *Graduate Studies Advisory Board*

Natural & Computational Sciences
Mr. Michael Bracken, *Graduate Studies Advisory Board*
Dr. Randolph Coleman, *Chemistry*
Dr. Zhenming Liu, *Computer Science*
Dr. Eugeniy Mikhailov, *Physics*
Dr. Saskia Mordijck, *Applied Science*
Dr. David Opie, *Graduate Studies Advisory Board*
Dr. Jelena Pantel, *Biology*
Dr. Elenaor Silverman*, Graduate Studies Advisory Board*
Dr. Laura Terry, *Graduate Studies Advisory Board*
Dr. Anke Van Zuylen, *Computer Science (COR)*

Mentoring Awards: Humanities & Social Sciences
Dr. Alan Braddock, *American Studies*
Dr. Danielle Dallaire, *Psychological Sciences*
Dr. Alexandra Joosse, *Public Policy*
Dr. Neil Norman, *Anthropology*
Dr. Carol Sheriff, *History*

Mentoring Awards: Natural & Computational Sciences
Dr. Saskia Mordijck, *Applied Science*
Dr. Anh Ninh, *Computer Science (COR)*
Dr. Pieter Peers, *Computer Science*
Dr. Patricia Vahle, *Physics*
Dr. Matthew Wawersick*, Biology*
Dr. Kristin Wustholz, *Chemistry*

ACADEMIC
JOB MARKET
WORKSHOP
Date/Time: March 14th (Wed) 5-6pm
Location: Sadler Commonwealth Auditorium
THIS WORKSHOP IS FOR PHD STUDENTS IN HUMANITIES WHO ARE PURSUING CAREERS IN ACADEMIA. FACULTY MEMBERS WILL WALK YOU THROUGH THE FOLLOWING TOPICS.
1) The conditions of current academic job market
2) The most common mistakes made by job seekers
3) How to build a competitive record and communicate that record in job documents and interviews
4) How to strategically plan your years in PhD studies
Please RSVP to Hyunyoung Moon at csga04@wm.edu

WILLIAM & MARY
Four William & Mary faculty members from diverse disciplines are stranded on a desolate island with only a one-person life raft to escape to civilization. Who should survive for the sake of humanity?
THE ANNUAL
RAFT DEBATE
Fabrício Prado
for the Humanities
Doug Young
for the Natural and Computational Sciences
Jaime Settle
for the Social Sciences
Pieter Peers
as the Devil's Advocate
Virginia Torczon
as the Judge
THURSDAY, MARCH 15, 2018 @ 6:30PM
COMMONWEALTH AUDITORIUM
The Debate is free and open to the public.
Sponsored by the Office of Graduate Studies & Research

William & Mary
Interdisciplinary Award for Excellence in Research

This award acknowledges the graduate student whose research presentation demonstrates original investigation and the integration of knowledge, and distinguished excellence in scholarship through potential contribution to the discipline and recognition by peers. The top three papers submitted in the category of W&M Humanities and the top three papers submitted in the category of W&M Natural & Computational Sciences competed for the overall Award for Excellence in Research. The papers were judged blindly by an independent panel of William & Mary faculty. The paper by the following student was selected to merit an award among the outstanding submissions.

David De La Mater

Advisor: Dr. Harmony Dalgleish

Range-wide variation in common milkweed traits and the effect of food source on larvae of the monarch butterfly

As a M.S. student in the department of Biology at William & Mary, De La Mater's research focuses on understanding how environmental changes act on or shape ecosystems.

Join David as he presents his award winning research
Saturday, March 17, 2018
11:00am-12:00pm in Tidewater A

The Arts & Sciences Graduate Studies Advisory Board at William & Mary is a proud sponsor of the 2018 Graduate Research Symposium

The Graduate Studies Advisory Board is a group of educational, corporate, and community leaders with a commitment to enhancing the quality of graduate education in Arts & Sciences at William & Mary. We commend the attendees of the Graduate Research Symposium for their dedication to excellence in research.

The missions of the Graduate Studies Advisory Board are:

- Development/fundraising to increase graduate Arts & Sciences financial resources
- Assisting in the building of a graduate Arts & Sciences community
- Enhancing professional development opportunities for graduate students
- Advocating for graduate Arts & Sciences within the William & Mary community

Arts & Sciences graduate programs are critical to the mission of William & Mary and to its status as a research university. Graduate programs strengthen the undergraduate program by providing research and mentoring opportunities, and are essential in retaining approximately a third of William and Mary's faculty members in Arts & Sciences.

By sponsoring the 2018 Graduate Research Symposium, initiating the Distinguished Thesis and Dissertation Awards, the Carl J. Strikwerda Awards for Excellence and the S. Laurie Sanderson Awards for Excellence in Undergraduate Mentoring in Arts & Sciences, as well as providing recruitment fellowships to outstanding entering graduate students, the Graduate Studies Advisory Board is playing a vital role in advancing William & Mary's graduate programs in Arts & Sciences.

Members of the Graduate Studies Advisory Board, 2017-18

President: Robert Saunders '00 BS Physics
Vice-President: Kathryn Caggiano '90 BS Math
Past President: Brian J. Morra '78 BA History
Chair, Communications and Advocacy Committee: Laura J. Terry, '03 BS Biology
Chair, Finance and Development Committee: Michael Bracken, '86 BS Mathematics
Chair, Student Professional Development Committee: David K. Hood '90 BS Chemistry, '92 MA Chemistry, '96 PhD Applied Science

John D. Burton '89 MA History, '96 PhD History
Diane Alleva Cáceres '87 BA Economics, '89 MA Govt
Jim David '04 MA History, '10 PhD History
Jeffrey Deitrich, '04 BA Political Science
Kurt Erskine '92 BA Public Policy
Mike Hoak '02 MA History
George Miller '67 BS Physics, '69 MS Physics, '72 PhD Physics
Cynthia C. Morton '77 BS Biology
David Opie '88 MS Physics, '91 PhD Physics
Susan Rawles '05 PhD American Studies
Betsy Page Sigman '78 BA Government
Eleanor K. Silverman '85 BA Mathematics
Jeffrey Voas, '86 MS Computer Science, '90 PhD Computer Science
Gail Williams Wertz '66 BS Biology

Graduate Studies Advisory Board Award for Excellence in Scholarship in the Natural and Computation Sciences

These awards acknowledge William & Mary graduate students whose research presentation demonstrates original investigation and the integration of knowledge, and distinguished excellence in scholarship through potential contribution to the discipline and recognition by peers.

To be considered for an award, presenters had to submit a 5-6 page paper describing their research. The papers were judged blindly by an independent panel of William & Mary faculty and Graduate Studies Advisory Board members. The papers by the following students were selected to merit an award among the many outstanding submissions. The corporate sponsored awards listed below were open to students from William & Mary.

KENNETH BLACKSHAW

M.S. Candidate - Department of Chemistry
Advisor: Dr. Nathan Kidwell

Investigating the Dissociation Dynamics of Atmospheric Brown Carbon via Velocity Map Imaging

Join Kenneth as he presents his research
Friday, March 16, 2018
3:30pm in Chesapeake ABC

Graduate Studies Advisory Board Award for Excellence in Scholarship in the Humanities and Social Sciences

These awards acknowledge William & Mary graduate students whose research presentation demonstrates original investigation and the integration of knowledge, and distinguished excellence in scholarship through potential contribution to the discipline and recognition by peers.

To be considered for an award, presenters had to submit a 5-6 page paper describing their research. The papers were judged blindly by an independent panel of William & Mary faculty and Graduate Studies Advisory Board members. The papers by the following students were selected to merit an award among the many outstanding submissions. The corporate sponsored awards listed below were open to students from William & Mary.

HOLLY GRUNTNER

Ph.D. Candidate - Department of History

Advisor: Dr. Karin Wulf

"Some People of Skil and Curiousity:"
Botany and the Early American Family

Join Holly as she presents her research
Saturday, March 17, 2018
11:00am-12:00pm in Tidewater A

Award Recipients for Excellence in Scholarship

William & Mary Award for Excellence in the Humanities & Social Sciences

ANNE POWELL
History, Advisor: Dr. Karin Wulf
"Miss Rebecca Story's Book": A Portal to a Boundless World

William & Mary Honorable Mentions

ALEXIS OHMAN
Anthropology, Advisor: Dr. Jennifer Kahn
Mingling on the Table: Chinese Foodways in the Post-Emancipation Caribbean

KARA NEWMAN
Public Policy, Advisor: Dr. Elaine McBeth
Aid Shocks and Immigration to the United States

Visiting Scholar Award for Excellence in the Humanities & Social Sciences

PATRICK WOODRUFF
Human Development & Psychological Counseling, Appalachian State University
Advisor: Dr. Geri Miller
Experience, Perception and Normalcy as Predictors of Traumatic Stress Anxiety (PTSD)

Visiting Scholar Honorable Mention

ERIN DURHAM
History, University of Maryland-College Park
Advisor: Dr. Colleen Woods
In Pursuit of Reform, Whether Convict or Free:
Prison Labor Reform in Maryland, 1912-1922.

Award Recipients for Excellence in Scholarship

William & Mary Award for Excellence in the Natural & Computational Sciences

CHRISTOPHER WELD
Applied Science, Advisor: Dr. Larry Leemis
Plotting Two-Dimensional Confidence Regions

William & Mary Honorable Mentions

KEVIN MORAN
Computer Science, Advisor: Dr. Denys Poshyvanyk
ReDraw: Automated Prototyping of Graphical User Interfaces for Mobile Apps

YONGSEN MA
Computer Science, Advisor: Dr. Gang Zhao
Word-Level American Sign Language Recognition Using WiFi

Visiting Scholar Award for Excellence in the Natural & Computational Sciences

JESSICA MCCANLESS
Biology, Appalachian State University, Advisor: Dr. Maryam Ahmed
Modulation of the Breast Cancer Tumor Microenvironment by Oncolytic Vesicular Stomatitis Virus

Visiting Scholar Honorable Mentions

NEGIN FOROUZESH
Computer Science, Virginia Tech, Advisor: Dr. Alexey Onufriev
Fast and Accurate Atomistic Calculation of Free Energies for Molecular Modeling & Simulation

RACHEL WALKER
Chemistry, West Virginia University, Advisor: Dr. Alfred Stiller
Development of a Paraffin-Impregnated Graphite Electrode (PIGE) for the Study of Calcium Carbide Particles

Carl J. Strikwerda Awards for Excellence

These awards recognize W&M Arts & Sciences graduate students for an outstanding written paper by a student who is engaged in thesis research/scholarship to earn an MA, MS, or MPP degree. In the spring of 2011, the Arts & Sciences Graduate Studies Advisory Board voted unanimously in support of the Board's concept for initiating these annual awards. To be considered for an award, Graduate Research Symposium presenters had to submit a 5-6 page paper describing their research. The papers were judged blindly by an independent panel of William & Mary faculty and Graduate Studies Advisory Board members. Awardees are listed in alphabetical order.

Awards for Excellence in the Humanities & Social Sciences

CHANDLER FITZSIMONS
Anthropology Department, M.A./Ph.D.
Advisor: Dr. Audrey Horning

JOSEPH LAWLESS
American Studies Program, M.A./Ph.D.
Advisor: Dr. Elizabeth Losh

Awards for Excellence in the Natural & Computational Sciences

MEREDITH ANDERSEN
Biology Department, M.S.
Advisor: Dr. Helen Murphy

MARY ROONEY
Chemistry Department, M.S.
Advisor: Dr. Tyler Meldrum

S. Laurie Sanderson Awards for Excellence in Undergraduate Mentoring

These awards recognize Arts & Sciences graduate students for outstanding undergraduate mentoring in scholarship and research outside of classroom teaching. Such mentoring includes graduate students who mentor undergraduates in the context of the undergraduate students' senior theses, honors theses, writing projects, term papers, or research in a laboratory, field site, museum, or archive. In the spring of 2009, the Arts & Sciences Graduate Studies Advisory Board and the Arts & Sciences Committee on Graduate Studies voted unanimously in support of the Board's concept for initiating and funding these annual awards.

Nominations consisted of supporting statements from current or past W&M undergraduate students and faculty members. A panel of W&M faculty and Graduate Studies Advisory Board members ranked the nominations. Awardees are listed in alphabetical order.

Awards for Excellence in Undergraduate Mentoring in the Humanities & Social Sciences

TRAVIS HARRIS
American Studies Program, Ph.D.
Advisor: Dr. Michael Blakely

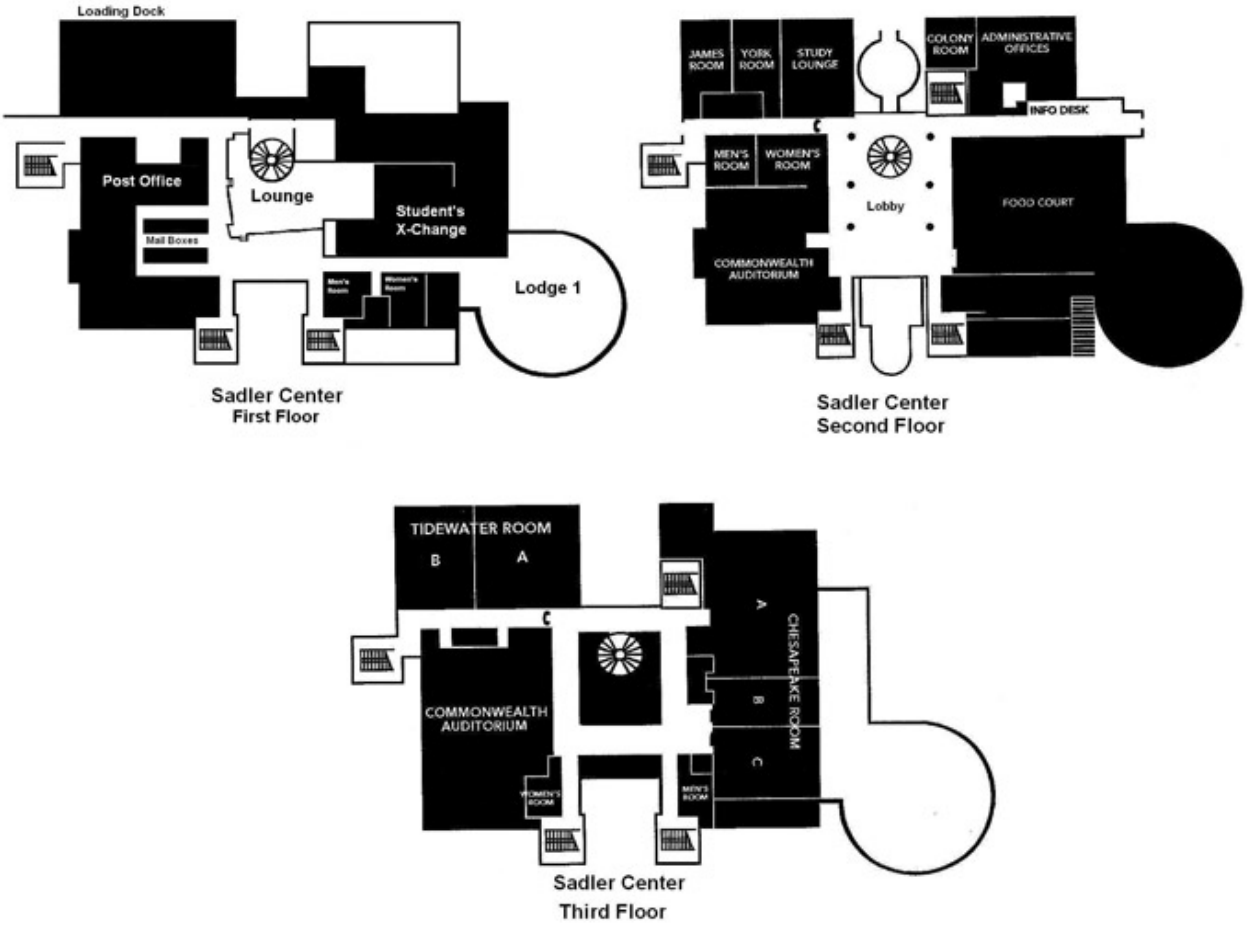
MOLLY PENROD
Psychological Sciences Department, M.S.
Advisor: Dr. Christopher Conway

Awards for Excellence in Undergraduate Mentoring in the Natural & Computational Sciences

KEVIN MORAN
Computer Science Department, Ph.D.
Advisor: Dr. Denys Poshyvanyk

CYRIL ANYETEI-ANUM
Biology Department, M.S.
Advisor: Dr. Lizabeth Allison

William & Mary Sadler Center



William & Mary
Graduate Arts & Sciences

17th Annual Graduate Research Symposium
Schedule at a Glance

Highlighted names indicate award winners

Friday, March 16, 2018

8:30-9:30	**Tidewater A**	**Tidewater B**	**Chesapeake C**	**James Room**	**York Room**	
	Yan Wang	Jessica Turner	Spencer Kirn	Laura Mallison	Brenna Vaz	
	Qingyan Shi	Meaghan Smith	Patricia Thibodeau	Jessica Cowing	Zijiang Hao	
	Christopher Weld	Jennifer Beckensteiner	Brianna Stanley	Lauren Howard	Gurunath Kadam	
		Betsy Presgraves			Lishan Yang	
	Chair: Larry Leemis	*Chair:* Carl Friedrichs	*Chair:* Hannes Schniepp	*Chair:* Elaine McBeth	*Chair:* Evgenia Smirni	
	Proctor: Lauren Bridges	*Proctor:* Ananda Menon	*Proctor:*	*Proctor:* Chris Slaby	*Proctor:*	
9:45-10:45	**Tidewater A**	**Tidewater B**	**Chesapeake C**	**James Room**	**York Room**	**Colony Room**
	Cheng Li	Khanh Vo	Repairer Etuk	Corinne Vigen	Jessica McCanless	Christina Beck
	Jacob Alter	Waleska Solorzano	Shannon Hahn	Janine Boldt	Jan Huebenthal	David Rothmund
	Bin Nie	Xiaodan Zhu	Rachel Capps	Anne Powell	Cyril Anyetei-Anum	Stefan Kosovych
	Lele Ma					
	Chair: Adwait Jog	*Chair:* Sarah Glosson	*Chair:* Danielle Dallaire	*Chair:* Grey Gundaker	*Chair:* Hannah Rosen	*Chair:* Chris Grasso
	Proctor: Lauren Bridges	*Proctor:* Chris Johnson	*Proctor:* Lena Wadsworth	*Proctor:* Zach Smith	*Proctor:* Ananda Menon	*Proctor:* James Bieron
11:00-12:00	**Tidewater A**	**Tidewater B**	**Chesapeake C**	**James Room**	**York Room**	**Colony Room**
	Nick Belluzzo	Victoria Cooper	Rachel Scrivano	Lena Wadsworth	Shoji Malone	Emil Iqbal
	Summer Moore	Zhaoliang Duan	Eden Maness	Yoon Young Sim	Alison Bazylinski	Denise McKaig
	Chandler Fitzsimons	James Bieron	Kelsey Shaffer	Patrick Woodruff	Margaret Haynes	Ronald Smith
		Nancy Carter	Veronica Gonzalez			
	Chair: Andrea Wright	*Chair:* Denys Poshyvanyk	*Chair:* Pam Hunt	*Chair:* Matthew Hilimire	*Chair:* Leisa Meyer	*Chair:* Helen Murphy
	Proctor: Emily Ruhm	*Proctor:* Chris Johnson	*Proctor:* Carly Hawkins	*Proctor:* Zach Smith	*Proctor:* Janine Boldt	*Proctor:*

William & Mary
Graduate Arts & Sciences

17th Annual Graduate Research Symposium

Friday, March 16, 2018

Highlighted names indicate award winners

1:15-2:15	**Tidewater A**	**Tidewater B**	**James Room**		
	Jasmine Parham	Charles Welsko	Christopher Slaby		
	Negin Forouzesh	Kasey Sease	Frances Bell		
	Weizheng Wang	James Rick			
	Chair: Christopher Abeli	*Chair:* Hiroshi Kitamura	*Chair:* Alan Braddock		
	Proctor: Emily Ruhm	*Proctor:* Holly Gruntner	*Proctor:* Eric Alpert		
2:30-3:30	**Tidewater A (2:30-4:00)**	**Tidewater B (2:30-4:00)**	**James Room (2:30-4:00)**	**York Room (2:30-4:00)**	**Colony Room**
	Mark Mulligan	Guillaume Dewaele Le Roi	Erin Durham	Luke Craig	Patrick McArdle
	Mitchell Oxford	Nicolas Abrigo	Alex Aguirre	Nichole Gustafson	David Lahneman
	Ryan Langton	Jayasinghe-Arachchige Mahesha	Lela Akiashvili	Qi Zhou	Jason Creeden
	Jewel Parker	Zachary Smith	Ashley Richardson	Carly Hawkins	Scott Madaras
		Matthew McCarron		Ananda Menon	
	Chair: Chris Grasso	*Chair:* Bob Pike	*Chair:* Alan Braddock	*Chair:* Jennifer Bestman	*Chair:* David Armstrong
	Proctor: Chris Slaby	*Proctor:* Daniel Aboagye	*Proctor:*	*Proctor:*	*Proctor:* Qijue Wang
3:30-5:30	**Poster Presentation and Networking Reception - Chesapeake ABC**				
	Meredith Andersen	Kody Carmody	Amanda Hudson	Molly Penrod	Sara Sargent	Jingwei Song
	Katherine Bemis	Savannah Cuozzo	Mohamed Ibrahim	Nicholas Race	Amy Schienschang	Rachel Walker
	Curtis Berry	Wendel Friedl	Shea Johnson	LaMarise Reid	Morgan Shelton	Zolian Zoong Lwe
	Kenneth Blackshaw	Robert Galvin	Maria Larrazabal	Margaret Rooney	Elizabeth Skinner	
	Shelle Butler	John Halonski	Sahara Mohammed Prem Nazeer	Mary Rooney	Cassandra Smith	

William & Mary
Graduate Arts & Sciences

17th Annual Graduate Research Symposium

Saturday, March 17, 2018

Highlighted names indicate award winners

8:30-9:30	**Tidewater A**	**Tidewater B**	**Cheaspeake C**	**James Room**	**York Room**	**Colony Room**
	Erik Cole	William Dickinson	Joseph Lawless	Steven Goldenberg	Yongsen Ma	Andrew Rotunno
	Sunil Manandhar	Mahmoud Amin	Ciera Ferrone	Sarah Blumenthal	Nabeel Siddiqui	Victoria Owen
	Daniel Emery	Qijue Wang		Kathleen Owens	Madelyn Elliott	Shuangli Du
	Qiong Wu			Nikunjkumar Prajapati	Chandra Lehner	
	Chair: Zhenming Liu	*Chair:* George Miller (GSAB)	*Chair:* John Burton (GSAB)	*Chair:* Joshua Burk	*Chair:* Gang Zhou	*Chair:* D. Evtyushkin
	Proctor: Lauren Hoak	*Proctor:* Seth Lyles	*Proctor:* Jennifer Ellis	*Proctor:* Shannon Hahr	*Proctor:* Patrick Johnson	*Proctor:*
9:45-10:45	**Tidewater A**	**Tidewater B**	**Chesapeake C**	**James Room (9:45-11:00)**	**York Room**	**Colony Room**
	Shuangquan Wang	Shanhe Yi	Leah Kuragano	David An	Kaila Schwartz	Emily Richardson
	Alexis Ohman	Kyle Wallace	Jennifer Ellis	Jennifer Ross	Alexandra Macdonald	Lindsay Garcia
	Megan Victor	Kevin Moran	Matthew Preda	Kara Newman	Tracie Canada	Dylan Simpson
		Jianing Zhao		Chen Wang		
	Chair: Marley Brown	*Chair:* Kathryn Caggiano (GSAB)	*Chair:* Rob Saunders (GSAB)	*Chair:* Mike Hoak (GSAB)	*Chair:* John Burton (GSAB)	*Chair:* Michelle Lelievre
	Proctor: Qijue Wang	*Proctor:* Seth Lyles	*Proctor:* Shannon Hahr	*Proctor:* Eric Alpert	*Proctor:* Holly Gruntner	*Proctor:* Carly Hawkins

11:00-12:00 Awards for Excellence in Scholarhips Presentation - Tidewater A

Interdisciplinary Award for Excellence in Research	**David De La Mater, MS Biology**
W&M Award for Excellence in Humanities	**Holly Gruntner, PhD History**

17th Annual Graduate Research Symposium
Detailed Schedule
Friday, March 16, 2018

Friday 8:30 AM

TIDEWATER A — Mathematical Models

Persistence and Extinction of Population in Reaction-Diffusion-Advection Model with Strong Allee Effect Growth
Yan Wang (William & Mary)

Hopf bifurcation and pattern formation in a delayed diffusive logistic model with spatial heterogeneity
Qingyan Shi (Tongji University)

Plotting Two-Dimensional Confidence Regions
Christopher Weld (William & Mary)

TIDEWATER B — Fish and Aquaculture

Water clarity and suspended particle dynamics at oyster aquaculture sites in Chesapeake Bay, Virginia
Jessica Turner (Virginia Institute of Marine Science)

Characterizing the Immune System of Sockeye Salmon during their Spawning Journey in Alaska
Meaghan Smith (William & Mary)

Spatial management of benthic resources fisheries in Chile
Jennifer Beckensteiner (Virginia Institute of Marine Science)

An Evaluation of Methodologies for Measuring Antibacterial Activity of the Epithelial Mucosa of Farmed Tilapia
Betsy Presgraves (Clemson University)

CHESAPEAKE C — Environmental Monitoring

Autonomously Deployable Oil Tracking System for Arctic Oil Spill Response
Spencer Kirn (William & Mary)

Environmental controls on pteropod phenology along the Western Antarctic Peninsula
Patricia Thibodeau (Virginia Institute of Marine Science)

Influence of Wastewater Effluent Treatment and Disinfection on DON and Chlorophyll in a Chesapeake Bay Tributary
Brianna Stanley (Virginia Institute of Marine Science)

JAMES ROOM — Policy and the Body

Critical Intersectional Studies: Policy through the lens of feminism and disability
Laura Mallison (William & Mary)

Dissent Discourses and Bodyminds on Front Lines
Jessica Cowing (William & Mary)

The Power of Making Friends: The Influence of Relational Mobility on the Well-Being of Disabled Individuals
Lauren Howard (William & Mary)

17th Annual Graduate Research Symposium
Detailed Schedule

Friday 8:30 AM

YORK ROOM — Secure the Perimeter!

Data breaches in biopharmaceuticals: Information at stake and how to protect it
Brenna Vaz (Appalachian State University)

FastPay: Achieving Secure Fast Payment on Blockchain-based Cryptocurrency Systems
Zijiang Hao (William & Mary)

RCoal: Mitigating GPU Timing Attack via Subwarp-based Randomized Coalescing Techniques
Gurunath Kadam (William & Mary)

Evaluating Scalability and Performance of a Security Management Solution in Large Virtualized Environments
Lishan Yang (William & Mary)

Friday 9:45 AM

TIDEWATER A — Computer Systems

Efficient Access Control Scheme in Edge Computing
Cheng Li (William & Mary)

SSD Failure Prediction for Data Center Reliability
Jacob Alter (William & Mary)

GPU Error Prediction by Leveraging Soft-Error Characteristics in a Large-Scale HPC System
Bin Nie (William & Mary)

Efficient Service Handoff Across Edge Servers via Docker Container Migration
Lele Ma (William & Mary)

TIDEWATER B — Looking Through the Glass

The Adaptive Powers of Nostalgia: Televisual Representations of the 1980s in IT and Stranger Things
Khanh Vo (William & Mary)

Photography as Time Travel
Waleska Solorzano (George Mason University)

Facial Fusion of Photos and Artwork by Using Markov Random Field Based Convolutional Neural Networks and Image Color Editing
Xiaodan Zhu (William & Mary)

CHESAPEAKE C — Psychology of Children and Adolescents

Implicit Cognitive Responses to Fruit and Vegetables in Food Neophobic Children
Repairer Etuk (William & Mary)

"Startling" insights into the effect of fear on learning and emotional reactivity in adolescents and young adults
Shannon Hahn (William & Mary)

Assessing and Responding to Lethal Means Access and Adolescent Suicidal Risk
Rachel Capps (Appalachian State University)

17th Annual Graduate Research Symposium
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Friday 9:45 AM

JAMES ROOM — Images and Narratives

Constructing the Ideal in Miniature: Symbolic and Political Meanings of Twentieth Century American Doll Houses

Corinne Vigen (George Mason University)

A Roman Conqueror in the Virginia Wilderness: English Baroque Portraiture and the Colonial Frontier

Janine Boldt (William & Mary)

"Miss Rebecca Story's Book": A Portal to a Boundless World

Anne Powell (William & Mary)

YORK ROOM — Health and Wellness

Modulation of the Breast Cancer Tumor Microenvironment by Oncolytic Vesicular Stomatitis Virus

Jessica McCanless (Appalachian State University)

A Virus Knows No Morals: Transnational Specters of AIDS Quarantine in 1980s West Germany

Jan Huebenthal (William & Mary)

Acetylation Controls Thyroid Hormone Receptor Intracellular localization and Intranuclear Mobility

Cyril Anyetei-Anum (William & Mary)

COLONY ROOM — Revolution and Reform

Education Reform in the New American Republic: Bancroft, Cogswell, and the German Model

Christina Beck (William & Mary)

Reds, Rights, and Firing Lines: The Southern Negro Youth Congress and the Anti-Communist Crusade 1936-1949

David Rothmund (College of Charleston)

Revolutionary Royalists in Third Republic France, 1879 - 1882

Stefan Kosovych (University of Illinois, Urbana-Champaign)

Friday 11:00 AM

TIDEWATER A — Archaeologies of Place and Identity

The Other Half of the Sky: Competitive Anarchy in Contact-Era Palau

Nick Belluzzo (William & Mary)

Foreign Objects in Early Colonial-Era Hawaii: An Examination of Continuity and Change at Nualolo Kai, Kauai

Summer Moore (William & Mary)

"Monarchs of All They See": Identity and the Afterlives of the Frontier in Fort Davis, Texas

Chandler Fitzsimons (William & Mary)

denotes award winner

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Friday 11:00 AM

<u>TIDEWATER B</u> — Visual Content in the Digital Age

Recovering Material Properties from Photographs Under Uncontrolled Natural Lighting
Victoria Cooper (William & Mary)

Full Resolution Direct-global separation from a Single Image using Sparsity Similarities
Zhaoliang Duan (William & Mary)

Appearance Matching with Analytic BRDFs
James Bieron (William & Mary)

Graphical Passwords for Older Computer Users
Nancy Carter (William & Mary)

<u>CHESAPEAKE C</u> — Measuring the Mind

Reliability of Brief Neurometric Battery in EEG
Rachel Scrivano (William & Mary)

The effects of intranasal orexin-A on MK-801-induced attentional deficits
Eden Maness (William & Mary)

Social Valuation and the Measurement of Welfare Tradeoff Ratios
Kelsey Shaffer (William & Mary)

Recovery of Psychiatric Illness from the Perspective of Mental Health Personnel in Mexico City
Veronica Gonzalez (University of California, Irvine)

<u>JAMES ROOM</u> — Under Your Skin

Goosebumps, Tingling, Coldness, and Shivering: Discrete Emotions
Lena Wadsworth (William & Mary)

Motive Goal Congruence, Imagination, and Well-being: A longitudinal analysis with a structural equation model
Yoon Young Sim (William & Mary)

Experience, Perception and Normalcy as Predictors of Traumatic Stress Anxiety (PTSD)
Patrick Woodruff (Appalachian State University)

<u>YORK ROOM</u> — Dress to Impress

The Fashioning of Self: African American women's head fashion from 1870 to 1900
Shoji Malone (University of Maryland, College Park)

They were the Cinderellas of textiles: Making Cotton Fashionable, 1926 to 1937
Alison Bazylinski (William & Mary)

Social Cohesion and Identity in the Cosplay Community
Margaret Haynes (George Mason University)

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17th Annual Graduate Research Symposium
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Friday 11:00 AM

<u>COLONY ROOM</u> — Health Science

Addition of unnatural amino acids to the genetic code
Emil Iqbal (Virginia Commonwealth University)

Blood Pressure Waveform Analysis to Predict Hemorrhage in ICU Patients
Denise McKaig (William & Mary)

The role of selection in sculpting the genome-wide distribution of genes and transposons
Ronald Smith (William & Mary)

Friday 12:00 PM Chesapeake A/B – **LUNCH**

Friday 1:15 PM

<u>TIDEWATER A</u> — Chemistry in Pharmacy and Diet

Dietary Transfer of Methylmercury in the South River Floodplain
Jasmine Parham (William & Mary)

Fast and Accurate Atomistic Calculation of Free Energies for Molecular Modeling and Simulation
Negin Forouzesh (Virginia Tech)

Detection of reducing sugar-PMP derivatives by HPLC-DAD after optimization by response surface methodology
Weizheng Wang (Clemson University)

<u>TIDEWATER B</u> — U.S. History

The Cultural Cartography of Yankeedom and Dixie: Mapping Loyalty in the Civil War Mid-Atlantic, 1861-1865
Charles Welsko (West Virginia University)

A Marketing Agency for Science? Capitalism and the Science Museum of Virginia in 20th and 21st Century America
Kasey Sease (William & Mary)

Agricultural Machines and the Material Culture of the Transition to Capitalism in the Nineteenth-century Midwest
James Rick (William & Mary)

<u>JAMES ROOM</u> — Memory and Identity

The Brafferton Indian School: History, Memory, and the Legacy of a Colonial Institution
Christopher Slaby (William & Mary)

"Thrown into this Hospitable Land": French Refugees in Virginia, 1793-1810
Frances Bell (William & Mary)

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Friday 2:30 PM

<u>TIDEWATER A</u> — Holiness and Healing

True Religion on the Isle of Errors: Religious Conflict in Colonial Rhode Island, 1636-1763
Mark Mulligan (William & Mary)

The Invasion of Quebec and Fate of Catholic Toleration in Revolutionary America
Mitchell Oxford (William & Mary)

Who have always been Secret Enemies: The Philadelphia Acadian Exiles and the Violence of Atlantic Migration
Ryan Langton (William & Mary)

Agents of the Devil?: Women, Witchcraft, and Medicine in Early America
Jewel Parker (Appalachian State University)

<u>TIDEWATER B</u> — Better Living Through Chemistry

Novel Antibody-Gold based Drug Conjugates for Targeted Delivery in Breast Cancer Chemotherapy
Guillaume Dewaele Le Roi (University of New York)

Improving and examination of phosphomimetic BRCA1 peptide inhibitors
Nicholas Abrigo (Virginia Commonwealth University)

Insights into the mechanisms of phosphoester hydrolysis using bioinspired mimics of metalloenzymes
Jayasinghe-Arachchige Mahesha (University of Miami)

IRMPD Studies of b2+ and b3+ Fragment Ions from Lysine Homolog Containing Tetrapeptides
Zachary Smith (William & Mary)

Ratiometric Mercury Ion Sensor in Aqueous Environments
Matthew McCarron (William & Mary)

<u>JAMES ROOM</u> — Society and Social Change

In Pursuit of Reform, Whether Convict or Free: Prison Labor Reform in Maryland, 1912-1922.
Erin Durham (University of Maryland, College Park)

Mapping Gaps in Orange County Re Entry Services
Alex Aguirre (University of California, Irvine)

Women's Property Rights in Georgia: de jure equality, de facto failure
Lela Askiashvili (Texas A&M)

Producing the "Latina Disney Princess"
Ashley Richardson (William & Mary)

Friday 2:30 PM
<u>YORK ROOM</u> — Bees and Butterflies

What do Honey Bee Audio Recordings Reveal?
Luke Craig (Appalachian State University)
Herbivores as conditional mutualist
Nichole Gustafson (William & Mary)
Different harvest time affects peach tree nutritional needs
Qi Zhou (Clemson University)
Effects of anthropogenic noise disturbance on songbird social networks
Carly Hawkins (William & Mary)
The Effect of Mercury Pollution on Sperm Traits and Function in the Zebra Finch
Ananda Menon (William & Mary)

COLONY ROOM — Let's Get Physic-al
Modeling near-field infrared microscopy data
Patrick McArdle (William & Mary)
Broadband near-field infrared spectroscopy with a high temperature plasma light source
David Lahneman (William & Mary)
A Study of the Microstructural Effects on Optical Parameters and Quantum Efficiency in VO_2 Thin Films on TiO_2 and TiO_2:Nb
Jason Creeden (William & Mary)
A new mechanism for Vanadium Dioxide's Insulator to Metal Transition via surface plasmon excitation.
Scott Madaras (William & Mary)

Friday 3:30 PM

Chesapeake A/B/C – **POSTER PRESENTATION AND NETWORKING RECEPTION**

Killer yeast toxin production as a "Trojan horse" strategy to disrupt biofilm formation
Meredith Andersen (William & Mary)
The Golden Puffer, Chonerhinos naritus (Richardson, 1848), an anadromous, piscivorous pufferfish from Southeast Asia
Katherine Bemis (Virginia Institute of Marine Science)
Second-year evaluation of the impact of a required agricultural mechanics unit of instruction on pre-service teachers
Curtis Berry (Clemson University)
Investigating the Dissociation Dynamics of Atmospheric Brown Carbon via Velocity Map Imaging
Kenneth Blackshaw (William & Mary)
Optimization of SERS substrates for solution-phase sensing
Shelle Butler (William & Mary)

17th Annual Graduate Research Symposium
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Friday 3:30 PM

Chesapeake A/B/C – **POSTER PRESENTATION AND NETWORKING RECEPTION**

Virginia Tax Revenue Forecasting
Kody Carmody (William & Mary)

Vibration Insensitive Laser
Savannah Cuozzo (William & Mary)

Dissociating Alzheimer's Disease from Amnestic Mild Cognitive Impairment Using Time-Frequency Based EEG Measures
Wendel Friedl (William & Mary)

Wading Bird Use of Living Shorelines and Natural Fringing Marshes
Robert Galvin (William & Mary)

The Utilization of Unnatural Amino Acids for Site-specific Protein Immobilization
John Halonski (William & Mary)

Play Hard, Sleep Harder: Relationship between Time Spent Playing Videogames and Sleep
Amanda Hudson (Appalachian State University)

Design and Analysis of Efficient Inter-core Communication in GPUs
Mohamed Ibrahim (William & Mary)

Heterocycloadditions utilizing an organic iminium salt catalyst as a nitrene-transfer reagent
Shea Johnson (University of Virginia)

Behavioral distress tolerance: associations with borderline personality symptoms
Maria Larrazabal (William & Mary)

The DarkLight Experiment at LERF
Sahara Mohammed Prem Nazeer (Hampton University)

Misalignment of diverse measures of distress intolerance
Molly Penrod (William & Mary)

Immobilization of chromophores and catalysts to titanium dioxide via robust attachments
Nicholas Race (William & Mary)

Coopers, Peddlers, and Bricklayers: Stories of a Working-Class Property through Public Archaeology in Washington, DC
LaMarise Reid (William & Mary)

Low-Cost Wave Characterization Modules for Oil Spill Response
Margaret Rooney (William & Mary)

Effects of pigment volume concentration on acrylic emulsion paint properties assessed using single-sided NMR
Mary Rooney (William & Mary)

Radiation Shielding Bricks for Mars using Martian Regolith Simulant and Hydrogen-rich Polymers
Sara Sargent (William & Mary)

Investigation of the ArsRS signaling system in H. pylori using mass spectrometry-based bottom-up proteomics.
Amy Schienschang (William & Mary)

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Friday 3:30 PM

Chesapeake A/B/C – **POSTER PRESENTATION AND NETWORKING RECEPTION**

Mathematical Modeling of Alzheimer's disease and Mitochondrial Function
Morgan Shelton (William & Mary)
SonicNets A Benign Acoustic Deterrence: Commercial Installations and Field Studies
Elizabeth Skinner (William & Mary)
Abortion Rights: Examining Law and Policy in the Post-Casey America
Jessica Smith (Virginia Commonwealth University)
Wait, Wait, Don't Tell Me: How Statistical Versus Summary Information May Reduce the Desirability Bias
Cassandra Smith (Appalachian State University)
Are Speckled Trout Adapted To Cold Waters At The Northern Range Limit?
Jingwei Song (Virginia Institute of Marine Science)
Development of a Paraffin Impregnated Graphite Electrode (PIGE) for the Study of Calcium Carbide Particles
Rachel Walker (West Virginia University)
Physiological Characterization of Peanut Cultivars, Experimental Lines and Wild Species for Drought and Heat Tolerance
Zolian Zoong Lwe (Clemson University)

Saturday, March 17, 2018

Saturday 8:30 AM

TIDEWATER A — Data Science
3D Reconstruction of Micro-CT Images for Identification of Coronary Collateral Vessels in Mice
Erik Cole (Appalachian State University)
Outlier Detection in Large Scale Dataset
Sunil Manandhar (William & Mary)
Trash to Treasure: Transforming Waste Management with Landfill Gas Collection Systems Driven by Big Data Analytics
Daniel Emery (Appalachian State University)
Foundations of Nonparametric Preference Learning from Rank Data
Qiong Wu (William & Mary)

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Saturday 8:30 AM

<u>TIDEWATER B</u> — Materials Science

Graphene as two-dimensional surfactant
William Dickinson (William & Mary)

Boron Nitride Nanotube Composites for Thermal Management
Mahmoud Amin (William & Mary)

Optical Investigation of Nanofibrillar Spider Silk
Qijue Wang (William & Mary)

<u>CHESAPEAKE C</u> — Sexual Vulnerability in the Digital Age

On the (Re)Production of an Imagistic Economy: Pharmacopornism And Affective Labor In Dick-Pic Capitalism
Joseph Lawless (William & Mary)

Examining the effects of stereotypes on legal and moral judgments of sexual victims and perpetrators
Ciera Ferrone (Appalachian State University)

<u>JAMES ROOM</u> — Methods and Madness

A Golub-Kahan Davidson Method for Computing the Smallest Singular Triplets of Large Sparse Matrices
Steven Goldenberg (William & Mary)

Effects of medial prefrontal cortical administration of an orexin-2 receptor antagonist on attentional performance in rats
Sarah Blumenthal (William & Mary)

The Effects of Alcohol Priming and Alcohol-Related Cues on Subsequent Alcohol Preferences
Kathleen Owens (James Madison University)

Intensity Difference Squeezing in Rubidium Vapor
Nikunjkumar Prajapati (William & Mary)

<u>YORK ROOM</u> — Language, Math, and Education

Word-Level American Sign Language Recognition using WiFi
Yongsen Ma (William & Mary)

Thinking Creatively: Personal Computers and Educational Technology
Nabeel Siddiqui (William & Mary)

Cognitive Intervention and Mild Cognitive Impairment: The Effects of Cognitive-Linguistic Intervention
Madelyn Elliott (Appalachian State University)

The Relationship Between Fast-Tracking Students into Curriculum Math Using Multiple Measures and Subsequent Success Rates
Chandra Lehner (Appalachian State University)

Saturday 8:30 AM

COLONY ROOM — Atomic Technology

Atom Chip AC Zeeman Potentials: Spin-Dependent Trapping and Interferometry
Andrew Rotunno (William & Mary)

Weak Parity-Violating Electrons to Probe the Distribution of Neutrons in Lead
Victoria Owen (William & Mary)

Ultracold Potassium for Atom Interferometry
Shuangli Du (William & Mary)

Saturday 9:45 AM

TIDEWATER A — Inquiries into Eating

Eating detection and chews counting through noninvasive sensing of mastication muscle contraction
Shuangquan Wang (William & Mary)

Mingling on the Table: Chinese Foodways in the Post-Emancipation Caribbean
Alexis Ohman (William & Mary)

Oysters in the Mountains, Champagne in the Saloon, White Mugs in the Tavern, and Seagulls in the Stew.
Megan Victor (William & Mary)

TIDEWATER B — Mobile and Software Engineering

Accelerate Mobile Video Analytics through Edge Computing Platform
Shanhe Yi (William & Mary)

Toward Sensor-Based Random Number Generation for Mobile and IoT Devices
Kyle Wallace (William & Mary)

ReDraw: Automated Prototyping of Graphical User Interfaces for Mobile Apps
Kevin Moran (William & Mary)

Simulation Study in Quantifying Heterogeneous Causal Effects
Jianing Zhao (William & Mary)

CHESAPEAKE C — Questions of Race and Ethnic Identity

The Problem of Race in Indigenous Studies
Leah Kuragano (William & Mary)

Closing the Gap?: Aboriginality and Agency in Contemporary Urban Australia
Jennifer Ellis (William & Mary)

Comparing Self-Report and Behavioral Measures of Hypodescent in Racial Categorization
Matthew Preda (William & Mary)

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Saturday 9:45 AM

JAMES ROOM — Defense and Dissent

US and UN Security Cooperation with China as Strengthening a Potential Adversary
David An (Catholic University of America)

Words of Dissent: Re-Teaching History in Post-Hurricane Katrina Literature
Jennifer Ross (William & Mary)

Aid Shocks and Immigration to the United States
Kara Newman (William & Mary)

The U.S. Allies Under Fire: A Centre-Periphery Theory of Terrorist Target Selection
Chen Wang (University of Virginia)

YORK ROOM — Constructing Kinship

Memory, Family, and Tradition in the Lives of George Robert Twelves Hewes, Robert Twelves, and Boston's Old South Church
Kaila Schwartz (William & Mary)

The Public Face(s) of Albinia Hobart, Countess of Buckinghamshire: Vice, Theatrics, Politics, and the Press
Alexandra Macdonald (William & Mary)

Football Families: Kinship in College Football
Tracie Canada (University of Virginia)

COLONY ROOM — Jeepers Creepers!

The road to stardom: linking larval food environment with juvenile recruitment success in echinoderms
Emily Richardson (William & Mary)

Man-Hating Pests: Traumatic Insemination, Reproductive Futurism and Bed Bug Infestation
Lindsay Garcia (William & Mary)

Influence of seasonal and microclimatic weather patterns on the tick-borne pathogen Ehrlichia chaffeensis
Dylan Simpson (William & Mary)

Saturday 11:00 AM

TIDEWATER A — Awards for Excellence in Scholarship Presentations

Range-wide variation in common milkweed traits and the effect of food source on larvae of the monarch butterfly
David De La Mater (William & Mary)

"Some People of Skil and Curiousity:" Botany and the Early American Family
Holly Gruntner (William & Mary)

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They Were the Cinderellas of Textiles: Making Cotton Fashionable, 1926 to 1937

Presenter: Alison R. Bazylinski
Advisor: Charles McGovern
William & Mary,
American Studies

Cloth is a mediating surface through which people encounter the world, with meanings that shift with time and space. Surface, appearance, and tactility are linked directly to the body and can be used to examine class, gender, and racial difference. The economic, cultural, and agricultural importance of cotton in the United States has been well documented. However, cotton did not always connote fashion. In 1926, cotton was neither mentioned nor tolerated in the world of fashion, even termed the Cinderella of fashion, but by 1937 had achieved style, color, and beauty. Professional home economists noted shifts in consumer and producer behavior, as did the Cotton-Textile Institute, a trade organization that believed consumer appreciate was the cause of this shift. I examine surface, materiality, business, and society together to question the relationships between women, fabric, and cultural hierarchies. An investigation of why the Cotton-Textile Institute, governmental agencies, and home economists developed educational programs and cotton marketing schemes provides insight into the multi-direction relationships between textile producers and trade organizations, home economists, and consumers. The resulting dialogues help illuminate how people thought about and interpreted aesthetic, cultural, and economic values together.

Alison Bazylinski is a fifth-year Ph.D. candidate in the American Studies Program at William & Mary. Her research focuses on material culture, namely textiles and clothing, as a means of examining twentieth-century American culture, society, and identity. Her dissertation investigates fabric as an object that connects production and consumption by looking at cultural processes while considering social, material, and economic implications.

A Roman Conqueror in the Virginia Wilderness: English Baroque Portraiture and the Colonial Frontier

Presenter: Janine Yorimoto Boldt
Advisor: Susan Webster
William & Mary,
American Studies

This paper examines the ca. 1680 English portrait of colonial Virginian William Byrd II (1674-1744). Commissioned by his father, William Byrd I (ca. 1652-1704), in the years immediately following Bacon's Rebellion, the portrait features young William in the guise of a Roman warrior standing in the wilderness. Through visual analysis and archival research, I argue that this portrait contains allegorical references to Native Americans, slavery, and dynastic politics. William Byrd I was an Indian trader, a slave trader, and an aspiring tobacco planter. He was deeply involved in Bacon's Rebellion, a civil conflict that left Virginia in a state of social upheaval. In the years that followed, Virginia's relations with the Indians soured, the African slave trade expanded, and the colony's relationship to the imperial government shifted as English officials increased oversight of local politics. The portrait of William Byrd II responded to and participated in these developments. This complex painting of the young boy reveals how colonists adapted English Baroque pictorial traditions to suit the colonial context and participate in empire building. I consider the portrait's diverse audiences to argue that the painting constructed the Byrd family as British imperial agents and visualized the subjugation of non-white colonial subjects. This paper focuses on a rarely published and largely forgotten portrait to shed light on a neglected period in early American art history and cultural history.

Janine Yorimoto Boldt is a Ph.D. candidate in the American Studies Program at William & Mary. Her dissertation, "The Art of Plantation Authority: Domestic Portraiture in Colonial Virginia," looks at the social function of colonial portraiture in a southern plantation society. Her research has been generously supported by Colonial Williamsburg, the Virginia Historical Society, Winterthur Museum and Library, and the Decorative Arts Trust.

Dissent Discourses and Bodyminds on Front Lines

Presenter: Jessica Louise Cowing
Advisor: Kara Thompson
William & Mary,
American Studies

In late November 2016, non-Native ally Sophia Wilanksy was one of many water protectors who sustained extensive injuries on a bridge near Cannonball, North Dakota, while resisting construction of the Dakota Access Pipeline. In the days following this incident of police aggression, headlines and reports directed attention to Wilansky's injuries and the possibility that she might undergo an amputation. The wide circulation of Wilansky's injury narrative raises significant questions about the ways in which activists' #standwithstandingrock social media hashtag was deployed to express solidarity with water protectors and tribal nations including the Standing Rock Sioux. To stand with Standing Rock invites multiple forms of allyship beyond traveling to Standing Rock camps. However, the hashtag also relies on assumptions that activists and allies are able to stand in solidarity with a level of ability that calls for physical presence—for bodyminds on the front lines. Dissent discourses—calls for action and solidarity—require critical interventions recognizing bodyminds as sites of valuable knowledge production with different attachments to Native land. The settler state generated the conditions under which water protectors sustained injuries, prompting the question. This paper argues that dissent discourses at Standing Rock expose how bodyminds experience debility in precarious zones of resistance as the cost for claiming forms of tribal and bodily sovereignty.

Jessica Cowing is a Ph.D. candidate in the American Studies Program at William & Mary. Her dissertation, "Settler States of Ability: Discourses of Assimilation and Narratives of Embodied Sovereignty," examines nineteenth and early twentieth-century narratives of Native sovereignty through settler discourses of ability, reform, and assimilation.

Man-Hating Pests: Traumatic Insemination, Reproductive Futurism & Bed Bug Infestation

Presenter: Lindsay Garcia
Advisor: Alan Braddock
William & Mary,
American Studies

Even though bed bugs do not spread diseases, humans have long feared and hated them. Their intrusive, middle-of-the-night, blood-sucking happens during a person's most intimate, vulnerable, and potentially erotic moments: in bed. One major issue for humans is the frequency with which bed bugs reproduce, often leading to large-scale infestations. Infestations uproot people's lives in many uneven ways. Even though some have called bed bugs "the great equalizer," access to chemical pest control is dependent on factors such as income, ability, immigration status, landlord-neighbor-tenant relationships, geographical location, and other political and structural determinants and comes with its own set of environmental and health issues. Bed bugs, too, are affected by uneven political structures, especially when it comes to gender and sexuality. Female bed bugs do not have vaginas. Instead, male bed bugs engage in traumatic insemination, or, piercing the abdomen of their mate with a sword-like penis, which causes pain and scarring of the female body. Therefore, once pregnant, a female bed bug emits a pheromone to deter men and migrates away from potential male penetrators to a place where she can find an ample food source (read human blood) and reproduce more effectively, laying up to 200 or 250 eggs in her four-to-six month lifespan. By engaging with the discourses of queer ecology, queer time, rape culture, and reproductive futurism, this paper reads the gender and sexuality complexities of bed bug infestations as spatiotemporal manifestations of queerness.

Lindsay Garcia is an artist and fourth-year Ph.D. candidate in the American Studies Program at William & Mary. Her research areas include contemporary and American art history, animal studies, environmental justice, race, and gender and sexuality studies. Her dissertation focuses on pest animals, their border-crossing abilities, and their representations in rhetoric, media, and art.

A Virus Knows No Morals: Transnational Specters of AIDS Quarantine in 1980s West Germany

Presenter: Jan Huebenthal
Advisor: Leisa Meyer
William & Mary,
American Studies

In November, 1987, a federal court in Nuremberg, Germany, sentenced Lindenwood B., an African American gay man, to two years in prison for attempted aggravated assault. The police had charged B. with knowingly infecting a number of sexual partners, some of whom testified at his trial, with HIV. Amidst a growing sex panic, B.'s case exemplifies how deftly the emergence of HIV/AIDS re-activated biologistic and radicalized fantasies of state power. This paper examines narratives of AIDS incarceration, quarantine, and discipline in late 1980s West Germany, as well as their concurrent echoes in American political discourse. When U.S. Senator Jesse Helms was openly wondering if tattooing people with AIDS might be a good idea, Bavarian Interior Minister Peter Gauweiler proposed a "Zwangmassnahmenkatalog" (a catalog of force measures). In 1987, Bavarian politicians of the ruling CSU party (Christian Social Union) plotted to destroy "homosexual" subcultures, institute mandatory blood tests for prostitutes and asylum seekers, and incarcerate people with AIDS found have exposed or infected others. Foucault's brief but rich writing on "other spaces" and heterotopias, along with Agamben's work on political sovereignty, helps theorize the mobilization of spatial imaginaries in the service of disciplinary sexual politics.

Jan Huebenthal is a fifth-year Ph.D. candidate in the American Studies Program at William & Mary. His dissertation project, "AIDS, Affect, Activism: Centering HIV Legacies in Times of Queer Equality," examines affective economies of queer identity in relation to political histories of HIV/AIDS, from 1987 to the present. At William & Mary, Jan is affiliated with and teaches in the Gender, Sexuality and Women's Studies program.

The Problem of Race in Indigenous Studies

Presenter: Leah Kuragano
Advisor: Lynn Weiss
William & Mary,
American Studies

Indigeneity is an identity and worldview tied to land, sovereignty, and heritage. It is also a distinct category from race, which is an imposed and oppressive organizational system that relies on distinct markers of otherness such as physical appearance, blood quantum, and cultural practice. Despite the difference between race and indigeneity, racialization and racism are among the many violences indigenous peoples face under colonialism. How can scholars recognize the effects of racism on indigenous communities without conflating the distinct categories of indigeneity and race? In this presentation, I will first review in depth the difference between these two models of identity as theorized by indigenous scholars. I will then propose a method for understanding the unique place of race in indigenous studies by using examples from my own dissertation research on U.S. representations of indigenous Hawaiians. I argue that it is crucial for scholars of indigeneity and indigenous experience to reject the simplistic conflation of race and indigeneity in their work and think critically about the difference between the process of racialization and the experience of racial identity.

Leah Kuragano is a current Ph.D. student in the American Studies Program at William & Mary. Her dissertation research concerns the production of Hawaiian and Hawaiian-inspired imagery, objects, sound, and performance by white settler Americans, Asian Americans, and indigenous Hawaiians after World War II. The project engages with transnational history, queer theory, critical indigenous theory, and settler colonial theory.

On the (Re)Production of an Imagistic Economy: Pharmacopornism And Affective Labor In Dick-Pic Capitalism

Presenter: Joseph F. Lawless
Advisor: Elizabeth Losh
William & Mary,
American Studies

Internet forums are saturated by flows of curiosity, revulsion, and ambivalence aimed at the dick pic--a self-made pornographic image of the penis commonly transmitted via cellphone messaging. The dick pic exists within varied sexual topographies, each of which imbues the image with unique ideological meaning. Against heterosexual backdrops and experiences, what is cultivated as the quintessential characteristic of the dick pic is the unsolicited nature of its exchange; the image is almost always sent without request by the recipient. That the dick pic operates through the absence of consent suggests its imbrication of heteronormative power relations and domination. Of additional consequence is that the dick pic blurs the boundaries between material and virtual. The image profoundly underscores the corporeal elements of virtual sexual embodiment and, as such, likely implicates registers of the affective, bodily sensations and impingements not easily discursively captured. Drawing on the work of Paul B. Preciado and artist Whitney Bell, I argue that the unsolicited transmission of the image operates to fortify heterosexual libidinal economies, whereby the image extracts the bodily labor its recipient performs in order to mark receipt of the dick pic as banal and expected. This reiteration of banality conceals the violence the image effects through the ascription of banality. This labor, demanding manipulations of excitation and frustration, becomes the siphoned excess that resuscitates a heterosexual libidinal economy always already approaching decomposition.

Joseph F. Lawless is a first-year M.A./Ph.D. student in the American Studies Program at William & Mary, with research interests in the effects of sexuality criminalization on the making of legal subjects, the role of the affective in subjectification, and the relationship of the digital to the sexual in the constitution of the psyche. He holds a B.A. from the University of Pennsylvania and a J.D. from Columbia Law School.

The Fashioning of Self: African American Women's Head Fashion from 1870 to 1900

Presenter: Shoji Malone
Advisor: Psyche Williams-Forson
University of Maryland-College Park,
American Studies

African American women have always worn headdresses. They have always been used not only to adorn but also to offer performative statements about their lives. In the New York Library Prints and Photographs collection there are several photos of African American women during the Reconstruction Era wearing aprons, coats, shawls and various other accessories. After surveying the collection of images from enslavement through the Reconstruction era, I discovered that there are many photos of African American women wearing headdresses while working in agricultural settings, caring for children, in kitchens and some in churches. Each headdress was fashioned differently, some tied on the side, others knotted in the front and others tucked and layered in intricate ways. Along with the different tying and wrapping methods, these headdresses are made of various materials, possibly handkerchiefs and coarse cotton. The headdresses are sometimes decoratively patterned and sometimes neutral. More interestingly, I began seeing more women in hats. Repeatedly seeing women photographed with different types of head fashion in multiple contexts led me to question the role head fashion in the lives of African American women during the Reconstruction Era. I examine the ways that clothing, specifically head adornment, might functions as markers of group belonging, subversion, and subterfuge. This analysis of adornment expands our understanding of the ways that black women negotiate their everyday lives in various contexts.

Shoji Malone is fourth-year Ph.D. student in the Department of American Studies at the University of Maryland-College Park. Her research interests include black women's history, black feminist theory, material culture, and black performance theory. She is currently exploring the ways that fashion, specifically head fashion, speak to larger conversations of identity formation for black women.

Producing the "Latina Disney Princess"

Presenter: Ashley Sarah Richardson
Advisor: Arthur Knight
William & Mary,
American Studies

In this "Golden Age" of American television, programs featuring Latinx characters, especially Latinas, remain scarce. The history of Latinx representation in American television is filled with stereotypical portrayals of violent drug dealers and forlorn domestic workers. Though Hollywood's obsession with Latinx criminals remains an issue, I want to examine how fantasy television programs offer alternative, and potentially empowering, narratives for Latinas. Oddly enough, most of these Latina-driven fantasy programs, including *Once Upon a Time* (2011-) and *Elena of Avalor* (2016-) are products of the Disney empire, a corporation that for years has faced criticism for their portrayals of Latinxs in their live-action and animated films and shows. Though a "Latina Disney Princess" would undoubtedly have a significant impact on the lives of young Latinas, there remains the question of how the Latina body is commodified by and for white, non-Latinx people. By analyzing the episodes, tie-in merchandise, and viewer responses to *Elena of Avalor* and *Once Upon a Time*, among other shows, I plan to argue that the Latina identities these shows create are emblematic of a larger problem in American popular culture, specifically the homogenization and exploitation of Latin American cultures for corporate gains. In this presentation, I will trace Hollywood's history of using Latina bodies and stories for profit and review the ways in which the U.S. film and television industry continues to disregard the cultural complexity of its Latina viewers to cater to a white audience.

Ashley Richardson is an M.A. student in the American Studies Program at William & Mary. Her research focuses on the representation and commodification of marginalized groups, particularly women of color, in contemporary American film and television.

Words of Dissent: Re-Teaching History in Post-Hurricane Katrina Literature

Presenter: Jennifer Ross
Advisor: Susan Donaldson
William & Mary,
American Studies

In an era when September 11 occupied hallowed cultural ground, post-Hurricane Katrina authors dared to repudiate a pedagogy that atomized history and asserted the righteousness of the counter-terror state. For these writers, September 11, the counter-terror state, and Hurricane Katrina were intimately related. Among other crimes, they accused the U.S. government of diverting funds from levee repairs to the wars in Afghanistan and Iraq; profiling and imprisoning American citizens; failing to adequately address the physical, emotional, and psychological needs of survivors; and a tradition of institutionalized violence and disregard toward people of color. Using Tom Piazza's *City of Refuge* and Dave Egger's *Zeitoun* as case studies, this paper will examine how post-Katrina fiction created a fugitive network in which to re-think and re-teach September 11 and the counter-terror system. I argue that by refusing to separate these events, post-Katrina authors breached the seemingly inviolable memory of September 11 to write a new history of the first half of the counter-terror decade. In their dissent, these authors put forth alternative pedagogies of history, embracing Walter Benjamin's notion of "constellations" of history in which multiple temporalities and subjectivities intercalate. Their writing seizes hold of these marginalized tellings as they "flash up at a moment of danger," and weaves them into a new history before they can be suppressed once again by the weight of 9/11 and the counter-terror state.

Jennifer Ross is a Ph.D. candidate in the American Studies Program at William & Mary. She received dual bachelor's degrees in Honors English and History, as well as her master's in English at the University of Michigan-Flint. Jennifer's dissertation examines the developing counter-terror state by counterpoising the September 11 attacks and Hurricane Katrina. Her research interests include the structure and function of state power, disaster literature, and American racisms.

Thinking Creatively: Personal Computers and Educational Technology

Presenter: Nabeel Siddiqui
Advisor: Charles McGovern
William & Mary,
American Studies

At the World Summit on the Information Society in November 2005, Nicholas Negroponte, co-founder of the MIT Media Lab, revealed a mock-up of a hundred dollar laptop to educate children across the Global South. In the following years the laptop, dubbed the "XO" (with a lowest price point of $188), was packed with features that enthralled the tech world: mesh networking, software to help children learn programming, a state-of-the-art security system, and a "view source" keyboard button that would instantly expose the machine's source code. The press hailed Negroponte's announcement for its sweeping vision, but it did not emerge in vacuum. Instead, it was the culmination of over forty years of work at MIT by Seymour Papert to link computation with Jean Piaget's model of children's intellectual development. In this paper, I examine personal computer magazines, newsletters, popular media coverage, and Papert's writings to examine constructionism as an instrument of post-World War II scientific models of the body. Specifically, I argue that Papert's theories relied on a belief in adolescent creativity that perpetuated an ideal of the posthuman child. By focusing on creativity in youth, I highlight how constructionism created a new biopolitical reality where computation served as a means of sidelining structural racial, gender, and class inequalities for the purposes of enmeshing children within their techno-material environments.

Nabeel Siddiqui is a Ph.D. candidate in the American Studies Program at William & Mary. His research focuses on the digital humanities, media studies, and cultural history. He currently serves as the Humanities Liaison for the Center for Teaching, Learning, and Technology at the University of Richmond.

The Brafferton Indian School: History, Memory, and the Legacy of a Colonial Institution

Presenter: Christopher J. Slaby
Advisor: Alan Braddock
William & Mary,
American Studies

During the spring of 2011, William & Mary performed a ceremony at the base of the Brafferton Building to honor the memory of Indigenous students who matriculated there during the eighteenth century. Members of descendant communities stood with current administration officials to contemplate the future of the institution. While this suggests a more inclusive memory of the Brafferton, the past tells a different story. Since it ceased to function as an Indian school, William & Mary has focused its attention on the eighteenth-century past of the Brafferton, as both a physical site and an institution. By looking at the ways that William & Mary has remembered the school and used the building over time, this paper demonstrates that William & Mary's limited focus on the eighteenth-century past of the Brafferton cut actual Native peoples out of the story. Emphasizing the eighteenth-century colonial style of the building during the twentieth century marginalized the ongoing presence of Native peoples. Idealizing the architecture of the building and the institution that it represented for their historical significance led to sidestepping questions about more recent Native history. Recognizing that some histories are elevated while others are suppressed reveals the power of selective memory. Honoring certain pasts over others exculpates institutions and justifies continued inequalities. This paper shows that the history of honoring the Brafferton was (and possibly even still is) just as colonial as the eighteenth-century school.

Christopher J. Slaby is a second-year Ph.D. student in the American Studies Program at William & Mary. His research focuses on the intersection of environmental, Native American, and cultural history. He has a B.A. in Art History from Hobart and William Smith Colleges and an M.A. in Art History from the University of Wisconsin-Madison.

Photography as Time Travel

Presenter: Waleska Solorzano
Advisor: Rachel Jones
George Mason University,
Philosophy

The analysis of the temporal dimension of photographs in my research leads to my claim that photography is an uncanny version of time travel. My research examines the ability of a photograph to stop time and motion while nonetheless appearing differently through time. By drawing on philosophical reflections on time and the image, I explore the radical contingency of the photograph together with the idea that every photograph tells a story that bridges past, present, or future. The aim of my research is not to measure the photograph against a past moment, but to attend to what it is now disclosing. A photograph is a double of the person and/or place that is pictured brought to the present, but it is not the person or place that it was in the past. This doubling effect is revealed through photographs I have taken, which are the core of my project. They provide the basis for my philosophical analysis of photography and time. My research method combines analysis from philosophical texts with the creative process of photography. In my research, I use a set of images drawn from my own photographic work to explore three specific themes: the photographic passage of time; the interplay of concealing and disclosing; and the relation of depth and surface. All three of these themes unfold through the interpretation of my photographs, which are digitally produced.

Waleska Solorzano is a graduate student in the Philosophy Department at George Mason University. Her research areas include aesthetics, continental philosophy, photography, and material and visual culture. She was a photographer for the 2016 Tribeca Film Festival, which is when she began questioning the ties between philosophy and photography. Waleska is currently exploring her research question, "can photography serve as time travel?"

The Adaptive Powers of Nostalgia: Televisual Representations of the 1980s in *IT* and *Stranger Things*

Presenter: Khanh Vo
Advisor: Charles McGovern
William & Mary,
American Studies

From *Mad Men* and *The Americans* to reboots of *Twin Peaks* and *The X-Files*, the process of remaking and rebooting the past abounds in popular culture. What accounts for this nostalgic turn? How are our cultural memories shaped as we continually borrow from and refer to the past? Through the Netflix original Stranger Things and the remakes of Stephen King's *IT*, this paper examines the nostalgic representation of the 1980s. I argue that Stranger Things and *IT* are data-mining specific points in our cultural memory. What feels authentic to the 1980s is not only embodied in the material artifacts of the decade, but the affect that such materials generate, from the synthesizers heavy theme tune to the bike lights on a suburban street. Incidentally, shows created as homage to the era in which the creators matured are consumed by audiences who do not share those collective memories. The binding of individuals to the larger history and memory through which they did not live carries resounding cultural and political consequences. Ultimately, this papers grapples with the structures of power in popular culture as we move forward while simultaneously retreating into the past. The analog world of the 1980s has given way to the digital millennium which not only challenges our perception of what is new, but also given us countless ways to revisit the old. The digital spaces of our current culture provide new accessibility to the past and that new intimacy has turned nostalgia from wistful retrospection into a cultural force.

Khanh Vo is a Ph.D. candidate in the American Studies Program at William & Mary. Her research interests include nineteenth and twentieth-century American history, material culture, history of science and technology, childhood studies, game studies, and the digital humanities.

The Other Half of the Sky: Competitive Anarchy in Contact-Era Palau

Presenter: Nick Belluzzo
Advisor: Jennifer Kahn
William & Mary,
Anthropology

This paper explores the way in which contact-era Palauan society negotiated between hierarchy and heterarchy to ensure long-term sociopolitical stability, developing and deploying a theory of competitive anarchy. The evaluation critiques the frequent correlation of complexity with hierarchy and centrality and does so through a geostatistical analysis. This investigation begins with the development of a proposed model of Palauan sociopolitical structure, derived through ethnographic descriptions contextualized with re-readings of contact-era narrative accounts. This proposed model provides a hypothesis which is tested in a geographic information system (GIS) through the geostatistical analysis of regional settlement patterns and the distribution of village sites across the landscape at multiple scales. Through modelling clustering and dispersion of village sites across the landscape, the evaluation of central places and authority in Palau suggests the presence of meaningful settlement patterns at both local and regional scales. The results suggest that intentional and complex social structures can allow competition while both limiting social inequality and ensuring group cohesion.

Nick Belluzzo is a Ph.D. student in the Anthropology Department at William & Mary. His research focuses on Oceania and, in particular, Hawai'i and Micronesia. Leveraging Geographic Information Systems (GIS) and landscape approaches, he seeks to elaborate upon the complex and intersectional ways in which humans understand their environment and relationships with one another.

Football Families: Kinship in College Football

Presenter: Tracie Canada
Advisor: George Mentore
University of Virginia,
Anthropology

This ethnographic paper examines the various ways kinship is conceptualized despite and in the context of a Division-I college football program in the southeastern U.S. I propose that a thread of kinship is deliberately incorporated into the program, primarily because of the motto that the team permanently displays throughout its facilities. Furthermore, based on my analysis of interviews and participant observation conducted during fieldwork in multiple university and family settings, I argue that Black football players create meaning in their everyday lives by prioritizing their configuration of kin and social relations. Because of the heightened importance that players express of their matrifocal families, as well as the social kin they create with peers on the football team, this paper not only considers how "biological" and "social" aspects of kinship are blurred, but also how Black players embody and live kinship in multiple productive ways.

Tracie Canada is a fourth-year Ph.D. candidate in the Department of Anthropology at the University of Virginia. Her dissertation will explore the lived experiences of Black college football players. Her work questions how their Blackness is perceived in different contexts, particularly the "play" world of sport and the "serious" real world, and how the people in the players' lives help them navigate these experiences.

Closing the Gap?: Aboriginality and Agency in Contemporary Urban Australia

Presenter: Jennifer Ellis
Advisor: Michelle Lelievre
William & Mary,
Anthropology

This paper explores aboriginal identity and agency in contemporary urban Australia. Specifically, this paper examines Aboriginal cultures and identities in Sydney, New South Wales. The Australian state works in harmony with non-governmental organizations (NGOs), which are often non-profit, to close the gap of inequality between Aboriginal Australians and Anglo-Australians. However, this gap closing often results in a seemingly assimilative process, aimed at incorporating Aboriginal Australians into Anglo-Australian society. This paper examines two specific examples of assimilative processes in Australia; namely, the Pemulwuy housing project in Redfern, Sydney, and the "Close-the-Gap" initiative of the Australian government, which aims to lower the gap of health inequality between Aboriginal and non-Aboriginal Australians. Finally, this paper will problematize the notion of a monolithic or homogenous Aboriginal urban identity. Instead, the paper will focus on the complexity of how "Aboriginality" is constructed, understood, and utilized by Aboriginal Australians, Anglo-Australians, the Australian state, and the involved NGOs. Specifically, I will focus on the how the urban environment of Sydney acts, in part, as a structuring aspect of these identity constructions, which is often at odds with how Aboriginal Australians are agentively constructing their own Aboriginality.

Jennifer Ellis is a second-year Ph.D. student in the Anthropology Department at William & Mary. Her research areas include Australia, aboriginal rights, identity, post-colonialism, cultural production, power, and agency. She holds a B.A. in Anthropology and History from Vanderbilt University.

"A Squalid Little Settlement": Alterity and Agency in Depression-Era Fort Davis, Texas

Presenter: Chandler E. Fitzsimons
Advisor: Audrey Horning
William & Mary,
Anthropology

Fort Davis, a frontier fort in far west Texas tasked with protecting the Overland Trail to California and fighting Comanche, closed in 1891, leaving behind the ethnically and financially diverse town that had grown up around it. This community struggled to redefine itself economically in the years following the fort's closure only to find a new lease on life in the first decades of the twentieth century as a tourist destination. In this paper, I examine manifestations of intersectional identity in archaeological material from a 1930s dump site in Chihuahua, the town's Mexican-American neighborhood, excavated during the UC Berkeley's Fort Davis Archaeological Project (FODAAP) in 2014. I ask what these manifestations of identity have to say about the community itself and the larger social forces that were acting to shape the region into its modern form.

Chandler Fitzsimons is a first-year M.A./Ph.D. student in the Anthropology Department at William & Mary. Her archaeological research interest is in the ways in which altered and new identities are negotiated within frontier and colonial spaces in the North American historic period and the afterlives of these frontier spaces. She addresses these questions from an archaeological paradigm that is community-based, collaborative, and participatory.

Social Cohesion and Identity in the Cosplay Community

Presenter: Margaret E. Haynes
Advisor: Rashmi Sadana
George Mason University,
Anthropology

Cosplay is a word that combines "costume" and "play." It is used to describe the act of dressing up and acting as fictional characters, specifically, characters from manga/anime, animated movies, TV shows, video games, books, board games, and more. Characters can be male, female, asexual, alien, robot, et cetera. Cosplaying is an individual and group phenomenon with participants varying in age, gender, race, and socio-economic status. A person cosplays to engage in a social experience, feel support, have fun, and illustrate their creativity. Cosplayers hold common values that are traditionally found in theater, such as a dedication to artistic purity, duty to proper research, and commitment to characteristic standards. Simply put, cosplayers can pick a character, research the background and personality of the chosen character, and carry out a performance in a realistic-looking costume. This process creates a sense of authenticity. Unlike many social groups in America, an individual does not have to share the same beliefs, religion, ideology, or background to become a member. Cosplay is an example of a transnational cultural production, with roots in Japan but extending to Australia, the U.K., the U.S., and elsewhere. Methods for this research included a literature review, 48 interviews, and participant observation at three different cosplay conventions. I conclude that cosplay fosters social cohesion that transcends most societal subdivisions and allows individuals to come together to form a community.

Margaret Haynes graduated with her master's in Anthropology at George Mason University in the Fall Semester of 2017. Her areas of focus in her thesis included reenactment, social cohesion, socialization, gender, identity, and performance in the cosplay community.

Foreign Objects in Early Colonial-Era Hawai'i: An Examination of Continuity and Change at Nu'alolo Kai, Kaua'i

Presenter: Summer Moore
Advisor: Jennifer Kahn
William & Mary,
Anthropology

Archaeologists have long been interested in the complex ways that indigenous groups in colonial settings appropriated foreign goods into existing spheres of use and exchange and how this appropriation may have altered dynamic processes of social and cultural transformation. Documentary accounts of explorers, traders, and missionaries during Hawaii's early colonial period suggest that trade provided a crucial means of negotiating power and establishing social relationships between Hawaiians and foreigners. Because Hawaiian residential sites from this period have rarely been identified, however, we have little information about the role such items ultimately played within Hawaiian communities. This paper describes the analysis of a legacy collection of foreign objects from Nu'alolo Kai, a stratified site occupied from several centuries before European contact through the mid-nineteenth century. Protected deposits at the base of a cliff preserved a remarkable collection of imported materials in the site's upper layers. Archaeological evidence about the origins, use, and modification of these artifacts is used to consider how foreign goods were incorporated within this rural community. While small numbers of such items appeared at Nu'alolo Kai by the early nineteenth century, this research suggests that residents appropriated these objects within a framework characterized by both innovation and pervasive continuity.

Summer Moore is a fifth-year Ph.D. candidate in the Anthropology Department at William & Mary. Her research interests include the archaeology of Polynesia, household archaeology, and historical anthropology. She holds an M.A. in Anthropology from the University of Denver.

Mingling on the Table: Chinese Foodways in the Post-Emancipation Caribbean

Presenter: Alexis Ohman
Advisor: Jennifer Kahn
William & Mary,
Anthropology

The purpose of this presentation is to extend discussion of overseas Chinese into the post-Emancipation Caribbean, as this group has traditionally been left out of anthropological and archaeological discourses in the region. I use my broader research on British Caribbean foodways as a foil to the Chinese, and discuss the specific social, cultural, political, environmental, and religious mores that guide which animals are food, labor, pets, pests, and/or taboo. This provides a backdrop for discussing zooarchaeological analyses that have yielded important insight into the daily lives of overseas Chinese communities. For example, current research across North America has attempted to tackle previous assumptions such as social homogeneity and cultural isolation in these communities, and recent zooarchaeological syntheses have begun to demonstrate the variety and adaptability of immigrant Chinese foodways practices. Drawing such discussions into the Caribbean region will be mutually beneficial to both the burgeoning field of overseas Chinese archaeology as well as the recent advancement of Caribbean research into the post-Emancipation period. The differential dispersion of immigrant Chinese among the islands, the varied ecological restrictions, and the taxonomic diversity across the Caribbean affected which animals were available for inclusion in foodways practices. I conclude by developing historically- and culturally-situated hypotheses for identifying Chinese foodways practices in the Caribbean that can be applied to future analyses.

Alexis Ohman is a Ph.D. candidate in the Anthropology Department at William & Mary with a focus on historical archaeology and zooarchaeology. Her research engages with the zooarchaeology of the British Caribbean and the intersection between ecology, culture, and foodways practices during the colonial period. She holds a B.A. (Honors) in Anthropology from the University of Victoria and an M.A. from Simon Fraser University in Archaeology.

Coopers, Peddlers, and Bricklayers: Stories of a Working-Class Property through Public Archaeology in Washington, D.C.

Presenter: LaMarise Chardé Reid
Co-Authors: J. Jackson, R. Trocolli, C. Ames
Advisor: Joseph Jones
William & Mary,
Anthropology

An archaeological investigation of a lot where a former frame shotgun house once stood offers a unique look at 19th century working-class immigrant households. A German immigrant carpenter built the house before 1853 and it was successively occupied by a peddler, cooper, and bricklayer; little is known about their lives. Prior to redevelopment, the DC HPO Archaeology Program conducted a systematic archaeological survey from August 2016 to May 2017, the “Shotgun House Public Archaeology Project.” Volunteers helped uncover features and a wealth of material culture related to multiple generations of these immigrant households, including an artifact-rich midden and cellar. Public outreach and education were key components for engaging the public with the past. Hands-on learning, site tours, fence talks, local news media, and Facebook posts have resulted in an outpouring of support from the economically, socially, and racially diverse neighborhood—a microcosm of the city as a whole.

Chardé Reid is a first-year M.A./Ph.D. historical archaeology student in the Department of Anthropology at William & Mary. Chardé has experience in collections management, compliance review, cultural resource management, and public archaeology. She is interested in the relationship between landscape and memory in historically Black spaces. Chardé’s research will focus on the intersection between race, identity, cultural landscapes, and materiality through community-based archaeology.

Oysters in the Mountains, Champagne in the Saloon, White Mugs in the Tavern, and Seagulls in the Stew

Presenter: Megan Rhodes Victor
Advisor: Neil Norman
William & Mary,
Anthropology

Frontiers are creative, at times chaotic, places of the collusion and collision of ideas; as people encounter one another, as well as the geological and ecological forces of the physical environment, they forge spaces of meeting, interaction, dynamism, and change. Doctoral analysis now complete, this presentation compares the assemblages of the fishing village on Smuttynose Island, Maine (1623-1775) with the Montana mining town of Highland City (1866-1890), focusing in particular on the locations' drinking spaces. Saloons and taverns are ideal lenses for the examination of trade and exchange networks, commensal politics, and informal economy. Although separated geographically and temporally, the archaeological record reveals similar trends and activities at these two sites which speak to the ways that inhabitants of frontier zones interact with one another, the physical environment, and the distant metropole. In particular, this paper addresses activity areas at the two sites and the presence of exotic goods.

Megan Victor is a fourth-year Ph.D. candidate in the Anthropology Department at William & Mary. Her research focuses on social negotiation, drinking spaces, and commensal politics. Her dissertation examines these themes comparatively at two frontier sites: the 17th century Isles of Shoals, Maine and the 19th century Highland City, Montana. She holds a B.A. from the University of Michigan and an M.A. from William & Mary.

Constructing the Ideal in Miniature: Symbolic and Political Meanings of Twentieth-Century American Doll Houses

Presenter: Corinne Anne Vigen
Advisor: Rashmi Sadana
George Washington University,
Anthropology

The doll and the house are not just symbols of material culture. This paper is based on archival research and anthropological observations focused on twentieth century doll houses and the homes they were made to represent. By reproducing doll houses into playthings, collectors and manufactures quickly defined and normalized an archetype, that is, a two-story, single family structure for the "ideal" American home. Studying popular doll houses from 1890 to 1950, advice journals (*Ladies Home Journal*, et al.), mass housing projects of the early twentieth century, we can see how an "acceptable" image of an ideal house emerges in the U.S. Simultaneously, American museums were being built as public institutions, attempting to reimagine urban areas into cultural spaces. This paper gives a brief history of both museums and the origins of doll houses to help explain how and why these mundane miniature objects became part of present day museum collections. The cultural context of this analysis focuses on the idea of "home" in the U.S., with reference to cross-cultural and historical comparisons worthy of consideration. However, it is the quintessential, ideal American home, built in miniature, that reproduces symbolic meanings of gender and democracy while never losing touch of its colonial past.

Corinne Vigen is graduating this spring with an M.A. from the Sociology and Anthropology Department at George Mason University. She holds a B.S. in Cultural Anthropology from Virginia Commonwealth University. Her current research investigates twentieth-century miniature dollhouses as historical objects. She is passionate about museums and volunteers weekly at the National Museum of Women in the Arts.

Boron Nitride Nanotube Composites for Thermal Management

Presenter: Mahmoud Samy Amin
Co-Authors: T. Dushatinski, D. Kranbuehl
Advisor: Hannes Schniepp
William & Mary,
Applied Science

Nanoelectronics and photonics systems are critical for aerospace, defense, and consumer applications. The smaller the size and the higher the performance of the components, the more concentrated the power becomes per unit area, which leads to two significant problems: overheating and thermal stress. We design advanced thermal interface materials (TIMs) employing boron nitride nanotubes (BNNTs) to reinforce epoxy and other polymer matrices. These TIMs feature improved heat dissipation, so that the heat can be guided away from electronic components more efficiently. Different methods for preparation of free standing, 40 to 50 micrometer thin films of thermal composites have been investigated. Moreover, the thermal conductivity of the composites were measured using nanoscale and macroscale thermal conductivity techniques, such as scanning thermal microscopy and infrared microscopy, featuring spatial resolutions of 50 nm and 3 μm, respectively. Our BNNT-loaded TIMs feature a 10-fold enhancement in thermal conductivity over unloaded polymers.

Mahmoud Amin is a third-year Ph.D. candidate in the Applied Science Department at William & Mary. He is Egyptian. He finished his master's thesis before coming to the U.S. to study in the field of nonmaterial and its application in the petroleum industry. His current work focuses on thermal management of electronics using composites reinforced by nanomaterials for heat dissipation.

Autonomously Deployable Oil Tracking System for Arctic Oil Spill Response

Presenter: Spencer Lee Kirn
Co-Author: E. Skinner
Advisor: Mark Hinders
William & Mary,
Applied Science

Commerce in the Arctic is increasing. International shipping routes are opening up and drilling efforts for oil in the Arctic are expanding. With this increase comes many potential issues such as oil spills. When oil is trapped under the surface of the ice, the traditional methods of tracking the oil are not well suited. It is difficult to determine where the oil is located from above, and the oil also moves along with the ice floe. The system we are developing will be able to track oil slicks trapped below ice floes for future recovery. We establish the location of the oil from under the ice, then track the ice floe from above. Our system configuration consists of three parts: the underwater identification (UWID) tag, the Lamb-wave detection geo-referencing identification (LDGRID) tags, and the cloud communication system. The UWID tag is deployed by an autonomous underwater vehicle (AUV) and sits right below the ice. It emits a low frequency acoustic signal to induce Lamb waves into the ice floe. LDGRID tags detect the signal and triangulate the location of the UWID tag below the ice. On site testing of the system in the Arctic will ensure its functionality and gather data about the elasticity of ice for future improvements to the system. Here we will discuss the Arctic testing as well as simulations of the Lamb waves used to better understand the acoustic transmission through the ice.

Spencer Kirn is a second-year Ph.D. candidate in the Applied Science Department at William & Mary. He graduated from the College of Wooster in 2016 with a B.A. in physics. His research areas include acoustics, NDE, and machine learning. His dissertation topic is the development of a through-ice communication system using Lamb waves.

The Effects of Intranasal Orexin-A on MK-801-Induced Attentional Deficits

Presenter: Eden Blake-Lea Maness
Co-Author: J. Fadel
Advisor: Joshua Burk
William & Mary,
Applied Science

Schizophrenia (SZ) is a debilitating condition wherein those afflicted experience positive symptoms, including hallucinations and delusions, as well as negative symptoms such as alterations of processing affecting cognition and social interactions. The NMDA receptor hypofunction model of SZ asserts that a reduction in NMDA receptor input to GABAergic interneurons produces the pathology of this disorder, promoting excessive frontocortical excitatory neurotransmission—particularly overstimulation of basal forebrain cholinergic neurons - that ultimately impairs cognitive and sensorimotor processes. Orexin-A (OxA), a neuropeptide principally involved in wakefulness, has been shown to demonstrate cognitive-enhancing qualities in models of psychiatric and neurodegenerative illness. In the present study, the effects of OxA on attentional performance were examined in a NMDA receptor antagonist model of SZ. Male Fischer 344 Brown Norway F1 Hybrid rats (N = 12) received both intraperitoneal injections of MK-801 and intranasal administration of OxA prior to placement in a sustained attention task requiring differentiation between signal trials (500, 100, and 25ms illumination of a central panel light) and non-signal trials (no light illumination). OxA ultimately worsened attentional performance in this task. These findings suggest that, in a state of cortical hyperexcitation like what is observed following NMDA receptor antagonism, the introduction of pharmacotherapies augmenting activity at the orexinergic system further exacerbates existing cognitive dysfunction.

Eden Maness is a Ph.D. student in the Applied Science Department at William & Mary. She graduated from William & Mary's experimental psychology master's program in 2017 and is continuing her work in Dr. Burk's psychopharmacology lab. Her research involves pharmacologically targeting the neurological substrates of attentional processing, particularly the orexinergic system, in the context of neurodegenerative and psychiatric illness.

Low-Cost Wave Characterization Modules for Oil Spill Response

Presenter: Margaret Rooney
Co-Author: E. Skinner
Advisor: Mark Hinders
William & Mary,
Applied Science

Marine oil spills can be remediated by mechanical skimmers in calm waters, but performance degrades with increased wave height. We have developed and demonstrated a system that quantifies local wave characteristics with an uncertainty of four inches of heave. Our system is intended for the measurement of wave characteristics during oil spill recovery. It conveys this information to responders in real time via WiFi and remote reporting through a satellite network, allowing for enhanced situational awareness during an oil spill response. Our wave characterization module (WCM) uses accelerometer outputs from a very small inertial measurement unit to calculate wave statistics and is configured such that a WCM can be attached to a skimmer or incorporated into a micro buoy. Wave height and period are transmitted via WiFi or a satellite-enabled mesh -grid network to a cloud-hosted geographic information system (GIS). Here, we discuss the barebones sensors-plus-algorithm approach we developed by using spring-mass systems to approximate the wave height and period regime of interest and describe open water tests carried out using that development system. We then present controlled tests in the wave tank at Ohmsett, National Oil Spill Response Test Facility, with the WCMs communicating wave characteristics via WiFi to tankside laptops and via satellite to the cloud-based GIS. Snapshot determinations of the calculated wave height were within four inches of the Ohmsett wave measurement system.

Margaret Rooney is a second-year Ph.D. candidate in the Applied Science Department at William & Mary. Her dissertation research focuses on machine learning, signal identification, and signal classification to infer network processes. She holds a B.S. in Mathematics from St. John's University.

Hopf Bifurcation and Pattern formation in a Delayed Diffusive Logistic Model with Spatial Heterogeneity

Presenter: Qingyan Shi
Co-Author: Y. Song
Advisor: Junping Shi
Tonji University,
Mathematics

Logistic differential equation models have been used to describe the growth and dispersal of population, and a time delay is often incorporated into the model because of the maturation time for reproduction or other biological process. When the resource function in the model is spatially homogeneous, the dynamics of the model has been thoroughly known: a large time delay will destabilize the constant equilibrium and temporal oscillations can be observed. Here, we study the dynamics of a delayed diffusive logistic model with spatially heterogeneous resource supply under Neumann boundary condition. It is shown that for large diffusion coefficient, a supercritical Hopf bifurcation occurs near the non-homogeneous positive steady state at a critical time delay value, and the dependence of corresponding spatiotemporal patterns on the heterogeneous resource function is demonstrated via numerical simulations. Moreover, it is proved that the heterogeneous resource supply contributes to the increase of the temporal average of total biomass of the population even though the total biomass oscillates periodically in time.

Qingyan Shi is a fourth-year Ph.D. candidate in the Department of Mathematics at Tongji University in China and now is visiting William & Mary as a visiting Ph.D. student. Her research interest is differential equation and its application in biology, especially the dynamics and bifurcation behavior of delayed reaction-diffusion population models. She is now working on the pattern formation in some biological models.

SonicNets A Benign Acoustic Deterrence: Commercial Installations and Field Studies

Presenter: Elizabeth Skinner
Advisor: Mark Hinders
William & Mary,
Applied Science

Birds cause billions of dollars in damages annually in the aerospace and agricultural industries. Most bird deterrents on the market today provide short term solutions due to habituation. SonicNets is an acoustic deterrent system that has shown little habituation over long periods of time. Instead of trying to haze or scare the pest birds, we leverage the need for vocal communication between and within bird species. We create a colored noise signal designed to disrupt the auditory communication of the pest species present. Using a combination of directional acoustic parametric array speakers, traditional horn speakers, and omnidirectional speakers we create a localized area where acoustic communication is difficult, causing the birds to leave. This poster will focus on some of the commercial installations world wide, through our commercialization partner Midstream Technology, as well as field testing carried out locally.

Elizabeth Skinner is a Ph.D. candidate in the Applied Science Department at William & Mary in the Nondestructive Evaluation Lab. She is also the Lead Scientist at Midstream Technology. Her research interests include supercomputer simulations, acoustics, and image processing.

The Role of Selection in Sculpting the Genome-wide Distribution of Genes and Transposons

Presenter: Ronald D. Smith
Co-Author: J. Puzey
Advisor: Greg Conradi Smith
William & Mary,
Applied Science

A significant portion of eukaryotic genomes are comprised of transposons - mobile genetic elements capable of moving throughout the genome utilizing cut and paste or copy and paste mechanisms. Additionally, research has suggested that the presence of transposons may impact gene expression. This, along with the generally non-uniform distribution of genes and transposons across genomes is suggestive of non-neutral evolutionary processes. In this talk I'll present some preliminary results regarding the variation of transposon abundance in a naturally occurring population of monkeyflower (*Mimulus guttatus*), discuss the shortcomings of existing population genetic theories of transposons in explaining this variation, and discuss how we might move forward.

Ron Smith is a fourth-year Ph.D. candidate in the Applied Science Department at William & Mary. His main interests are in evolution, genetics and dynamical systems. Ron holds a B.S. in Applied Mathematics from the State University of New York-Farmingdale.

Persistence and Extinction of Population in Reaction-Diffusion-Advection Model with Strong Allee Effect Growth

Presenter: Yan Wang
Advisor: Junping Shi
William & Mary,
Applied Science

A reaction-diffusion-advection equation with strong Allee effect growth rate is proposed to model a single species stream population in a unidirectional flow. Here random undirected movement of individuals in the environment is described by passive diffusion, and an advective term is used to describe the directed movement in a river caused by the flow. Under biologically reasonable boundary conditions, the existence of multiple positive steady states are shown when both the diffusion coefficient and the advection rate are small, which lead to different asymptotic behavior for different initial conditions. On the other hand, when the advection rate is large, the population becomes extinct regardless of initial condition under most boundary conditions.

Yan Wang is a fourth-year Ph.D. candidate in the Applied Science Department at William & Mary. Her research investigates how asymmetric movement affects the stream population in river system.

Optical Investigation of Nanofibrillar Spider Silk

Presenter: Qijue Wang
Co-Authors: S. Wang, Z. Xing, M. Qazilbash
Advisor: Hannes Schniepp
William & Mary,
Applied Science

The origin of spider silk's superior mechanical properties has been intensively studied for several decades. It is widely accepted that such appealing properties are originated from the hierarchical structure within silk threads. Although the protein sequence and macroscopic morphology of the silk fiber are known, our understanding regarding structural organization for length scales in between is still limited. Our recent study found the silk ribbon produced by recluse (*Loxosceles*) spider is solely composed out of protein nanofibrils with diameter of 20 nm. Thus, the outstanding properties are essentially embedded within a single nanofibril and understanding the protein structures within nanofibrils becomes the last piece required towards fully understanding silk structure. Optical techniques like Fourier Transform Infrared (FTIR) and Raman spectroscopy grant us non-invasive detection of protein secondary structure, which is directly related to the mechanical properties of silk fiber. By analyzing the optical spectra of *Loxosceles* silk, we were able to identify different secondary structures within pristine nanofibrils. Furthermore, polarized FTIR and Raman allowed us to quantitatively determine the relative orientation and volumetric percentage of each secondary structures. Combined with our previous work of nanofibrils, we were able to provide a comprehensive image of the hierarchical structure organization of spider silk. Our results will also further the understanding of natural silk spinning process and guide future development of artificial silk based materials.

Qijue Wang is a fourth-year Ph. D. candidate in the Department of Applied Science at William & Mary. He works in the Nanomaterial and Imaging Lab led by Prof. Hannes Schniepp. His research project focuses on the mechanical properties, internal structure as well as their relationships in silk materials. He is also in charge of a spider colony consisting of hundreds of spiders.

Plotting Two-Dimensional Confidence Regions

Presenter: Christopher Weld
Co-Author: A. Loh
Advisor: Lawrence Leemis
William & Mary,
Applied Science

Plotting two-parameter confidence regions is non-trivial. Numerical methods often rely on a grid-like exploration of the parameter space to develop the corresponding contours of its confidence region, which is computationally expensive. A recent advance reduces the two-dimensional problem to a series of one-dimensional problems employing a trigonometric transformation of the parameter space that assigns an angle from the maximum likelihood estimator, and an unknown radius to its confidence region boundary. This paradigm shift significantly eases the computational burden and improves plot accessibility, however, is not terribly robust. Specifically, when parameters differ greatly in magnitude—which is not unusual for two parameter distributions—the corresponding graphics are susceptible to computational inefficiencies and poor definition, given a naive approach to its chosen set of angle values. This article improves the low cost two-dimensional radial profile log likelihood plot technique by (1) selectively targeting points along the confidence region boundary through heuristics for angle selection, in lieu of uniformly-spaced angles from its maximum likelihood estimator, and (2) enhancing the existing algorithm to keep the confidence region boundary searches in the parameter space. Two heuristics are given—an elliptic-inspired angle selection heuristic and an intelligent confidence region smoothing search heuristic—each improving graphic quality and computation time over the established technique.

Christopher Weld is a second-year Ph.D. candidate in the Applied Science Department at William & Mary. His dissertation focuses on computational probability efficiencies and manipulating mixed type random variables. He holds a B.S. in Mechanical Engineering from Cornell University and a M.S. in Computational Operations Research from William & Mary.

ACADEMIC
JOB MARKET
WORKSHOP
Date/Time: March 14th (Wed) 5-6pm
Location: Sadler Commonwealth Auditorium
THIS WORKSHOP IS FOR PHD STUDENTS IN HUMANITIES WHO ARE PURSUING CAREERS IN ACADEMIA. FACULTY MEMBERS WILL WALK YOU THROUGH THE FOLLOWING TOPICS.
1) The conditions of current academic job market
2) The most common mistakes made by job seekers
3) How to build a competitive record and communicate that record in job documents and interviews
4) How to strategically plan your years in PhD studies
Please RSVP to Hyunyoung Moon at csga04@wm.edu

Killer Yeast Toxin Production as a "Trojan Horse" Strategy to Disrupt Biofilm Formation

Presenter: Meredith Andersen
Advisor: Helen Murphy
William & Mary,
Biology

Biofilms, cooperative communities of microbes with complex architecture and social interactions, cause many clinical infections and place heavy strain on the U.S. healthcare system. A theoretical "Trojan horse" approach, in which medically beneficial engineered microbes outcompete pathogenic strains, is a treatment possibility that could circumvent the antibiotic resistance that biofilms confer. Some Saccharomyces cerevisiae strains form biofilms and are an excellent model for characterizing competitive strategies in biofilms. In this study, I will answer the question: can toxin production be exploited as a competitive strategy to disrupt cooperative microbial communities? To answer this, I will determine the fitness advantage of toxin production in direct competition with other strains. I will engineer strains that produce multiple toxins and then challenge these strains with other biofilm-forming strains and assess colony structure. I will also investigate competitive effects of introducing toxin at different biofilm development stages by engineering a strain with inducible promoters and inducing toxin production at predetermined timepoints. I will then engineer a toxin-producing strain with a self-destruct mechanism, and repeat these tests with self-destruction induced at predetermined timepoints. I will then assess the the colonies for edge dominance, cell death, and vulnerability to antifungal treatments. If this proof of concept is successful, it will support the further development of competition-based strategies in medical contexts.

Meredith Andersen is a first-year M.S. candidate in the Biology Department at William & Mary. Her research focuses on the social evolutionary processes in biofilms, especially toxin production as a competitive strategy. Her thesis topic is the use of microbe competition to disrupt biofilm formation as a potential clinical treatment.

Acetylation Controls Thyroid Hormone Receptor Intracellular Localization and Intranuclear Mobility

Presenter: Cyril S. Anyetei-Anum
Advisor: Lizabeth Allison
William & Mary,
Biology

Thyroid hormone (T3) is important for controlling many physiological processes, including growth and development. Its action is mediated by the thyroid hormone receptor (TR), a protein that binds to target genes and regulates their expression. Our studies have shown that TR is shuttled rapidly between the nucleus and cytosol, while localizing primarily to the nucleus. Mislocalization of TR can be linked to diseases such as T3-resistance and cancer. We have characterized amino acid sequences, called nuclear localization signals (NLSs) and nuclear export signals, within TR that are recognized by specific transport proteins and direct TR nuclear entry and exit. Recent data show that acetylation, a post-translational amino acid modification that occurs within one of the NLSs of TR, alters its intracellular localization. Here, we investigate how acetylation influences TRα1's ability to bind with specific transport proteins, how acetylation affects TRα1's intranuclear mobility, and what enzyme acts to acetylate TR. To this end, we constructed TR acetylation and nonacetylation mimics with fluorescent protein tags and introduced them into HeLa (human) cells. Analysis by western blotting and fluorescence microscopy showed that the TR acetylation and nonacetylation mimics interact with specific transport proteins, and that TRα1's intranuclear mobility is strikingly reduced in the absence of acetylation. Lastly, pharmacological inhibition of a candidate TR-specific acetylation enzyme led to increased nuclear localization of TR.

Cyril Anyetei-Anum is a second-year M.S. candidate in the Biology Department at William & Mary. His research interests include molecular biology, genetics, and biochemistry.

The Golden Puffer, *Chonerhinos naritus* (Richardson, 1848), an Anadromous, Piscivorous Pufferfish from Southeast Asia

Presenter: Katherine Elliott Bemis
Advisor: Eric Hilton
Virginia Institute of Marine Science, Fisheries Science

The Golden Puffer, *Chonerhinos naritus* (Richardson, 1848) is a monotypic genus in the family Tetraodontidae that occurs along the east coast of India and throughout Southeast Asia. Previous work has focused on the toxicity of this species because it is consumed in Malaysia as a local favorite food and is celebrated annually during the Pufferfish Festival. Its biology and morphology, however, are poorly known. It is rare in museum collections, but available specimens come from both freshwater and brackish-marine environments. Spawning occurs in freshwater, meaning that this species is anadromous, an uncommon pattern in the ~200 species of Tetraodontidae. I studied 34 specimens of *C. naritus* from throughout its range to collect external meristic and morphological data; I also studied the anatomy of one individual using CT scanning to investigate its internal anatomy. *Chonerhinos naritus* has several anatomical features unusual for tetraodontids, including a large nasal organ, three lateral lines, and four times the number of dorsal- and anal-fin rays as found in other members of this family. I developed a new range map documenting the distribution based on the specimens I examined. My examinations suggest that *C. naritus* is primarily piscivorous because stomach contents consist of chunks of fishes, including portions of fins, which it processes with its sharp beak. Piscivory is not widespread Tetraodontidae: most species feed on hard-shelled prey or corals, and the closest relatives of *C. naritus* (species of the freshwater genus *Auriglobus*) specialize on fruits and seeds.

Kate Bemis is a second-year graduate student at the Virginia Institute of Marine Science. She studies tooth replacement in teleost fishes.

Spatial Management of Benthic Resources Fisheries in Chile

Presenter: Jennifer Beckensteiner
Co-Authors: D. Kaplan, M. Fernandez
Advisor: Andrew Scheld
Virginia Institute of Marine Science, Fisheries Science

Territorial User Right for Fisheries (TURFs) are area-based rights granting exclusive harvest privileges to groups of fishers. A network of ~1,000 TURFs was initially successful in Chile, having positive economic and ecological benefits. Recently, the profitability of many TURFs has declined, potentially leading to fishing effort increases in unregulated areas outside of TURFs. Increased exploitation rates in open-access areas may further erode TURF benefits via reduced recruitment and overall ecosystem integrity. We analyzed harvest of benthic resources in Chile to evaluate potential impacts of the large network of TURFs. Landings of red sea urchin (*Loxechinus albus*), keyhole limpet (*Fissurella* spp.) and kelp (*Lessonia* spp.) were used to estimate catch-per-unit effort (CPUEs) indices inside and outside TURFs. For these species, it was found that CPUEs were significantly higher inside TURFs, suggesting unregulated areas were less productive. This finding could be due to selective implementation of TURFs in the most productive fishing grounds or, conversely, the displacement of fishing effort from TURFs. A LASSO regression model was used to explain catches in the open-access areas, including variables related to proximal TURFs' characteristics and activity. Contrasting results are found across fishing locations and suggest that a) the displacement of fishing effort may be a heterogeneous process and b) differences in catch are mostly driven by exogenous environmental factors. These results contribute to a better understanding of TURFs' efficacy in Chile and globally.

Jennifer Beckensteiner is a fourth-year Ph.D. candidate in the Fisheries Science Department at the Virginia Institute of Marine Science, William & Mary. She holds a bachelor's degree (Biology and Ecology) from the University of Lyon 1, France, and an M.S. (Fisheries Sciences) from AgrocampusOuest School in Rennes, France. Her research roots in the determination of the success or failure of property rights for fisheries management of benthic resources.

Range-Wide Variation in Common Milkweed traits and the Effect of Food Source on Larvae of the Monarch Butterfly

Presenter: David S. De La Mater
Advisor: Harmony Dalgleish
William & Mary,
Biology

Plants play an important role in structuring ecological communities from the bottom up through interactions with herbivores, and environmental variation can affect these interactions. We use the interaction between common milkweed (*Asclepias syriaca*) and the monarch butterfly (*Danaus plexippus*) to examine 1) the role of environmental variation in dictating plants traits, and 2) how those variations affect herbivores. We quantified intraspecific trait variation in 55 natural common milkweed populations, then remeasured these traits when population representatives were regrown in a common garden to control for environmental variation. We then measured growth, performance, and survival of monarch larvae feeding on these same plants. Our findings indicate distinct spatial patterns in functional and defensive traits throughout the range of *A. syriaca*, but these patterns dissipate when genets are regrown in a common environment. When monarch larvae are raised on these equilibrated milkweeds, those fed on plants from the Northeast gain more weight than those fed on plants from the Southwest. These results can better inform monarch conservation efforts; when sourcing milkweed seed for restoration projects throughout the monarch breeding range, managers should consider the intraspecific variation between ecotypes of milkweed, and the differential effects they might have on monarchs. Furthermore, we demonstrated plasticity in specific plant traits in response to environmental change, which could have theoretical implications in light of current and projected changes in climate.

David De La Mater is a second-year M.S. candidate in the Biology Department at William & Mary and a National Science Foundation Graduate Research Fellow. He is an ecologist and a conservationist, and he is broadly interested in understanding how environmental changes act on or shape ecosystems; especially how this happens through the interface of plant-animal interactions.

Wading Bird Use of Living Shorelines and Natural Fringing Marshes

Presenter: Robert Michael Galvin
Advisor: Randolph Chambers
William & Mary,
Biology

Climate change is one of the biggest factors affecting global biodiversity. In the Chesapeake Bay, climate change and associated sea level rise threaten shorelines used by birds and other species. Rising waters exacerbate coastal erosion, prompting coastline managers to implement strategies to address this destructive process. The current paradigm for managers is to armor shorelines; armoring does shield the shore behind the protective structure, but eliminates the natural shoreline in the process. Living shorelines are a recently developed management tool that both protects against coastal erosion and mimics the ecosystem functionality of a natural fringing marsh. The degree to which these living shorelines actually copy natural marshes with respect to use by mobile fauna has been examined to some extent for fish and crustaceans, but not for birds. My research aims to quantify wading bird use of living shorelines and proximate natural fringing marshes in the lower Chesapeake Bay. I will be collecting prey community and anthropogenic disturbance data to help explain any differences in bird use between the two types of marsh. This research fills a critical gap in our knowledge about avian use of these smaller marshes, and will help to guide management decisions in the future.

Bob Galvin is a first-year M.S. candidate in the Biology Department at William & Mary. His research interests include conservation biology, ornithology, ecology, and environmental ethics. His thesis will investigate the effects of sea level rise on coastal wading birds. He holds a B.S. in Marine Biology and a minor in Philosophy from the University of Delaware.

Herbivores as Conditional Mutualist

Presenter: Nichole Winifred Gustafson
Advisor: Harmony Dalgleish
William & Mary,
Biology

Recently there has been a concern about the global decline in pollinators. Because it is the primary host plant of the charismatic monarch butterfly (*Danaus plexippus*), the decline in common milkweed (*Asclepias syriaca*) has been linked to the dramatic decline in monarch numbers (the "milkweed limitation hypothesis"). Although we know a great deal about the ecology of monarchs, we know much less about the ecology of milkweed; such information will be critical for efforts to slow or reverse the decline of the monarch. One piece of ecology that could be informative for maintaining and expanding milkweed populations is reproductive ecology. Herbivores consuming tissue generally reduces reproduction, but there are ways in which at low densities herbivores could increase reproduction. Milkweed reproduces asexually from root buds that could potentially be increased with low amounts of damage to the root. In addition, herbivores could increase sexual reproduction by pollinating common milkweed. This creates a system where herbivores have the potential to be conditional mutualist. Can herbivores be conditional mutualist by altering allocation to sexual and asexual reproduction? The answer to this question has the potential to shift management practices for milkweed patches. If herbivores can be conditional mutualist controlling for outbreaks instead of eliminating herbivore populations could produce larger and healthier patches of milkweed.

Nichole Gustafson is a first-year master's candidate in the Biology Department at William & Mary. Her research interests includes plant and insect interactions, and population biology. She is currently working on conditional mutualisms in common milkweed.

Effects of Anthropogenic Noise Disturbance on Songbird Social Networks

Presenter: Carly Hawkins
Advisor: John Swaddle
William & Mary,
Biology

Anthropogenic noise, which is increasing globally, affects birds from gene expression up through alteration of community composition. At the behavioral level, noise often disperses birds away from the point source. The impacts of this dispersal on surrounding quieter areas is not well understood. Therefore, in this project, we sought to understand how noise-related dispersal affected the sociality of groups of songbirds as they moved away from the source of noise. As the displaced birds would likely be forced to occupy a smaller area that may already have resident individuals, we predicted that displaced birds would show a more clustered social network that may include new individuals, and that individuals within the flock would have more social connections. We were also interested in the effects of noise-disturbance on social groups when dispersal is not an option. We tested these ideas in two songbird systems, captive domesticated zebra finches (*Taeniopygia guttata*) and free-living red-backed fairy-wrens (*Malurus melanocephalus*). Preliminary results indicate that between-group interactions decreased in the presence of noise, meaning the birds became less social, contrary to our initial hypothesis. Additionally, free-living groups regularly shifted their territories away from noise. If social networks are altered consistently, there may be implications for future breeding success, detection of communication signals, and even for pathways of disease transmission among individuals.

Carly Hawkins is a second-year M.S. candidate in the Biology Department at William & Mary. She is broadly interested in the effects of anthropogenic disturbance on animal behavior. She currently studies the effects of noise pollution on songbird social groups in both free-living and captive systems. Before coming to William & Mary, Carly completed her B.S. in Biology at The Pennsylvania State University.

Modulation of the Breast Cancer Tumor Microenvironment by Oncolytic Vesicular Stomatitis Virus

Presenter: Jessica L. McCanless
Co-Authors: M. Polzin, J. Slate, R. Fuller
Advisors: Maryam Ahmed, Darren Seals
Appalachian State University,
Biology

High tumor-associated macrophage (TAM) densities in cancerous breast tissue often correlates with poor clinical outcomes. This can be attributed to the M2 macrophage subtype whose wound-healing functions stimulate cancer cell proliferation, tumor angiogenesis, and metastasis, thus making TAMs a suitable target for therapeutics. We are interested in developing oncolytic vesicular stomatitis virus (VSV) as a treatment option for breast cancer. VSV is cytotoxic to breast cancer cells (BCC), including the invasive MDA231 BCC line used in this study. We also have recent data suggesting that VSV converts M2 macrophages to the more immunogenic, tumor-fighting M1 profile. To determine the oncolytic potential of VSV in a simulated breast tumor microenvironment (TME), MDA231 BCCs and model THP1 monocytes were co-cultured and infected with recombinant wild-type (rwt virus) and or matrix (M) protein mutant (rM51r-M virus) strains of VSV. Secretion of the pro-inflammatory cytokines, IL-6 and TNFα was monitored by ELISA. MDA231 monocultures secreted both IL-6 and TNFα, and IL-6 levels increased 2-fold when the two cell types were cultured together. Importantly, we observed that rwt virus inhibited IL-6 and TNFα secretion, while rM51R-M virus enhanced it under co-culture conditions. Our results are consistent with the ability of rwt virus to inhibit host gene expression in infected cells and the ability of rM51R-M virus to promote a pro-inflammatory and potentially immunogenic TME. Future studies will dissect how VSV strains modulate both M1 and M2 macrophage populations in the TME.

Jessica McCanless is a second-year M.S. candidate in Cell and Molecular Biology at Appalachian State University. She is currently studying how infection with wild-type (rwt) and M-protein mutant (rM51R-M) vesicular stomatitis virus modulates tumor-associated macrophage populations in the breast cancer tumor microenvironment.

The Effect of Mercury Pollution on Sperm Traits and Function in the Zebra Finch

Presenter: Ananda Menon
Advisor: John Swaddle
William & Mary,
Biology

Mercury is a persistent, globally distributed contaminant that biomagnifies through food webs, causing mortality, reproductive failure and other health concerns in humans and wildlife. Songbirds in some polluted watershed areas have highly elevated blood mercury levels. The effects of mercury on fertility have primarily been examined through correlative field studies and the use of unrealistic doses or modes of exposure to mercury in laboratory conditions. To investigate the effects of ecologically relevant levels of dietary mercury exposure on sperm quality and fertility, we presented captive zebra finches with a diet containing mercury at levels compared to a polluted watershed site and examined how sperm morphology and motility changed in mercury-exposed animals relative to controls. All birds were then paired with non-exposed females, and eggs were dissected to study how the ability of the sperm to reach the perivitelline membrane in the egg was affected. Preliminary results suggest that testis size, sperm length and sperm counts were reduced in mercury dosed birds, and fewer sperm cells were found in the perivitelline membrane of the egg. If exposure to ecological mercury levels reduces male fertility, mercury pollution could pose a unique threat to reproductive processes and thus population viability in regions affected by mercury pollution.

Ananda Menon is an M.S. candidate in Biology Department at William & Mary. He is interested in ecotoxicology, animal physiology and behavior. His research focuses on the effects of mercury pollution on avian reproduction and behavior.

Dietary Transfer of Methylmercury in the South River Floodplain

Presenter: Jasmine Alexandria Parham
Advisor: Daniel Cristol
William & Mary,
Biology

From 1929 to 1950, a DuPont chemical plant polluted South River, a major headwater tributary of the Shenandoah River, with mercury. In 2017 DuPont agreed to pay a multi-million-dollar settlement to remediate the polluted watershed area, a figure bolstered by research that found high levels of mercury in forest birds living in the river floodplain. My research examines how mercury from that contaminated river is making its way into forest birds with no direct trophic connection to that river. Previous work in this system has already found evidence that spiders, a major prey item for breeding forest birds, are bioaccumulating large amounts of mercury and transferring it to avian predators. But how are the spiders the birds eat getting their mercury? Specifically, is mercury transported into terrestrial food webs by emerging aquatic insects eaten by the spiders? Or is it introduced to floodplain soils during periodic flooding events, where it then biomagnifies up the terrestrial food web? To answer this, I will use stable isotopes to examine whether these spiders are eating mostly aquatic or terrestrial prey. This work could influence remediation strategies. If mercury is not transported into terrestrial food webs by emerging aquatic insects, but instead by contaminated floodplain soil, remediation focusing on the river channel will not be successful in stopping the dietary transfer of mercury to forest birds. It would also mean bioavailable methylmercury is not demethylating into inorganic mercury once it leaves the water, or is being absorbed by terrestrial plants before it can.

Jasmine Alexandria Parham is a first year M.S. candidate in the Biology Department at William & Mary. She has broad interests in ecology, evolution, and conservation. Her Master's thesis is about how mercury moves from river sediment into terrestrial food webs.

An Evaluation of Methodologies for Measuring Antibacterial Activity of the Epithelial Mucosa of Farmed Tilapia

Presenter: Betsy Virginia Presgraves
Advisor: Tiffany Wilmoth
Clemson University,
Animal and Veterinary Science

The biggest threat to commercial tilapia production is streptococcus infection, which accounts for worldwide losses exceeding $150 million annually. Consumer preferences and the looming threat of antibiotic resistance limit producer approaches to fish disease management; however, strengthening the mucosal immune response is a promising avenue of disease prevention research. The present work was undertaken to evaluate the antibacterial assays commonly utilized when measuring the effectiveness of the mucosa at fighting pathogens. Four disk diffusion and four micro titer plate assays were evaluated based upon their common levels of use in the literature. Each of the disk diffusion assays failed to measure antibacterial activity when controlled for the antibacterial activity of additives. The microtiter plate assays measured limited antibacterial activity at lower growth reduction levels of 10-30%. These assays were administered on samples collected from tilapia in a working aquaponics facility in contrast to the majority of experiments which are conducted on fish that have been purposely housed in clean and controlled conditions within research facilities. This deviation from standard methods introduced additional variables which may have influenced assay outcomes. The ability of research science to enhance the mucosal immune system of tilapia is only as good as the methods used to test for treatment responses; therefore, better assays must be developed before novel ideas can be tested.

Betsy Presgraves is a first-year Ph.D. student in the Department of Animal and Veterinary Sciences at Clemson University. She holds a master's degree (Animal science) from Clemson University and a bachelor's degree (History and Biology) from Erskine College. She recently completed research in the areas of aquaculture and fish immunology, and she is currently studying reproductive endocrinology and physiology in ruminants.

The Road to Stardom: Linking Larval Food Environment with Juvenile Recruitment Success in Echinoderms

Presenter: Emily Lynn Richardson
Advisor: Jonathan Allen
William & Mary,
Biology

Echinoderms are characterized by boom-bust population dynamics in which species exhibit rapid outbreaks followed by drastic die-off events. These extreme density fluctuations can be driven by both bottom-up and top-down forces, and recruitment bottlenecks may occur at a variety of life history stages. However, few studies have considered the importance of links between life history stages, particularly the potential role larval history has in impacting juvenile recruitment. Laboratory studies of the sea star *Asterias forbesi* have shown that larvae reared on low food levels have lower survival and metamorphose as smaller juveniles than those reared at high food levels. We extended these studies to test how differing phytoplankton concentration during *A. forbesi* larval development impacts post-metamorphic performance and whether juveniles with access to high food levels can overcome the negative effects of low larval food background. We manipulated food availability during larval rearing (two levels: high = 22,500 cells/ml or low = 7,500 cells/ml) and during juvenile rearing (four levels: fed 6 juvenile mussels/week, 3 juvenile mussels/week, 1 juvenile mussel/week or unfed) to assess the relative importance of feeding in each life history stage. Our response variables were juvenile survival and growth, number of juvenile mussels eaten/week and mean size of juvenile mussels eaten. We then compared the effects of larval food availability with juvenile food availability to determine whether pre- or post-metamorphic processes have a greater impact on sea star growth and survival.

Emily Richardson is a second-year M.S. candidate in the Biology Department at William & Mary. She is interested in environmental factors that affect the early development of marine invertebrates. Her thesis work is focused on investigating juvenile ecology of the sea star Asterias forbesi*.*

Influence of Seasonal and Microclimatic Weather Patterns on the Tick-Borne Pathogen *Ehrlichia chaffeensis*

Presenter: Dylan Simpson
Advisor: Matthias Leu
William & Mary,
Biology

Predicting the prevalence of tick-borne pathogens is an important challenge in ecology. One such pathogen in the Southeast is *Ehrlichia chaffeensis*, a bacterium transmitted by the lone star tick (*Amblyomma americanum*) and maintained by the white-tailed deer (*Odocoileus virginianus*) as its primary reservoir. Incidence of human infection by *E. chaffeensis* is increasing in the US, but its dynamics remain poorly understood. Studies tend to be limited either spatially (i.e. few sites) or temporally (i.e. only snapshots in time). To begin teasing apart the spatiotemporal dynamics of *E. chaffeensis*, we examined relationships between *E. chaffeensis*, its tick host, and environmental factors at 130 sites across the Virginia Peninsula. We collected ticks at each site and used molecular methods to test for *E. chaffeensis*. Here, we used generalized linear mixed-effects models to ask how seasonal weather patterns drive inter-annual variation in *E. chaffeensis* prevalence and tick abundance. We found prevalence to be positively associated with rainfall during the current spring, and with temperature the previous fall and winter. Tick abundance may also be related to spring rainfall, but this evidence is not as strong. Precipitation and temperature each likely act on *E. chaffeensis* through its hosts; we hypothesize precipitation to affect tick survival through the relief of water stress, and temperature to affect deer fecundity. Our results highlight the complexity of tick-borne disease dynamics, but also represent an important step toward modeling *E. chaffeensis* prevalence through time.

Dylan Simpson is a second-year M.S. candidate in the Biology Department at William & Mary. He is broadly interested in how environmental factors act across the landscape to affect species' distributions and community dynamics. His thesis research regards the distribution and prevalence of tick-borne pathogens.

Characterizing the Immune System of Sockeye Salmon during their Spawning Journey in Alaska

Presenter: Meaghan K. Smith
Advisor: Patty Zwollo
William & Mary,
Biology

During the return journey to their spawning grounds, sockeye salmon are exposed to various pathogens and undergo major endocrine changes. Little is known about how these changes affect their immune system. The immune system of salmon is similar to mammals in that there are myeloid lineage cells, which provide first response to infection, and B lineage cells, which protect against specific pathogens. After activation by pathogen, B cells may differentiate into long-lived plasma cells (LLPCs) in the anterior kidney, where they can survive for years, continuously secreting protective antibody. Sockeye salmon return to their natal grounds for spawning and die shortly thereafter. Previous studies found that during the return, they retain their LLPCs, while B cell development is inhibited. This research characterized changes in anterior kidney immune cell abundance during the journey and at various spawning sites. Additionally, this research examined three relevant diseases. Flow cytometry was used to analyze the abundance of B cells, LLPCs, and myeloid lineage cells. Quantitative PCR was used to determine pathogen load. I hypothesize that as fish approach their spawning grounds, there will be increased abundance of myeloid cells, a decreased abundance in B lineage cells, no change in LLPCs, and an increased pathogen load. Additionally, I expect fish at the various spawning sites to have distinct differences in immune cell abundance as well as pathogen type and load. Understanding these changes will help efforts to preserve wild salmon and aid in aquaculture.

Meaghan Smith is a second-year M.S. candidate in the Biology Department at William & Mary. Her research examines the immune system of sockeye salmon during their spawning journey in Alaska. Meaghan also received her Bachelor of Science in Biology from William & Mary.

Are Speckled Trout Adapted To Cold Waters At The Northern Range Limit?

Presenter: Jingwei Song
Co-Author: R. Brill
Advisor: Jan McDowell
Virginia Institute of Marine Science,
Fisheries Science

Investigating how environmental features shape the genetic structure of populations is crucial for understanding their potential to adapt to future environmental change, as well as for sound management. Speckled trout, *Cynoscion nebulosus*, is an estuarine-dependent sciaenid fish that is widely distributed from Chesapeake Bay to the Gulf of Mexico and supports economically valuable recreational fisheries throughout its range. Populations at the northern range limit (Virginia, North Carolina), experience colder water temperatures in winter. In some years, rapid drops in temperature towards or below freezing can lead to mass-mortality events (cold stuns). Previous studies using microsatellite loci have found that speckled trout comprise genetically distinct northern (Virginia, North Carolina) and southern (South Carolina-Florida) populations. Since there is no known physical barrier to migration between these two populations, we hypothesize that the genetic break may be the result of selection on the northern population for increased tolerance to colder water temperatures. To test this hypothesis, we used high throughput sequencing to compare fish taken from either side of the genetic break to screen for genomic evidence of local adaptation. At the organismal level, we used intermittent respirometry to look for differences in metabolic rates between speckled trout sampled from the two genetically distinct populations. Understanding the factors that contribute to the observed differences is a first step in the ability to predict the potential resilience of speckled trout.

Jingwei Song is a third-year Ph.D. student at the Virginia Institute of Marine Science. His research focuses on population genomics and thermal physiology in fishes.

Influence of Wastewater Effluent Treatment and Disinfection on DON and Chlorophyll in a Chesapeake Bay Tributary

Presenter: Brianna Stanley
Co-Authors: R. Sipler, Q. Roberts, E. Norton, L. Killberg-Thoreson
Advisor: Deborah Bronk
Virginia Institute of Marine Science, Physical Sciences

Wastewater reclamation facilities use numerous variations of primary to tertiary treatment and disinfection to remove nutrients from influent. Current treatments focus on removal of inorganic nutrient forms such that even highly treated effluent can still contain high concentrations of dissolved organic nitrogen (DON). To determine the effectiveness of the different treatment and disinfection methods, with respect to removal of the DON fraction, incubations were conducted using 0.2 uμm filtered wastewater effluent from four sequencing batch reactors with treatments ranging from minimal, nitrification only, to full biological nitrogen removal with chemical or biological phosphorus removal. Each effluent treatment underwent additional disinfection treatments of no disinfection, germicidal UV, or chlorination. Effluent was combined with water collected from two sites in the York River, a tributary of the Chesapeake Bay. Chlorophyll a (Chl *a*) concentrations were monitored throughout the 5-10 day bioassay as a proxy for phytoplankton abundance. The bioassays were repeated twice during both summer and winter seasons. Summer incubations had higher levels of Chl *a* than winter incubations. Overall, the greater the level of treatment, the lower the level of Chl *a* accumulation. Nitrate controls, however, indicate that the reduction in Chl *a* accumulation is predominately caused by reduction in residual nitrate. Additionally, with minimally treated effluent, germicidal UV and chlorination provides only minimal improvement with respect to reducing phytoplankton abundance.

Brianna Stanley is a second-year bypass student at the Virginia Institute of Marine Science where she studies marine nitrogen cycling. Brianna's dissertation is focused on the nitrogen nutrient urea and its cycling in the Chesapeake Bay. She currently has a B.S. in Biochemistry from Washington State University.

Environmental Controls on Pteropod Phenology along the Western Antarctic Peninsula

Presenter: Patricia Susan Thibodeau
Co-Author: C. McBride
Advisor: Deborah Steinberg
Virginia Institute of Marine Science, Biological Sciences

The pteropod (pelagic snail), *Limacina helicina antarctica*, is one of the most abundant zooplankton taxa in the Western Antarctica Peninsula (WAP), a region affected by rapid climate warming. *L. antarctica* is an important grazer of phytoplankton and prey for higher trophic levels in the WAP. However, little is known about *L. antarctica* life history (phenology). The goal of this study is to determine if there have been shifts in phenology due to warming or other environmental controls - changes which would have important implications for regional food web dynamics. Pteropod shell lengths were analyzed from samples collected in the Palmer, Antarctica Long-Term Ecological Research program (PAL LTER) year-round sediment trap from 2004 to 2016. Sediment traps are used to measure export of sinking particulate matter from the surface to the deep ocean, but due to their sinking behavior to escape predators, live pteropods also commonly enter sediment traps. Preliminary results indicate new *L. antarctica* cohorts typically appear in May. The most rapid growth often arises in November (austral summer) corresponding to high biological productivity. The timing of *L. antarctica* first appearance varies among years with early appearance years (2007 and 2012) most strongly correlated with low sea ice area and fewer ice days in the north WAP region. It is expected that due to long-term regional warming and progressively earlier sea ice retreat in spring, new cohorts will appear progressively earlier in the year, leading to a shift in timing of abundance peaks.

Patricia Thibodeau is a fourth-year Ph.D. candidate in the Biological Sciences Department at the Virginia Institute of Marine Science, William & Mary. Her research areas include zooplankton ecology, global change biology, carbon cycling, and climate change. Her dissertation topic is the environmental controls on pteropod (open-ocean snail) physiology, phenology, and biogeography, along the Western Antarctic Peninsula. She holds a B.A. from Bowdoin College.

Water Clarity and Suspended Particle Dynamics at Oyster Aquaculture Sites in Chesapeake Bay, Virginia

Presenter: Jessica S. Turner
Co-Authors: G. Massey, L. Kellogg
Advisor: Carl Friedrichs
Virginia Institute of Marine Science,
Physical Sciences

As the oyster aquaculture industry grows in Virginia, with it grow concerns about possible negative impacts on water quality as well as hopes that oysters' efficient water filtration rates could improve water quality. This study investigated water clarity dynamics at four aquaculture sites in southwestern Chesapeake Bay, half bottom cages and half floating cages. Light attenuation and the characteristics of suspended particulate matter were measured during summer 2017. In situ particle size distributions and settling rates were captured by the Particle Imaging Camera System (PICS) and the Laser In Situ Scattering and Transmissometry (LISST) optical instruments alongside measurements of total suspended solids (TSS) and their organic content, colored dissolved organic matter (CDOM), and Chlorophyll-a concentrations. Water clarity in terms of both light attenuation and suspended particle dynamics varied widely among sites. However, at each site, little variation was seen between waters within the aquaculture operation and surrounding waters. This study highlights the possibility that the sites were hydrodynamically situated in locations favorable to dispersal and mixing. Currents likely provided sufficient velocities to locally disperse any resuspended organic matter associated with oyster feces or pseudofeces. Likewise, mixing of water between the aquaculture site and surrounding waters likely hid any obvious reduction in suspended particle concentration within the aquaculture site associated with oyster filtration.

Jessie Turner is a second-year Ph.D. student at the Virginia Institute of Marine Science in the Physical Sciences Department. Her current research explores particle dynamics and water clarity in Chesapeake Bay. She holds an M.S. in Oceanography from the University of Alaska-Fairbanks and a B.A. in Earth and Oceanographic Science from Bowdoin College in Brunswick, Maine.

Different Harvest Time Affects Peach Tree Nutritional Needs

Presenter: Qi Zhou
Advisor: Juan Carlos Melgar
Clemson University,
Plant and Environmental Sciences

The objective of this research was to determine the amount of nutrients removed in pruned wood, thinned fruitlets, harvested fruits and fallen leaves of peach trees of different ripening seasons. This information may be relevant for optimizing fertilization in peach orchards. We selected 18 peach trees of six cultivars from three different ripening seasons (early-season: "Desiree" and "Spring Snow"; middle-season: "Sweet N Up" and "Coralstar"; late-season: "Snow Gem" and "Snow King"), and measured the concentration of nutrients in pruned wood, thinned fruitlets, harvested fruit and fallen leaves. Nutrient analysis showed that early-season cultivars accumulated more nitrogen in thinned fruitlets and mature fruits, and more potassium in pruned wood and mature fruit than late-season cultivars. Fruit from late-season cultivars accumulated more calcium than early-season cultivars. These results suggest that peach cultivars from different ripening seasons may benefit from different fertilization programs rather than a universal, calendar-based fertilization program. These findings are expected to reduce environment pollution caused by over fertilization and help farmers improve fertilization plans that are specific to the ripening season of their peach cultivars.

Qi Zhou is a fourth-year Ph.D. candidate in Plant and Environmental Sciences at Clemson University. She has a bachelor's degree in horticulture and a master's degree in plant physiology. She has been doing peach research for four years under Dr. Juan Carlos Melgar's supervision.

Physiological Characterization of Peanut Cultivars, Experimental Lines and Wild Species for Drought and Heat Tolerance

Presenter: Zolian Zoong Lwe
Co-Author: S. Tallury
Advisor: Sruthi Narayanan
Clemson University,
Plant and Environmental Sciences

The peanut is an important crop grown worldwide for its nutritional value and economic significance. Although the demand for peanuts remains high, increasing drought episodes, combined with temperatures ≥ 100°F, affect the reproductive efficiency of the crop and threaten the supply. Peanut plants are most sensitive to drought and heat stresses during flowering, which drastically decreases yield due to poor pollen performance and reduced pod-set. There is no currently grown cultivar tolerant to both stresses. We tested wild species, Clemson experimental lines derived from wild species and currently grown cultivars for drought and heat tolerance. Plants were grown in a greenhouse at optimum conditions (82/72°F day/night + well-watered) until 9 days after flowering. Thereafter, plants were exposed to drought stress (82/72°F + water-withheld), heat stress (100/82°F + well-watered), drought & heat stresses (100/82°F + water-withheld) or optimum conditions [control] for 7 days. Pollen viability, pollen germination and pod number were measured to assess pollen performance. Clemson experimental lines SIN 83 and F7N 1 had high while Gregory (cultivar) had low pod numbers under both drought and heat stress unlike the other genotypes. SIN 83 also had high while SIN 121 had low pollen germination and viability % under both stresses unlike the other genotypes We will also profile and analyze the anther transcriptome of drought & heat-tolerant and susceptible genotypes in order to elucidate the underlying genes and biochemical pathways that drive pollen performance. Our findings will help develop drought and heat-tolerant high-yielding peanut cultivars.

Zolian Zoong Lwe is a first-year M.S. student in the Plant and Environmental Sciences Department at Clemson University. His research interests span from plant physiology to genetics and biochemistry. He is currently studying drought and heat tolerance in Clemson peanut experimental lines along with wild species and currently grown cultivars by examining pollen performance.

Improving and Examination of Phosphomimetic BRCA1 Peptide Inhibitors

Presenter: Nicolas Abrigo
Co-Author: A. Haymond
Advisor: Matthew Hartman
Virginia Commonwealth University,
Chemistry

Peptides have proven successful for the inhibition of therapeutic targets previously deemed "undruggable" by small molecules. These "undruggable" targets contain large binding interfaces and lack a defined pocket for small molecules to bind. Proteins use these large, hydrophobic surfaces to interact with each other, termed protein-protein interactions (PPI). A notable breast cancer protein (BRCA1), which participates in the repair of DNA double strand breaks, forms a protein-protein complex through the C-terminal BRCT domain. Many known inhibitors to this PPI are phosphopeptides with a pSer-X-X-F motif. Since phosphopeptides can be undesirable therapeutically due to their vulnerability to desphosphorylation and poor cell permeability, a peptide lacking phosphoserine is ideal. Using mRNA display a peptide inhibitor was found that did not contain the phosphoserine motif. This peptide was able to bind by picking up additional contacts on the protein surface that were not seen with phosphopeptides. Rationally designed mutations of this novel phosphomimetic peptide were developed in an effort to improve binding to the BRCA1 protein. The surface contacts were also examined using a recently developed technique known as "protein painting" and compared to the previously acquired crystal structure.

Nicolas Abrigo received his B.S. in Chemistry from William & Mary and is now a Ph.D. candidate in Chemistry at Virginia Commonwealth University. His research focuses on developing peptide inhibitors to the breast cancer protein BRCA1 as well as intracellular delivery with cell-penetrating peptides.

Investigating the Dissociation Dynamics of Atmospheric Brown Carbon via Velocity Map Imaging

Presenter: Kenneth Jacob Blackshaw
Advisor: Nathan Kidwell
William & Mary,
Chemistry

Brown carbons (BrC) are a family of atmospherically relevant molecules that are key players in the global climate largely due to their absorption properties. BrCs absorb a significant amount of radiation from the sun, most efficiently in the visible to the UV range, and this captured energy has an overall heating effect in the atmosphere. BrCs are generally have larger absorption coefficients due to a higher diversity in functional groups. The recent discovery that BrCs are prevalent in the atmosphere has invigorated many studies targeting their identification and photochemical decay processes. In this study, a molecular dynamics technique known as velocity map imaging (VMI) is used to investigate the dissociation dynamics of ortho-nitrophenol (oNP) and nitrobenzene (NB), two members of the BrC family. Upon absorbing UV radiation from the sun, oNP and NB release nitric oxide (NO) radicals, therefore acting as temporary reservoirs of reactive species. Both oNP and NB ion images indicate that the dissociation lifetime is slow, which is consistent with a roaming decay pathway during the dissociation process. The velocity distributions of these images were also analyzed and the relative recoil velocity between the photofragments was determined, enabling a quantitative assessment of the energy partitioning into NO and the co-fragment following photolysis. Finally, the experimental results will be compared to high-level theoretical calculations to interpret the dissociation mechanism.

Kenneth J. Blackshaw is a first-year M.S. candidate in the Chemistry Department the William & Mary. Currently, he is researching molecular dynamics of atmospherically relevant molecules. He has a broad interest in environmental sciences and intends to pursue this interest after graduation.

Optimization of SERS Substrates for Solution-Phase Sensing

Presenter: Shelle N. Butler
Advisor: Kristin Wustholz
William & Mary,
Chemistry

Surface-enhanced Raman spectroscopy (SERS) is an ultrasensitive analytical technique that is used in a wide array of applications from art conservation to biosensing. SERS utilizes the unique optical properties of noble metal nanoparticles to generate exceedingly enhanced Raman signals from an analyte, such that small samples and even single molecules can be detected. Silver nanoparticles (AgNPs) are commonly used as SERS substrates for various sensing applications due to their relative ease of preparation and ability to significantly enhance normal Raman signals. Yet, several studies have shown that slight variations in the conditions during nanoparticle synthesis and subsequent storage can have significant impact on the enhancing ability and stability of the AgNPs. Particle concentration, size, shape, and analyte concentration affect SERS signals. Here, we present a method to establish the optimal synthesis, sensing, and storage conditions for solution-phase sensing with citrate-reduced AgNPs as the SERS substrate. Subtle differences in reaction conditions lead to drastic modifications in AgNPs activity and stability, which produced enhancement factors (EFs) ranging from 10^4 to 10^7.

Shelle Butler is a second-year M.S. candidate in the Chemistry Department at William & Mary. Her research areas include physical and analytical chemistry, cultural heritage and conservation, and environmental sensing studies. She holds a B.S. in Chemistry and a B.S. in Forensic Science from Virginia Commonwealth University.

Novel Antibody-Gold Based Drug Conjugates for Targeted Delivery in Breast Cancer Chemotherapy

Presenter: Guillaume Dewaele Le Roi
Co-Authors: B. Elie, N. Curado, J. Lewis
Advisor: Maria Contel
City University of New York,
Chemistry

Antibody-drug conjugates, a promising therapeutic approach for cancer chemotherapy, combine the antigen-targeting specificity of monoclonal antibodies with the cytotoxic potency of chemotherapeutics. The conjugation of cytotoxic metallodrugs to antibodies has been overlooked and there is enormous potential in this area. We have envisioned a cytotoxic payload consisting on monometallic gold(I)-based compounds displaying high cytotoxicity on several cancer cell lines. We have synthesized cytotoxic gold(I)-phosphane or N-heterocyclic carbene complexes containing either maleimide or succinimide linkers amenable to conjugate with amino acid residues on trastuzumab monoclonal antibody.2 Preliminary tests were performed to assess the cytotoxicity of gold(I) compounds, for reported halogenated precursors and on their derivative products, in the breast cancer cell line MCF7. The cytotoxicity of the payloads is not affected by the introduction of the linkers. These tests were performed as a proof of concept. We will report on gold (I) derivatives with high cytotoxicity (low nanomolar values range) and subsequent bioconjugation with the antibody trastuzumab to these gold drugs.

Guillaume Dewaele Le Roi is a third-year Ph.D. candidate in the Chemistry Department at the City University of New York. His doctoral research focuses on the development of novel gold-based antibody drug conjugates for cancer chemotherapy. His work varies from the synthesis and characterization of these chemotherapeutic agents to their biological evaluation.

The Utilization of Unnatural Amino Acids for Site-Specific Protein Immobilization

Presenter: John Halonski
Advisor: Douglas Young
William & Mary,
Chemistry

Enzymes have proven useful in both therapeutic and industrial applications due to their ability to significantly enhance chemical reaction rates and confer a high level of regioselectivity; however, they are limited by their lack of stability in non-aqueous environments. Protein immobilization offers a simple and cost-effective way to improve upon these limitations, allowing for effective control of reactions while maintaining high protein concentrations and a degree of recyclability. Unfortunately, practical issues preclude widespread utilization of protein immobilization using the standard amino acids. Unnatural amino acids (UAAs) may represent a valuable tool for protein immobilization owing to their unique chemical functionality providing site-directed control of immobilization. A carboxylesterase enzyme obtained from the archaeon *Sulfolobus solfataricus* will be immobilized onto epoxy activated sepharose resin via a 1,3-dipolar cycloaddition reaction of an azide containing UAA followed by monitoring of the protein's activity. Three sites, Y90, Y116, and Y191, will be utilized as the site for incorporation of the UAA. Current work involves the expression and purification of mutant and wild type protein to increase yields, followed by optimization of the immobilization reaction. The activity of each mutant protein will be tested in comparison to wild type using an arylesterase assay to confirm that activity levels are maintained. Ultimately this approach will lead to immobilized enzymes with increased stability in non -organic solvents for industrial applications.

John Halonski is a second-year M.S. candidate in the Chemistry Department at William & Mary. He holds a B.S. in Biochemistry and Cellular Biology from Christopher Newport University. He is currently exploring the synthesis and incorporation of unnatural amino acids into proteins and the implementation of these unnatural amino acids for protein immobilization and modulation of protein function.

Addition of Unnatural Amino Acids to the Genetic Code

Presenter: Emil Saber Iqbal
Advisor: Matthew Hartman
Virginia Commonwealth University,
Chemistry

Small molecules are only able to target the small population of human proteins containing a hydrophobic pocket which is a major problem in traditional small molecule drug development. Peptide based therapeutics offer the potential to target a much wider range of targets by inhibiting protein-protein interactions. The major drawbacks of peptide therapeutics include lack proteolytic stability and ill-defined secondary structures. These problems can be eloquently overcome by incorporation of unnatural amino acids into potential therapeutics to lower the rate of proteolytic cleavage and by creating cyclic peptides to lock the peptide into a conformation which lowers the entropic penalty of binding. Indeed, there are numerous examples of unnatural peptides exhibiting enhanced pharmacokinetics over their parent peptides. Taking in all these considerations, the ability to create libraries of random peptides containing unnatural amino acids is an appealing endeavor. Through a reconstituted cell-free translation system we demonstrate the addition of multiple unnatural amino acids in peptides.

Emil Iqbal is a Ph.D. candidate in the Chemistry Department at Virginia Commonwealth University. His research involves genetic code expansion in cell free translation systems with the goal of incorporating unnatural amino acid acids to the powerful ligand discovery tool of mRNA display. He holds a B.S. degree in Chemistry from William & Mary.

Heterocycloadditions Utilizing an Organic Iminium Salt Catalyst as a Nitrene-Transfer Reagent

Presenter: Shea L. Johnson
Co-Authors: W. Shuler, L. Combee, J. Laudenschlager
Advisor: Michael Hilinski
University of Virginia,
Chemistry

Nitrogen is an abundant element and is pervasive in many areas of chemistry important to contemporary society. In particular, nitrogen containing compounds make up 92% of the 50 most prescribed pharmaceutical drugs, according to a 2016 study. While methods for synthesizing these nitrogen-containing compounds exist, they can often be inefficient and can require the use of toxic metals. Our lab seeks to combat these problems by developing an organic, metal-free catalyst to perform direct carbon-nitrogen bond formation. The catalyst that we have developed has proven to efficiently form both carbon-oxygen and carbon-nitrogen bonds. We are currently looking to develop a method for aziridination, the formation of a three-membered ring containing a nitrogen. Aziridines have been proven to be a valuable tool in the synthesis of complex nitrogen-containing compounds, as they can undergo many ring opening mechanisms to produce important intermediates. Thus far, we have developed a method to not only synthesize aziridines, but also to have them undergo a further cycloaddition reaction all in one reaction vessel, which could allow us to develop simpler, cheaper methods for the synthesis of pharmaceuticals and other bioactive compounds.

Shea Johnson is a second-year Ph.D. candidate in the Chemistry Department at the University of Virginia. She is interested in synthetic chemistry as a whole, with a focus on organic synthesis and methodology. She is currently studying novel methods of organocatalytic nitrenoid transfer, a method of directly adding nitrogen to molecules using an organic catalyst.

Insights into the Mechanisms of Phosphoester Hydrolysis using Bioinspired Mimics of Metalloenzymes

Presenter: Jayasinghe-Arachchige Vindi Mahesha
Co-Authors: C. Ozen, Q. Hu, G. Sharma
Advisor: Rajeev Prabhakar
University of Miami,
Chemistry

The selective hydrolysis of phosphoester bonds of biomolecules such as DNA and RNA play a crucial role in multiple critical biological processes. The nature utilizes highly specialized enzymes known as phosphoesterases to catalyze the hydrolysis of these bonds. Glycerophosphodiesterase (GpdQ) from *Enterobacter aerogenes* is a unique binuclear metallohydrolase that catalyzes the hydrolysis of all three kinds of phosphoesters (mono, di, and tri), including some organophosphate pesticides and nerve agents. Although natural enzymes are highly efficient, their chemical and thermal stability is very low. Thus, the development of their analogues with improved catalytic activities are highly desirable. However, the mechanism of hydrolysis of phosphoesters and the specific roles of metals ions and ligands in these enzymes are also unknown. To address these issues, we have investigated the catalytic mechanism of the phosphoester hydrolysis, using two chemically distinct ligands {bcmp = 2,6-bis(1,4,7-triazacyclonon-1-ylmethyl)-4-methylphenol) and H(2)bpbpmp = 2-bis[((2-pyridyl-methyl)-aminomethyl)-6-((2-hydroxy-benzyl)-(2-pydidyl-methyl))-aminomethyl)]-4-methylphenol} and three metal cores [(Fe(III)Zn(II), Zn(II)Zn(II) and Cu(II)Cu(II))]. Our theoretical results, suggested that the reaction takes place in concerted manner with the nucleophilic attack of the terminally bound hydroxyl and S_N2 type cleavage of phosphoester bond. Among all these analogues [Zn(II)Zn(II)(bpbpmp)] complex was found to be the most efficient system for phosphoester hydrolysis.

J. A. Vindi Mahesha is a third-year Ph.D. candidate in the Chemistry Department at University of Miami. Her research area includes studying of the mechanisms and structures of metallopeptidases, metallophosphoesterases, and their analogues using theoretical and computational chemistry approaches.

Ratiometric Mercury Ion Sensor in Aqueous Environments

Presenter: Matthew McCarron
Advisor: Elizabeth Harbron
William & Mary,
Chemistry

Mercury sensitive dye molecules in conjunction with conjugated polymer nanoparticles (CPN) are able to detect ion concentrations as low as a parts-per-billion in an aqueous environment. Select forms of spirolatam rhodamine dye are capable of undergoing a ring-opening reaction in response to Hg^{2+} ions. The initial closed form presents a colorless, non-fluorescent, compound while the opened form results in a colored and highly fluorescent form. The CPNs are also fluorescence, yet at a higher energy that allows for a transfer of their energy into the dye molecules via fluorescence resonance energy transfer. Increasing the energy imparted to the dye molecules improves the sensitivity of the system to mercury. The dye's reaction with Hg^{2+} is unhindered by the presence of CPNs, and the comparison of the two fluorescent peaks allows for the system to be used as a ratiometric sensor for Hg^{2+} sensing. The CPNs provide the additional functionality of stabilizing the hydrophophic dye, allowing for aqueous sensing of Hg^{2+} ions.

Matthew McCarron is a second-year M.S. candidate in the Chemistry Department at William & Mary. His research areas include physical organic chemistry, conjugated polymers, and synthetic chemistry with a background in physical chemistry. He is currently investigating the use of conjugated polymer nanoparticles in the detection mercury.

Immobilization of Chromophores and Catalysts to Titanium Dioxide via Robust Attachments

Presenter: Nicholas Race
Co-Authors: W. Zhang, M. Screen, B. Barden
Advisor: William McNamara
William & Mary,
Chemistry

Artificial photosynthesis (AP) has been shown to be an effective method for harnessing solar energy to generate hydrogen gas, which can be used as a fuel source. TiO_2 semiconductors functionalized with photocatalysts are of interest for AP as low-cost photocathodes. In order for these systems to efficiently absorb solar energy, a chromophore that effectively absorbs visible light must be incorporated into the AP system. Our research examines the effect of immobilizing inexpensive fluorescein and rhodamine-based dyes on catalyst-sensitized TiO_2 using robust hydroxamic acid linkages. The functionalized TiO_2 films have been characterized using IR and Diffuse Reflectance UV-Vis spectroscopy. Additionally, these films have been explored as materials for photocatalytic hydrogen generation.

Nicholas Race is a second-year M.S. candidate in the Chemistry Department at William & Mary. His research focuses on the development and optimization of systems for photocatalytic hydrogen generation from water. Nicholas holds a B.S. (Chemistry) from Towson University.

Effects of Pigment Volume Concentration on Acrylic Emulsion Paint Properties Assessed Using Single-Sided NMR

Presenter: Mary Therese Rooney
Advisor: Tyler Meldrum
William & Mary,
Chemistry

Acrylic emulsion paint is one of the most common media employed by twentieth-century painters. Since early acrylic paintings have begun to require the attention of conservators, scientists are working to characterize the properties of these paints to facilitate conservation efforts. In this study, we report an investigation of the physical and chemical properties of acrylic emulsion paints using single-sided NMR in conjunction with gloss measurements and scanning electron microscopy coupled with energy dispersive spectrometry. Combining the data from these techniques gives insight into pigment-binder interactions and the acrylic curing process, showing that as pigment concentration is increased in paints, the amount of binder adsorbed to pigment particles increases, resulting in films with differing relaxation times. Furthermore, pigments with a larger surface area or smaller particle size will have a greater effect on physical properties as concentration increases. This research emphasizes the efficacy of NMR relaxometry in studying cultural heritage objects, and may prompt further study into the effects of pigment concentration on the curing and conservation of acrylic paint films.

Mary Rooney is a second-year Chemistry M.S. candidate at William & Mary. Her research areas include using non-destructive single-sided nuclear magnetic resonance spectroscopy (NMR) to study the physical properties of acrylic paint films as well as developing a method for enhancing single-sided NMR measurements using hyperpolarization. She holds a B.S. in Chemistry & Mathematics and a B.A. in Classical Literature and Languages, both from Hofstra University.

Radiation Shielding Bricks for Mars Using Martian Regolith Simulant and Hydrogen-Rich Polymers

Presenter: Sara Southward Sargent
Advisor: Richard Kiefer
William & Mary,
Chemistry

Radiation shielding materials are an essential component of long-term space travel and habitation. The mission to Mars will require a radiation shielding material that can be produced on Mars through both energy and cost-efficient means. In this study, Martian regolith simulant and hydrogen-rich polymers were used to create a radiation shielding material in the form of bricks. The bricks will be capable of shielding against space radiation on Mars. There were three methods in which the bricks were formed: 1) a heated press, 2) a microwave oven in a CO_2 atmosphere, and 3) a vacuum oven with a low CO_2 pressure. Each brick varied by the type of polymer, percent of polymer, and by the method in which it was made. Flexural tests were conducted on the bricks to determine the flexural strength, flexural strain, and modulus of elasticity.

Sara Sargent is a first-year M.S. candidate in the Chemistry Department at William & Mary, where she also received her undergraduate degree. Her current research project involves developing radiation shielding materials for Mars.

Investigation of the ArsRS Signaling System in *H. pylori* using Mass Spectrometry-Based Bottom-Up Proteomics

Presenter: Amy S. Schienschang
Co-Author: T. Gozzo
Advisor: John Poutsma
William & Mary,
Chemistry

Helicobacter pylori uses unique adaptations to colonize and thrive in the harsh environment of the human stomach. An important pathway for maintaining cellular homeostasis is controlled by the ArsRS (acid-responsive signal sensor/regulator) system. The two component signaling system regulates the expression of an adhesin protein that anchors the bacterium to the stomach lumen. Investigation of the ArsRS signaling system can elucidate part of the mechanism for *H. pylori* infection resistance to the variable and acidic environment of the human stomach. Bottom-up proteomics is used to assess post-translational modifications in purified ArsR and cell digests of *H. pylori* using HPLC and tandem mass spectrometry with electron transfer dissociation and collision induced dissociation. Non-canonical phosphorylation sites for signal transduction are investigated using cellular digests of mutant *H. pylori*. Method improvements to established shotgun proteomics procedures attempted to mitigate instrumental limitations and optimize efficacy for this application.

Amy Schienschang is a second-year M.S. student in the Chemistry Department at William & Mary. Her research is focused on mass spectrometry-based proteomics analyses of biological samples. She holds a B.S. in Chemistry from Randolph College and served in the U.S. Army.

Mathematical Modeling of Alzheimer's Disease and Mitochondrial Function

Presenter: Morgan Griffin Shelton
Co-Authors: F. Castora, C. Durmaz, E. Gavrila
Advisor: Randolph Coleman
William & Mary,
Chemistry

Alzheimer's disease (AD) affects multiple pathways within individual neurons. The root stimuli for late onset Alzheimer's is still unknown, though believed to be related to pathogenic amyloid-beta (Abeta) and aggregations of hyper-phosphorylated tau protein. It is known that mitochondria produce an excess of reactive oxygen species (ROS) and become dysfunctional as AD progresses. Studies have shown that Abeta and tau protein play a role in this dysregulation of mitochondrial function. Mathematical modeling through Biochemical Systems Theory (BST) allows for simulation of these pathways to investigate critical points in disease progression and identify potential drug targets. An Alzheimer's model and a baseline model were created with different protein expression levels. Expression levels were determined using cortical tissue samples. The Alzheimer's model used AD tissue data from PCR array analysis done by a collaborative lab at Eastern Virginia Medical School (EVMS). Previous models have used this data to present AD-related mitochondrial dysfunction and eventual cell death. The pathways in this model focus on mitochondrial respiration, biogenesis, and the mechanisms behind Abeta interference with normal mitochondrial function. The current model aims to test different gene knock-down therapy targets for guiding wet lab research in the most viable direction to produce potential drug treatments for AD.

Morgan Shelton is a first-year M.S. student in the Chemistry Department of William & Mary. She is studying the use of mathematical modeling to investigate biochemical pathways related to neurodegeneration. She holds a B.S. in Neuroscience from William & Mary.

IRMPD Studies of b2+ and b3+ Fragment Ions from Lysine Homolog-Containing Tetrapeptides

Presenter: Zachary Michael Smith
Co-Authors: A. Somogyi, V. Wysocki, V. Steinmetz
Advisor: John Poutsma
William & Mary,
Chemistry

Infrared multiple photon dissociation (IRMPD) action spectra were taken on the b2+ and b3+ fragment ions from lysine homolog containing tetrapeptides. AlaXxx b2+ and AlaAlaXxx b3+ (Xxx = Lysine, Ornithine, 2,4-diaminobutyric acid, and 2,3-diaminopropionoic acid) fragment ions form through an oxazolone, diketopiperazine/macrocycle, or lactam pathway. Spectra in the fingerprint region (1000 cm-1 - 2000 cm-1) and the X-H region (3200 cm-1 - 3600 cm-1) were taken at the CLIO facility in Orsay, France. Complimentary calculations were performed at the B3LYP/6-311++G(d,p)//6-31++G(d) level of theory on the three isomers of the b2+ and b3+ fragment ions. Calculated structures show a preference for the diketopiperazine/macrocycle and lactam structures over the oxazolone form. Theoretical spectra were generated from the computational calculations for the comparison with the experimental data. The diagnostic ~1900 cm-1 carbonyl peak of the oxazolone form is missing in the experimental spectra confirming the computational predictions. The relatively small barrier between the diketopiperazine/macrocycle and lactam structures (<10 kJ/mol) suggests the existence of a mixture between the two states. These IRMPD spectra imply the presence of a lactam peptide fragment structure and provide spectroscopic evidence for the gas -phase ornithine effect.

Zachary Smith is a second-year M.S. candidate in the Chemistry Department at William & Mary. He has an interest in characterizing the structure and function of small biologically relevant molecules using mass spectrometry and computational methods. He is currently continuing his undergraduate research on peptide fragmentation in Prof. Poutsma's research group.

Development of a Paraffin-Impregnated Graphite Electrode (PIGE) for the Study of Calcium Carbide Particles

Presenter: Rachel Lee Tani Walker
Co-Author: H. Finklea
Advisor: Alfred Stiller
West Virginia University,
Chemistry

Many portable electronics contain lithium ion batteries which generate electrical energy from the intercalation of lithium ions into and out of solid electrodes. There is an increasing demand for smaller and lighter electronics and energy devices with even better performance than lithium ion batteries. This drives research not only into new materials synthesis but pushes scientists to revisit old materials for re-engineering for novel applications. Carbides, a class of materials with a history of industrial importance, have recently gained attention for their potential applications in fuel cells, batteries and capacitors. There are hints in the literature indicating calcium carbide may be a candidate material for electrochemical energy devices. Calcium carbide is semiconducting and has a structure which may allow for ion intercalation. Few studies are available on the fundamental electrochemistry of calcium carbide. Our goal is to gain a foothold in this area of study. With this objective in mind, we constructed paraffin wax impregnated graphite electrodes (PIGEs) upon which microparticles may be attached. In this poster we present a thorough characterization of the PIGE morphology and electrode behavior via Raman spectroscopy, scanning electron microscopy (SEM), x-ray photoelectron spectroscopy (XPS) and cyclic voltammetry (CV) results. Next we plan on performing voltammetric studies on the calcium carbide in a nonaqueous electrolyte following successful attachment of the particles to a PIGE surface. Development and results of these studies are also reported herein.

Rachel Lee Tani Walker is completing her seventh and final year as a doctoral student in the Chemistry Department at West Virginia University. She has been involved in patented research focusing on carbon materials synthesis in molten salt media. Her research interests include Raman spectroscopy, salt flux synthesis and solid state electrochemical analysis.

Detection of Reducing Sugar-PMP Derivatives by HPLC-DAD after Optimization by Response Surface Methodology

Presenter: Weizheng Wang
Advisor: Feng Chen
Clemson University,
Food, Nutrition, and Packaging Sciences

Reducing sugars can react with 1-phenyl-3-methyl-5-pyrazolone (PMP) to form sugar-PMP derivatives, which can be analyzed due to their relatively high UV absorbance at 248 nm by high performance liquid chromatography (HPLC) equipped with UV or diode array detector (DAD). To investigate the optimal conditions so as to achieve the best yields of different PMP derivatives, glucose, glucosamine, galactose, glucuronic acid and galacuronic acid were compared in terms of their reaction parameters under the response surface methodology (RSM), by which the synthetic reactions were designed to proceed within the temperature range between 60 degree Celsius (C) to 90 C, and time from 60 to 180 minutes. As a result, the optimal condition of glucose-PMP reaction was determined at 71 C for 129 minutes, and that of glucosamine and galactose-PMP reaction was at 73 C for 96 minutes and 70 C for 117 minutes, respectively. Moreover, glucuronic acid and galacuronic acid showed their maximum yields after incubation at 75 C for 151 minutes, and 76 C for 144 minutes, respectively. Obviously, different positions of functional groups in sugars and delicate difference of inner pH environment could significantly influence the sugar-PMP reactions. However, sugar stereoisomers were not found to have remarkable impacts on the reaction. This research demonstrated that the PMP method is highly reproducible, reliable, and suitable for sugar analysis both for academic research and quality control in industries in light of its easy pre-column derivatization and high sensitivity for HPLC detection.

Weizheng Wang is a first-year Ph.D. student at Clemson University. His research focuses on Food Chemistry and Food Analysis, especially on sugar chemistry and analysis. He holds a bachelor's degree in Food Science and Engineering from Zhejiang Wanli University in China and a master's degree in Food, Nutrition and Culinary Sciences from Clemson University.

SSD Failure Prediction for Data Center Reliability

Presenter: Jacob Alter
Co-Author: J. Xue
Advisor: Evgenia Smirni
William & Mary,
Computer Science

In recent years, solid state drives have become a staple high-performance data centers due to their speed and energy efficiency. However, the root causes of SSD failures are often difficult to discern. In this paper, we study the performance and failure characteristics of 30,000 drives from a Google data center across a span of six years. We determine the most salient indicators of drive failure and develop time series prediction models for early detection of impending failures. Using the predictions from this model, we develop an efficient data recovery strategy, reducing the need for costly drive rebuilding operations. Our strategy decreases drive downtime and lowers the likelihood of data loss when compared with current methods.

Jacob Alter is a first-year M.S./Ph.D. student in the Computer Science Department at William & Mary. His research interests include systems reliability, data analytics, and natural language processing.

Appearance Matching with Analytic BRDFs

Presenter: James Bieron
Advisor: Pieter Peers
William & Mary,
Computer Science

While many analytical models have been proposed to simulate the behavior of light reflecting off homogeneous surfaces, the problem of how to best use such models to replicate the appearance of specific real-world materials has been generally neglected. Where previous research has focused on achieving the best match between measured reflectance and the analytical model in a least-squares sense, we are driven by the principle that the end goal is accurate renderings under natural lighting. By viewing the problem as an appearance matching problem in image space as opposed to a numerical optimization in BRDF space, we will show several novel techniques for recreating the appearance of measured materials using simple analytical reflectance models.

James Bieron is a M.S./Ph.D. student in the Computer Science Department at William & Mary. He is studying computer graphics under the advisement of Pieter Peers.

Graphical Passwords for Older Computer Users

Presenter: Nancy J. Carter
Co-Authors: C. Li, J. Stevens, E. Novak, Z. Qin
Advisor: Qun Li
William & Mary,
Computer Science

Traditional text password authentication is widely used to gain access to computing resources. Younger users easily create, recall and enter text passwords. Our study of older computer users found they were challenged by text passwords. Older users felt the cognitive effort to create and recall a strong text password was difficult. Additionally, they engaged in insecure computer security practices such as writing down passwords or reusing passwords. Some of our study participants deliberately limited their use of the internet, because of the difficulties posed by passwords. Older users with vision, hand and finger health issues found the physical act of typing strong text passwords challenging. We sought to assist older computer users by designing a Graphical Password system based on simple touchscreen selection of familiar facial images embedded randomly among unfamiliar, yet similar images. We sought to leverage the unique capability of the human brain to recognize facial features. Our use of culturally familiar facial images from the notable past of our older users aided their password recall. We tested our system in a usability study with nineteen volunteers. These older users demonstrated a recall rate of 97% and provided positive verbal comments on our technique. The elapsed time to enter a four-image password decreased by 37% when compared to entering a four-character text password. The mathematical entropy of our graphical password is shown to be superior to short PINs.

Nancy Carter is a Ph.D. candidate in the Computer Science Department at William & Mary. Her research interests are focused on human-computer interaction. She holds a B.S. from the University of Maryland-College Park (Computer Science) and an M.S. from the Naval Postgraduate School in Monterey, California (Electrical Engineering).

3D Reconstruction of Micro-CT Images for Identification of Coronary Collateral Vessels in Mice

Presenter: Erik J. Cole
Advisor: Rahman Tashakkori
Appalachian State University,
Computer Science

Coronary collateral vessels are small vessels may contribute to survival after myocardial infarction by providing blood to cardiac muscle after coronary arterial occlusion. However, these vessels are not always present. They can develop after infarction and in some cases they develop prior to infarction for reasons not fully understood. One problem limiting study of collateral vessels is their exceedingly small size and correspondingly low blood flow. Using micro-computed tomography (micro-CT) images of mice hearts, the cardiac vessels were extracted and visualized in three dimensions. Contour plotting of the extracted vessel allowed visualization without the surrounding cardiac tissue. Image processing techniques further isolated the collateral vessels of interest. After identifying the collateral vessels the goal is to demonstrate functional relationships with feeder vessels. Their size (microns) can be calculated based on DICOM information. Reliably identifying these critical collateral vessels is an important step for studies aimed at determining the conditions that cause their development.

Erik Cole is a second-year master's student in the Computer Science Department at Appalachian State University. His research interests include medical imaging, data analysis, and machine learning. He holds a B.S.E. in Biomedical Engineering from the University of Iowa.

Recovering Material Properties from Photographs Under Uncontrolled Natural Lighting

Presenter: Victoria Cooper
Advisor: Pieter Peers
William & Mary,
Computer Science

We create a data-driven algorithm to reconstruct the Bidirectional Reflectance Distribution Function, (BRDF) of a unknown material under known but uncontrolled natural lighting. Utilizing a dataset of 100 measure BRDFs that span a variety of materials, we reconstruct a BRDF from a single image of a material. However the resulting BRDFs produce artifacts. To improve BRDF reconstruction we use Gaussian mixture model and expectation maximization algorithms to classify the BRDF dataset into clusters that can then improve BRDF reconstruction.

Victoria Cooper is a Ph.D. candidate in the Computer Science Department at William & Mary. Her research area is in Computer Graphics with a focus on Appearance Modeling, and BRDFs.

What do Honey Bee Audio Recordings Reveal?

Presenter: Luke Craig
Co-Author: P. Wilson
Advisor: Rahman Tashakkori
Appalachian State University,
Computer Science

Colony Collapse Disorder is a major threat to the survival of the western honey bee and is still not fully understood. Can Colony Collapse Disorder be better understood and prevented by analyzing the audio recordings from inside the hives? We record around 150 minutes of audio from our research beehives throughout the day. We perform signal processing to isolate the beehive sound and apply Fourier transforms to obtain spectral analysis of each recording. Then we average the analysis of every hour to obtain the spectral curve for that hour. From there, we conduct an hour-to-hour comparison to find the daily rhythms of activities. We also compare multiple days' spectral curves for the same hour. We also create the average spectral curves for the entire day and month comparing them form one year to another. We have created a software application with a custom Graphical User Interface to conveniently and efficiently make these comparisons. We have found that the beehives generate a sound with a fundamental frequency ranging from 70 Hz to 300 Hz, which changes the center frequency and intensity depending on the particular hive, time of the day, and other environmental factors. We have observed resulting patterns in the spectral curves for events such as feeding the bees or a robbery by bees from the neighboring hives. We expect to find patterns in the time leading up to beehives becoming weak or even collapsing.

Luke Craig is a first-year M.S. candidate in the Computer Science Department at Appalachian State University. He holds a B.A. in Audio Engineering Technology from Belmont University. He is interested in combining his knowledge gained from his professional experience in music recording studios with computer science to solve new problems.

Full Resolution Direct-Global Separation from a Single Image Using Sparsity Similarities

Presenter: Zhaoliang Duan
Advisor: Pieter Peers
William & Mary,
Computer Science

We present a novel separation method of direct and indirect illumination component from a single image. Previous papers either use multiple images under varying illumination pattern, which significantly lengthens the acquisition time, or they capture a single image and sacrifice the spatial resolution. Our approach can separate the direct and indirect illumination component from a single image at full spatial resolution. Key to our method is the observation that both direct and indirect illumination component share significant sparsity similarities in the wavelet or frequency domain. Because of the similarity in sparsity, we can bias the solution to maximize similarity in both sparsity as in recovering the original signal. This enables us to recover a high-quality reconstruction from a single image of the scene illuminated by a spatially varying incoherent pattern. We demonstrate our method on a variety of scenes and compare the accuracy on synthetic examples. Our experiment shows lower reconstruction error as well as better visually fidelity.

Zhaoliang Duan is a fifth-year Ph.D. candidate in the Computer Science Department at William & Mary. His research areas include computer graphics, computational photography and global illumination. He is currently working on direct-global illumination component separation from the challenging situation in practice.

Trash to Treasure: Transforming Waste Management with Landfill Gas Collection Systems Driven by Big Data Analytics

Presenter: Daniel Emery
Co-Authors: J. Hoyle, E. Hassler
Advisor: Joseph Cazier
Appalachian State University,
Applied Data Analytics

Gas produced from the decomposition of waste in landfills can be captured and transformed into a resource which benefits the local community, environment and economy. Currently, post-closure management of landfills involves decades of monitoring and expensive efforts to mitigate environmental hazards via processes with little automation. Research exists on the production and diffusion of landfill gas; however, little research has evaluated and predicted the performance of the landfill gas collection systems that convert these air pollutants into a valuable source of energy. We use big data to understand how weather conditions impact the methane content of landfill gas in ways significant enough to interfere with its use as a source of energy. We modeled methane concentration in landfill gas using machine learning techniques to predict future changes in methane concentration using a database of weather, water composition and landfill gas collection performance metrics. We developed a multilayer predictive model of methane concentration that will aid in the transformation of day-to-day operations of landfill gas collection maximizing both the amount and value of gas extracted from the landfill while minimizing the cost of pollution mitigation. This can help transform this ancient industry by turning trash into treasure while alleviated environmental concerns.

Daniel Emery is a first-year M.S. candidate in the Applied Data Analytics Program at Appalachian State University. He is interested in applied data analytics to business operations in order to optimize day to day processes and improve efficiency. He is currently researching predictive modeling of landfill gas methane concentration. He holds a B.S. in Geophysics from Stanford University.

Fast and Accurate Atomistic Calculation of Free Energies for Molecular Modeling and Simulation

Presenter: Negin Forouzesh
Advisor: Alexey Onufriev
Virginia Tech,
Computer Science

In pharmaceutical applications and structure-based drug discovery, it is necessary to have accurate and fast prediction of the binding free energy of drugs to biomolecular targets, e.g. proteins and nucleic acids. Atomistic modelling and simulation methods provide a powerful technique for predicting and understanding the structure, function, dynamics and interactions of biomolecules. The ability of these methods to address biologically relevant problems is largely determined by their accurate treatment of electrostatic interactions in the target biomolecular structure surrounded by water. As a popular representation of the solvent molecules, implicit solvent framework has been proposed, among which Generalized Born (GB) models have achieved a reasonable compromise between accuracy and speed. In this work we develop, evaluate, and improve a promising new generalized Born model (GBNSR6) for the purpose of calculating the binding free energies, accurately and fast. We also discuss its implementation in a popular molecular dynamics software suite AMBER (freely available at http://ambermd.org/).

Negin Forouzesh is a third-year Ph.D. student in the Department of Computer Science at Virginia Tech. As a member of Theoretical and Computational Molecular Biophysics Laboratory, she develops computational models for calculating solvation free energies, mainly in AMBER package of molecular simulation. The main application of this project is in Computer Aided Drug Design (CADD), which is used among pharmaceutical companies.

A Golub-Kahan Davidson Method for Computing the Smallest Singular Triplets of Large Sparse Matrices

Presenter: Steven Goldenberg
Co-Author: E. Romero
Advisor: Andreas Stathopoulos
William & Mary,
Computer Science

Obtaining high accuracy singular triplets for large sparse matrices is a significant challenge, especially when searching for the smallest triplets. Due to the difficulty and size of these problems, efficient methods must function iteratively, with preconditioners, and under strict memory constraints. In this research, we present a Golub-Kahan-Davidson method (GKD), which satisfies these requirements and includes features such as soft-locking with orthogonality guarantees, an inner correction equation similar to Jacobi-Davidson, GD+k restarting, and the ability to find real zero singular values in both square and rectangular matrices. Additionally, our method achieves full accuracy while avoiding the augmented matrix, which often converges slowly due to the difficulty of interior eigenvalue problems. We describe our method in detail, including implementation issues that may arise. Our experimental results confirm the efficiency and stability of our method over the current implementation of PHSVDS in the PRIMME software package.

Steven Goldenberg is a third-year Ph.D. candidate in the Computer Science Department at William & Mary. His current research explores new algorithms for finding the singular value decomposition on large, sparse matrices. He holds a B.A. (Mathematics) from Johns Hopkins University, a B.M (Music Performance) from the Peabody Conservatory, and an M.S (Computer Science) from William & Mary.

FastPay: Achieving Secure Fast Payment on Blockchain-based Cryptocurrency Systems

Presenter: Zijiang Hao
Advisor: Qun Li
William & Mary,
Computer Science

Blockchain-based cryptocurrency systems such as Bitcoin and Ethereum have attracted much attention during the last decade. Nevertheless, how to protect such a system from double-spending attacks in a fast payment scenario is still an unsolved problem. To be more specific, a malicious payer can make multiple payments to different payees using the same set of cryptocurrency, without being noticed by the payees involved. In the end, only one payee receives the cryptocurrency from the payer, and the others earn nothing on the goods or services they have provided. To prevent this from happening, payees must wait for as long as one hour before providing their goods or services, guaranteeing that they have indeed received the payment. This solution, however, hinders the blockchain-based cryptocurrency systems from being widely-adopted in many traditional business scenarios. To this end, we propose FastPay, a secure fast-payment solution for the blockchain-based cryptocurrency systems. FastPay guarantees that the system is resistant to double-spending attacks, while introducing reasonable overhead or demanding reasonable external requirements, depending on whether the system supports smart contract or not. We have built a private blockchain system on a testbed, and conducted experiments to evaluate FastPay. The results reveal that FastPay is as effective and efficient as expected.

Zijiang Hao is a Ph.D. candidate in the Computer Science Department at William & Mary. His research interests include mobile-cloud computing, edge computing, blockchain systems, and consensus algorithms.

Design and Analysis of Efficient Inter-Core Communication in GPUs

Presenter: Mohamed Assem Ibrahim
Co-Authors: H. Liu, O. Kayiran
Advisor: Adwait Jog
William & Mary,
Computer Science

Memory bandwidth is a critical performance bottleneck in Graphics Processing Units (GPUs). As the computation demand is continuously growing, it is imperative that GPUs scale in terms of performance and energy efficiency. To this end, we focus on efficiently unlocking another potential source of bandwidth in GPUs, which we call remote core bandwidth. As also observed by prior works, a fraction of data required by one GPU core (i.e., L1 misses) can also be found in the private caches of other GPU cores. If such sharing of data can be detected and accessed efficiently, access to shared caches (L2) and main memory can be avoided, thereby alleviating the L2/main-memory bottleneck in GPUs. However, efficient detection and utilization of this remote core bandwidth present several challenges; and in this work, we focus on these challenges. Specifically, we address: a) which data is shared across cores, b) which cores have the shared data, and c) how we can get the data as soon as possible. Our extensive evaluation across a wide set of GPGPU applications show that we can achieve significant improvement in performance because of the additional bandwidth received from the cores.

Mohamed Ibrahim is a Ph.D. candidate in the Computer Science Department at the William & Mary. His research interests include all aspects of computer architecture, specifically data-parallel architectures (e.g., GPUs), CPU-GPU heterogeneous architectures, and interconnection networks. His current research focuses on enhancing the communication between GPGPU components via interconnection networks.

RCoal: Mitigating GPU Timing Attack via Subwarp-based Randomized Coalescing Techniques

Presenter: Gunurath A. Kadam
Co-Author: D. Zhang
Advisor: Adwait Jog
William & Mary,
Computer Science

Recently, GPUs have also shown significant speedups for a variety of security-sensitive applications, such as encryptions, which benefit from the high memory bandwidth and compute throughput provided by the GPUs. One of the key features to optimize the memory bandwidth consumption in GPUs is intra-warp memory access coalescing, which merges memory requests originating from different threads of a single warp into as few cache lines as possible. However, this coalescing feature is also shown to make the GPUs prone to the correlation timing attacks to recover the AES private key as it exposes the relationship between the execution time and the number of coalesced accesses. In this work, we propose a series of defense mechanisms to alleviate such timing attacks by carefully trading off performance for improved security. Specifically, we propose to randomize the coalescing logic such that the attacker finds it hard to guess the correct number of coalesced accesses generated. To this end, we propose to randomize: a) the granularity (called as subwarp) at which warp threads are grouped together for coalescing, and b) the threads selected by each subwarp for coalescing. Such randomization techniques result in three mechanisms: fixed-sized subwarp (FSS), random-sized subwarp (RSS), and random-threaded subwarp (RTS). We find that the combination of these security mechanisms offers 24- to 961-times improvement in the security against the correlation timing attacks with 5 to 28% performance degradation.

Gurunath Kadam is a second-year Ph.D. candidate in the Computer Science Department at William & Mary. His area of research includes hardware-level security mainly focussing on many-core architectures, such as graphical processing units (GPUs). Currently, he is working on mitigating correlation timing attacks on AES algorithms running on CUDA GPUs by randomizing the memory optimizations implemented in the hardware.

Efficient Access Control Scheme in Edge Computing

Presenter: Cheng Li
Advisor: Qun Li
William & Mary,
Computer Science

Edge computing is a promising paradigm which helps optimize the cloud computing by aggregating and caching data at the edge of the network (usually near the gateway). Though many have been studied, there is very few literature on key sharing and access control scheme in edge computing scenario. Because edge servers and cloud servers may not be controlled by the same party and edge servers are more vulnerable to attacks, it is not a good idea to use the same key to encrypt shared content between clouds and edges. However, encrypting the shared content with different keys still does not work since it introduces heavy burden to manage keys in the cloud. In order to keep clients' data confidential and easing the burden of key management in the cloud at the same time, we propose an access control scheme specifically designed for edge computing. Our scheme leverages Ciphertext-Policy Attribute-Based Encryption (CP-ABE) to encrypt shared content with both user-defined attributes and cloud-defined attributes (used for describing edges). To help with the key management, our scheme also support key revocation feature. The cloud can revoke any private keys associated with a set of attributes once it finds the key is potentially exposed to adversaries. The key revocation only partially modifies the ciphertext and introduces small network traffic for updating affected shared contents on edges.

Cheng Li is a fifth-year Ph.D. candidate in Computer Science Department at William & Mary. His research interests include software-defined networking (SDN), machine learning, network security, edge computing, and Internet of things (IoT). He is currently exploring the privacy and security issues in edge computing.

Word-Level American Sign Language Recognition Using WiFi

Presenter: Yongsen Ma
Co-Authors: S. Wang, H. Zhao, W. Jung
Advisor: Gang Zhou
William & Mary,
Computer Science

In this paper, we propose an American Sign Language (ASL) recognition system using WiFi. We use Channel State Information (CSI) measured by WiFi packets as the input and a Convolutional Neural Network (CNN) as the classification algorithm. Existing WiFi-based ASL recognition technologies are tested on no more than 25 ASL words that only involve hand and/or finger gestures. Our goal is to recognize nearly 300 ASL words that are frequently used in daily life. These ASL words involve head, arm, hand, and finger gestures. To achieve high recognition accuracy, we propose a CNN as the classification algorithm. We collect CSI measurements by WiFi preambles and feed them to a CNN for ASL word classification. We collect CSI traces and run evaluations in both lab and home environments. There are 8,280 ASL word instances, 5,520 from the lab and 2,760 from the home, for 276 ASL words in total. For 5-fold cross validation using CSI traces of one user, the average recognition accuracy of our design is 94.81%.

Yongsen Ma is a Ph.D. candidate in the Computer Science Department at William & Mary. He holds an M.S. degree from Shanghai Jiao Tong University and a B.S. degree from Shandong University, both in Control Science and Engineering. He was a Research Assistant at the Mobile and Communications Group of Intel at Shanghai.

Efficient Service Handoff Across Edge Servers via Docker Container Migration

Presenter: Lele Ma
Co-Author: S. Yi
Advisor: Qun Li
William & Mary,
Computer Science

Supporting smooth movement of mobile clients is important when offloading services on an edge computing platform. Interruption-free client mobility demands seamless migration of the offloading service to nearby edge servers. However, fast migration of offloading services across edge servers in a WAN environment poses significant challenges to the handoff service design. In this paper, we present a novel service handoff system which seamlessly migrates offloading services to the nearest edge server, while the mobile client is moving. Service handoff is achieved via container migration. We identify an important performance problem during Docker container migration. Based on our systematic study of container layer management and image stacking, we propose a migration method which leverages the layered storage system to reduce file system synchronization overhead, without dependence on the distributed file system. We implement a prototype system and conduct experiments using real world product applications. Evaluation results reveal that compared to state-of-the-art service handoff systems designed for edge computing platforms, our system reduces the total duration of service handoff time by 80% (56%) with network bandwidth 5Mbps (20Mbps).

Lele Ma is a third-year Ph.D. candidate in the Computer Science Department at William & Mary. He has a broad interest in edge computing, computer system and its security, especially in virtualization system and binary analysis technique. He is currently exploring the security of Docker, as well as its applications in the edge computing.

Outlier Detection in Large Scale Dataset

Presenter: Sunil Manandhar
Co-Author: Q. Wang
Advisor: Zhenming Liu
William & Mary,
Computer Science

Finding outliers in a dataset has been an area of active research over the years with its application domain dispersed across networking systems, credit card transactions, health monitoring systems, among others. Different supervised and unsupervised techniques have been used in the literature to address this problem which classifies outliers based on distance between the instances, relative density, statistical distribution variation, model based approaches, etc. More importantly, most of the algorithms are constrained to low-dimensional and smaller datasets because of the high computational complexity. Distance based outlier detection, which relies on identifying k nearest neighbors to the query point suffer from either space or query time that is exponential in d. Approximation can help tackle this problem and Locality Sensitive Hashing has been used in the literature to approximate knn search. Our research is inclined towards improving outlier detection in massive datasets in high dimensional setting focusing on both computational and statistical performance improvement. We are currently exploring hashing based methods and singular value approximation for distance estimation. After dimension reduction, outliers are defined by using the method of ball partitioning with parameter R and centers chosen independently at random. Similarly, we explore sampling based methods to understand the outlier-ness of a query instance. Furthermore, to improve the statistical performance and to scale across larger datasets, we design our algorithm such that it can execute parallelly.

Sunil Manandhar is a second-year Ph.D. student in the Computer Science Department at William & Mary. He has a broad interest in machine learning and deep learning. He is currently exploring outlier detection methods that scales across large datasets. He completed his bachelor's in Computer Science and Information Technology from Tribhuwan University, Nepal.

ReDraw: Automated Prototyping of Graphical User Interfaces for Mobile Apps

Presenter: Kevin Patrick Moran
Co-Authors: C. Bernal Cardenas, M. Curcio, R. Bonett
Advisor: Denys Poshyvanyk
William & Mary,
Computer Science

When developing any software application with a graphical user interface (GUI), it is common practice for developers to translate a mock-up, in the form of a static image representing the GUI, into code. This process takes place not only at the inception of an application, but also in an evolutionary context, as GUI changes keep pace with evolving features. Unfortunately, the process of translating a mock-up into high quality code is exceptionally challenging. To aid developers, we present an approach enabling automated, accurate prototyping of GUIs that decomposes the process into three tasks: detection, classification, and assembly. First, logical components of a GUI are detected from a target mock-up artifact using either computer vision techniques or mock-up metadata. Then, our approach utilizes data mining, automated dynamic analysis, and deep convolutional neural networks to accurately classify detected GUI-components into domain specific types (e.g., dropdown menu). Finally, a data-driven, K-nearest-neighbors algorithm generates a suitable hierarchical GUI structure from which a prototype app can be automatically assembled. We implemented this approach for Android in a system called ReDraw. Our evaluation illustrates that ReDraw is capable of classifying Android GUI-components with 91% accuracy and assembling prototype apps that virtually mirror target mock-ups in visual affinity while exhibiting proper code structure. Finally, we interviewed developers and designers from Google, Facebook and Huawei who provided feedback and expressed interest in adopting ReDraw.

Kevin Moran is a Ph.D. candidate in the Computer Science Department at William & Mary. He graduated with a B.A. in Physics and Computer Science from the College of the Holy Cross and holds an M.S. in Computer Science from William & Mary. Kevin conducts research on the processes of software engineering, maintenance, and evolution with a focus on mobile platforms.

GPU Error Prediction by Leveraging Soft-Error Characteristics in a Large-Scale HPC System

Presenter: Bin Nie
Advisor: Evgenia Smirni
William & Mary,
Computer Science

Recently, GPUs have been widely deployed on large-scale HPC systems to provide powerful computational capability for scientific applications from various domains. As those applications are normally long-running, investigating the characteristics of GPU errors becomes imperative. Therefore, in this paper, we first study the conditions that trigger GPU errors with six-month trace data collected from a large-scale operational HPC system. Then, we resort to machine learning techniques to predict the occurrence of GPU errors, by taking advantage of the temporal and spatial dependency of the collected data. As discussed in the evaluation section, the prediction framework is robust and accurate under different workloads.

Bin Nie is a fourth-year Ph.D. candidate in the Computer Science Department at William & Mary under the supervision of Prof. Evgenia Smirni. Before attending William & Mary, she received her bachelor degree in Software Engineering from Xiamen University in 2012 and master's degree in Computer Science from Fordham University in 2014.

Faceless: Anonymity, Sarahah and Development

Presenter: Fayika Farhat Nova
Advisor: Shion Guha
Marquette University,
Mathematics, Statistics, and Computer Science

Sarahah, one of the newly emerged semi-anonymous online applications, has become a global sensation among the online users in a very short time, and multiple fascinating behavioral and contextual dynamics have been observed in them. Being anonymous in the virtual world gives a substantial opportunity to its users to be faceless, regardless of any online activity they perform. Although few research on anonymity and anonymous applications have been done in past, there is no specific study on the multicultural perception of anonymity and its distinct consequences on its users. Anonymity is surely a construct that has a contextual dependency, and demographical perception on anonymity through Sarahah application can answer questions like significant differences at preferring anonymity online in developing and developed countries, or interesting personality traits, privacy concerns among the users. With extensive surveys and interviews collected from the users of Sarahah who belong to developing countries, we plan to analysis the data and address the notion of anonymity through the spectacle of diversified contextual background. That is why our research is mainly focused around three research questions. For instance, based on the multicultural background, we ask, why do people in a specific cultural background use anonymous application like Sarahah—is this for privacy or personal preference? How are the audiences playing a role in this application? How does anonymity stand as a benefit (or threat?) in the daily life of a user, based on the demographics, locations and preferences?

Fayika Farhat Nova is a first-year Ph.D. student in the MSCS Department of Marquette University. Her research areas include Computational Social Sciences, human-computer interaction, social media networking, big data analysis, and psychology. She is currently exploring the aspects of anonymity and privacy concerns through social media applications to evaluate their impact on users.

Data Breaches in Biopharmaceuticals: Information at Stake and How to Protect It

Presenter: Brenna Elizabeth Vaz
Advisor: Dawn Medlin
Appalachian State University,
Applied Data Analytics

A biopharmaceutical is a pharmaceutical drug product originating from a biological source, most commonly human blood or plasma. International biopharmaceutical company Biotest is one of the leading companies that examines and extracts therapeutic proteins from plasma and purifies these proteins through manufacturing stages when producing their disease-fighting products. Over the last decade, to make their production processes more efficient, biopharmaceutical companies introduced various data-recording and automation technologies into their research, manufacturing and administration of drug products. These technologies foster an increasing need for data analytics, integrity, and security. Data is collected during the manufacturing process; from gathering raw materials through the final manufacturing steps. Access to this data is strictly limited to authorized and trained personnel as it contains confidential information. Due to the amount of data stored, a cyber-attack resulting in a data breach or data corruption can lead to exposure of sensitive information, damage to company credibility, supply chain delays, and interrupted production. Other devastating impacts include intellectual property theft and corporate or personal financial loss. Data is a valuable asset, and is a frequent target of breaches and cyber-attacks. This research will examine the role of data analytics and data security in the biopharmaceutical industry. Biotest will be studied as a model to further investigate risks that data breaches have on biopharmaceutical companies and how to prevent them.

Brenna Vaz is a first-year graduate student pursuing a M.S. in Applied Data Analytics at Appalachian State University. Her areas of interest include data analytics, cyber security, and supply chain management. She is currently investigating data breach prevention techniques in the biopharmaceutical industry.

Toward Sensor-Based Random Number Generation for Mobile and IoT Devices

Presenter: Kyle Wallace
Co-Authors: K. Moran, E. Novak
Advisor: Gang Zhou
William & Mary,
Computer Science

The importance of Random Number Generators (RNG) to various computing applications is well understood. To ensure a quality level of output, high -entropy sources should be utilized as input. However, the algorithms currently in use have not yet fully evolved to take advantage of newer technology. Even the Android Pseudo Random Number Generator (APRNG) merely builds atop the Linux RNG to produce its values. This work presents an exploratory study into methods of generating random numbers on sensor-equipped mobile and IoT devices. We first perform a data collection study across 37 Android devices to determine two things - how much random data is consumed by modern devices, and which sensors are capable of producing sufficiently random data. We use the results of our analysis to create an experimental framework called SensoRNG, which serves as a prototype to test the efficacy of a sensor-based RNG. SensoRNG employs collection of data from on-board sensors and combines them via a lightweight mixing algorithm to produce random numbers. We evaluate SensoRNG with the National Institute of Standards and Technology (NIST) statistical testing suite and demonstrate that a sensor-based RNG can provide high quality random numbers with only little additional overhead.

Kyle Wallace is a fifth-year Ph.D. candidate in the Computer Science Department at William & Mary. He received a B.S. in both Computer Science and Applied Discrete Mathematics from Virginia Tech in December 2012 and a M.S. in Computer Science from William & Mary in May 2015. Kyle has research interests ranging from algorithm design, cryptography and security, sensor data analysis, random number generation, the Internet of things, and neural networks.

Eating Detection and Chews Counting Through Noninvasive Sensing of Mastication Muscle Contraction

Presenter: Shuangquan Wang
Co-Authors: Y. Ma, L. Hu, Z. Chen, Y. Chen
Advisor: Gang Zhou
William & Mary,
Computer Science

Unhealthy dietary habits (eating disorders, eating too fast, excessive energy intake, etc.) are a major cause of some chronic diseases such as obesity, digestive system disease, and diabetes. Dietary monitoring is necessary and important for patients to break and change their unhealthy diet and eating habits. Existing audio or video based methods are often invasive and bring privacy concerns. Motion sensor based related works are popular for eating detection, but they cannot recognize and count chews. In this project, we propose a novel dietary monitoring method that can detect eating activity and count chews simultaneously. Based on the observation that during eating the mastication muscle contracts and accordingly bulges in some degree, we use a triaxial accelerometer attached on the temporalis to detect the muscle bulge and recognize user's eating activity. In addition, as the bulge of mastication muscle has the same frequency as chewing, we are also able to count chews through recognizing the frequency of periodic muscle bulges. The proposed method does not record any private information (audio, video, etc.). The accelerometer can be easily embedded into a headband or hat and therefore is comparatively noninvasive for user's daily living. Experiments are conducted and the results show that the proposed method can obtain high accuracy both on eating activity detection and chews counting.

Shuangquan Wang is a second-year Ph.D. student in the Computer Science Department at William & Mary. His research interests include ubiquitous and mobile computing, machine learning, and smart health.

Foundations of Nonparametric Preference Learning from Rank Data

Presenter: Qiong Wu
Advisor: Zhenming Liu
William & Mary,
Computer Science

Learning to rank is a fundamental component of machine learning. For example, in recommender systems, e-commerce companies estimate users' preferences over unranked items based on similar users' preferences; product designers estimate the demand curve of a new product based on consumers' past choices; security firms estimate terrorists' preferences based on past behavior; and political firms estimate campaign options based on voters' preferences. Most previous work on learning to rank has used a parametric approach. That is, agents' preferences are generated from a given parametric model such as a discrete choice model. The problem is then tackled by parametric statistical inference techniques such as maximum likelihood estimation or Bayesian estimation. However, a major drawback is that the performance of parametric approaches is sensitive to the choice of model, which requires domain expertise. Thus, non-parametric approaches such as collaborative filtering aim at developing robust methods that work well regardless of model. Surprisingly, little is known about the theoretical guarantees of non-parametric approaches in learning to rank, despite their popularity in practice. This project aims to establish the rigorous theoretical and algorithmic foundations of non-parametric preference learning from rank data. Our objective is to understand the optimal conditions for designing efficient non-parametric algorithms to effectively learn agents' preferences from rank data.

Qiong Wu is a second-year Ph.D. student in the Computer Science Department at William & Mary. Qiong's research interest focuses on the interplay between machine learning and the design of large-scale systems. Qiong is working on two projects under the supervision of Dr. Zhenming Liu. The first one focuses on non-parametric preference learning and the second one designs a low-latency and high-throughput load-balancer for distributed systems.

Evaluating Scalability and Performance of a Security Management Solution in Large Virtualized Environments

Presenter: Lishan Yang
Advisor: Yvgenia Smirni
William & Mary,
Computer Science

Virtualized infrastructure is a key capability of modern enterprise data centers and cloud computing, enabling a more agile and dynamic IT infrastructure with fast IT provisioning, simplified, automated management, and flexible resource allocation to handle a broad set of workloads. However, at the same time, virtualization introduces new challenges, since securing virtual servers is more difficult than physical machines. HyTrust Inc. has developed an innovative security solution, called HyTrust Cloud Control (HTCC), to mitigate risks associated with virtualization and cloud technologies. HTCC is a virtual appliance deployed as a transparent proxy in front of a VMware-based virtualized environment, thus it is important to carefully assess its performance and scalability as well as provide its accurate resource sizing. In this work, we introduce a novel approach for accomplishing this goal. First, we describe a special framework, based on a nested virtualization technique that enables the creation and deployment of a large-scale virtualized environment (with 30,000 VMs) using a limited number of physical servers (4 servers in our experiments). Second, we introduce a design and implementation of a novel, extensible benchmark, called HT-vmbench, that allows to mimic the session-based activities of different users in virtualized environments. By executing HT-vmbench in the emulated large-scale virtualized environments, we can support an efficient performance assessment of management and security solutions, and provide capacity planning rules and resource sizing recommendations.

Lishan Yang is a second-year Ph.D. student in the Computer Science Department at William & Mary under the supervision of Professor Evgenia Smirni. Her research interests include performance modeling, architecture, security, and virtualization. Before coming to William & Mary, she received her bachelor's degree in Computer Science and Technology from the University of Science and Technology of China in 2016.

Accelerate Mobile Video Analytics Through Edge Computing Platform

Presenter: Shanhe Yi
Co-Author: Z. Hao
Advisor: Qun Li
William & Mary,
Computer Science

Along the trend pushing computation from the network core to the edge where the most of data are generated, edge computing has shown its potential in reducing response time, lowering bandwidth usage, improving energy efficiency and so on. At the same time, low-latency video analytics is becoming more and more important for applications in public safety, counter-terrorism, self-driving cars, VR/AR, etc. As those tasks are either computation intensive or bandwidth hungry, edge computing fits in well here with its ability to flexibly utilize computation and bandwidth from and between each layer. In this paper, we present a mobile system built on top of an edge computing platform, which offloads computation between clients and edge nodes, collaborates nearby edge nodes, to provide low-latency video analytics at places closer to the users. We have utilized an edge-first design and formulated an optimization problem for offloading task selection and prioritized offloading requests received at the edge node to minimize the response time. In case of a saturating workload on the front edge node, we have designed and compared various task placement schemes that are tailed for inter-edge collaboration. We have implemented and evaluated our system. Our results reveal that the client-edge configuration has a speedup ranging from 1.3x to 4x (1.2x to 1.7x) against running in local (client-cloud configuration). The proposed shortest scheduling latency first scheme outputs the best overall task placement performance for inter-edge collaboration.

Shanhe Yi is a sixth-year Ph.D. candidate in the Computer Science Department at William & Mary. His research interests focus on the design and implementation of systems in the broad area of mobile/wearable computing and edge computing, with the emphasis on techniques that improve the usability, security and privacy of the applications and systems.

Simulation Study in Quantifying Heterogeneous Causal Effects

Presenter: Jianing Zhao
Co-Author: D. Runfola
Advisor: Peter Kemper
William & Mary,
Computer Science

Quantifying the impact of an intervention or treatment in a real setting is a common and challenging problem. For example, we would like to calculate the environmental implications of aid projects in third-world countries that target economic development. For causal inference problems of this kind, the Rubin causal model is one of several popular theoretical frameworks that comes with a set of algorithmic methods to quantify treatment effects. However, for a given data set, we neither know the ground truth nor can we easily increase the size of the data set. So, simulation is a natural choice to evaluate the applicability of a set of methods for a particular problem. In this paper, we report findings of a simulation study with four causal inference approaches, namely two single tree approaches (transformed outcome tree, causal tree), and two random forest versions of the former.

Jianing Zhao is a Ph.D. candidate in the Computer Science Department at William & Mary. His research interests include machine learning and data mining. He is doing research in causal inference and aid data.

Facial Fusion of Photos and Artwork by Using Markov Random Field Based Convolutional Neural Networks and Image Color Editing

Presenter: Xiaodan Zhu
Advisor: Zhenming Liu
William & Mary,
Computer Science

We consider the problems of transferring a face from a photo to an art portrait. Previously, this work was done by using image editing methods. They cover the face in photo on art portrait facial region and use color correction to make seamless fusion. However, the performance highly depends on the color and gradient difference between source and objective images. In some cases, there will be over saturated spots. This problem becomes more severe when fusing photos with artwork. Moreover, the image editing methods cannot fuse the facial expression, which makes it seem unnatural. Recently, convolutional neural networks have achieved significant improvements with style transfer from artwork to photos. The combined Markov random fields and convolutional neural networks can learn local patches from artwork style especially well, which makes it possible to fuse the facial expressions of photos with art portraits, but the transfer direction is opposite to our problems. We come up with an approach that combines convolutional neural networks with image editing. We applied Markov random field based convolutional neural networks to transfer artwork style to photos, which decreases the difference between two images. Next, we swap the art portrait with a stylized face from the photo and use image color editing to perform color correction. By using our method, we can transfer face identities from photo to art portrait with more seamless results than by only using image editing.

Xiaodan Zhu is a third-year Ph.D. candidate in the Computer Science Department at William & Mary. His research focuses on computer vision. He is currently working on facial fusion by using Markov random field based convolutional neural networks and image color editing.

Education Reform in the New American Republic: Bancroft, Cogswell, and the German Model

Presenter: Christina Beck
Advisor: Christopher Grasso
William & Mary,
History

In 1815, the first American students to seek advanced degrees at Europe's famed University of Gottingen arrived in Germany. This trickle of American intellectuals into German universities continued through the 1840s, and included some of the foremost American minds—George Ticknor, Edward Everett, Joseph Cogswell, and George Bancroft. For Joseph Cogswell and George Bancroft in particular, distance led to thoughts of the country they left behind, and questions of what they might do to improve their homeland with the knowledge they gained in Germany. Through networks of correspondence with family and friends at home and abroad, and above all, with one another, Bancroft and Cogswell developed ideas about the importance of American education. Upon their return home, they chose to found the Round Hill School in 1823, an educational establishment in Massachusetts that represented an extraordinary departure from the schools of their own youth. Employing principles of the German gymnasium and the experimental educational institutions they visited on their travels through Europe, Bancroft and Cogswell sought to marry American values with European ideas in an attempt to educate the next generation of intellectuals. While wide-reaching reform attempts did not begin until the 1840s with Horace Mann, the correspondence and writings of these two men indicate that Americans were formulating ideas about education, democracy, and identity long before comprehensive reform.

Christina Beck is an M.A. candidate in the History Department at William & Mary. She is particularly interested in the history of education in British North America and the early Republic, as well as the history of New England and public history. She also holds a B.A. in History from Principia College in Illinois.

"Thrown into this Hospitable Land": French Refugees in Virginia, 1793-1810

Presenter: Frances Bell
Advisor: Paul Mapp
William & Mary,
History

This paper explores the experiences of French refugees from the Haitian Revolution in Virginia, tracing several members of one household in order to understand how the refugees negotiated the opportunities and limitations that they faced upon arrival in the state. French refugees were received in the state with a mixture of enthusiasm and suspicion, with the latter being particularly directed towards enslaved refugees, who were feared to carry the "contagion" of slave revolt. By piecing together the archival traces left by members of the Burot family, I speculate on the ways in which they negotiated their experiences in Virginia, and argue that their ability to exploit personal and professional relationships, together with sheer good fortune, was instrumental to their achieving some level of socio-economic success in the state.

Frances Bell is a second-year Ph.D. candidate in the History Department at William & Mary. Her research focuses on plantation slave societies during the late eighteenth and early nineteenth centuries, with a particular interest in the Haitian Revolution and its impact in the broader Atlantic world.

"The Yorktown Problem": Constructing a Cultural Landscape, 1900-1935

Presenter: Rebecca Capobianco
Advisor: Hannah Rosen
William & Mary,
History

The history of the Uniontown community and Yorktown National Battlefield demonstrates that sites of memory are always contested, and that meaning is not only inscribed through formal means, such as interpretive signs or government-sponsored events, but is also appropriated and generated through cultural uses of sites of memory. Moreover, the founding of Yorktown National Battlefield reveals that the reconciliationist narrative of erasure applied to Civil War memory does not always hold. Park administrators made decisions for pragmatic, though not unproblematic, reasons, guided by their understanding of what makes history and what is significant in history. Taken collectively, the story of Yorktown and Uniontown demonstrates that the history and goals of national spaces must continually be interrogated and revised to ask what has been expunged, and what needs to be uncovered again to generate a more inclusive understanding of the past.

Rebecca Capobianco received a B.A. in history and an M.A. in U.S. and public history from Villanova University. Before returning to graduate school, she worked in education for the National Park Service. Her research interests focus on the construction and contestation of national identity in public spaces after the U.S. Civil War.

In Pursuit of Reform, Whether Convict or Free: Prison Labor Reform in Maryland, 1912-1922

Presenter: Erin Durham
Advisor: Colleen Woods
University of Maryland-College Park,
History

In the early twentieth century, the Maryland state prison system was transformed from a contract labor system motivated by profits to a state-use system that reduced the competition of prison products with those produced by free workers. This shift in ideology and policy can be understood in the broader framework of the Progressive Era, in which middle-class reformers looked to the state to ameliorate social ills brought about by industrialization. This paper highlights discussions of prison labor at three major junctures during this decade, namely, the agitation that led to prison reform legislation in 1916, resistance to and support of that legislation, and the partial adoption of a state-use labor system in 1922. At each point, this paper will illustrate how the perspectives of labor union members and prisoners influenced the views of state legislators, business owners, and prison administrators. This paper expands upon the work of historians such as Heather Thompson by interpreting the prison labor system of Maryland through the lens of labor tensions. Perspectives that are frequently neglected in intellectual histories of middle-class Progressive reformers are highlighted. Wage laborers in Baltimore agitated for prison labor reform and pressured politicians to denounce the prison contract system. Inmates contested labor conditions by voicing grievances and committing acts of resistance in the prison workshops. By such acts, both prison convicts and free laborers dynamically shaped prison labor reforms in Maryland during the Progressive Era.

Erin Durham is a current graduate student pursuing dual master's degrees in History and Library and Information Science at the University of Maryland-College Park. She received her B.A. from Oberlin College. Recently, Erin presented at the 2017 Oral History Association conference in Minneapolis for her work on oral histories of the Baltimore Freddie Gray protests. Her areas of research interest include oral history, public memory, information literacy, and prison labor.

"Some People of Skil and Curiousity": Botany and the Early American Family

Presenter: Holly Gruntner
Advisor: Karin Wulf
William & Mary,
History

Recent scholarship in the field of early modern science has contributed much to our understanding of individual botanists' discoveries and their transatlantic networks of knowledge sharing. I propose to add a new lens of analysis to the study of eighteenth-century American botany: the family. Defining "family," in this case, as including both biological relations and un-related members of a household, I argue that botanists' wives, children, extended family, servants, and enslaved people performed botanical labor alongside them. Using botanists William Byrd II, Cadwallader Colden, and John Bartram as case studies, I demonstrate that family support enabled their intellectual work. Using a variety of sources, from letters and census records to sketches and formal portraits, I examine the ways in which botanists' families contributed to the generation of formalized botanical knowledge at a time when the Royal Society of London hungered for details about the flora and fauna of the New World. In turn, I analyze how botanists viewed their own families as vital to their botanical projects, and keepers of their scientific legacies.

Holly Gruntner is a second-year Ph.D. student in the History Department at William & Mary. Her research areas include gender, families, and botanical knowledge. She holds a B.A. (English) from the University of Minnesota-Morris and a M.A. (History) from William & Mary.

Revolutionary Royalists in Third Republic France, 1879-1882

Presenter: Stefan Kosovych
Advisor: Mark Micale
University of Illinois, Urbana-Champaign,
History

German physicist Werner Heisenberg pondered about how conservatism in scientific thinking, that is considering a theory to be complete, was more revolutionary than continuous modifications to an existing theory. Heisenberg's statement illustrates the challenge for political conservatives by asserting that it is more revolutionary to return to the politics of a past time than to go with the winds of change. Royalists under Third Republic France were under this tough predicament. Were royalists under the Third Republic revolutionaries? Or were they counterrevolutionaries? I use the banquet as a lens to investigate the royalist political movement utilizing nineteenth-century newspapers and primary-source archival documents. French royalists appropriated the banquet, a historically leftist cultural site, for political action and the royalist banquet became widespread by 1879. According to John J. Baughman (1959), the banquet's role as a leftist, revolutionary cultural site dated to the banquets from 1847 to 1848 that led to the Revolution of 1848 and thus the overthrow of the monarchy. More than thirty years later, the situation became reversed as the royalists used banquets to challenge and attempt to replace the Third Republic with a restored monarchy. Although a royalist revolution did not take place, French royalists occupied a space of revolutionary agitation, the banquet, which enabled them to proclaim a violent, revolutionary discourse that shook the democratic Republic.

Stefan Kosovych is a seventh-year Ph.D. candidate in the Department of History at the University of Illinois, Urbana-Champaign. His main research areas include political culture, food studies, and memory. Stefan's dissertation is centered around banquets in early Third Republic France. He earned a B.S. in Chemistry from William & Mary in 2002, served in the U.S. Army from 2003 to 2007, and received a M.A. in History from The Citadel in 2011.

Who Have Always Been Secret Enemies: The Philadelphia Acadian Exiles and the Violence of Atlantic Migration

Presenter: Ryan P. Langton
Advisor: Christopher Grasso
William & Mary,
History

In the summer of 1755, thousands of Acadians were deported from their homelands and sent throughout the middle colonies of British North America. Caught up in the imperial conflict between Britain and France, these francophone Catholic exiles, initially considered neutrals in their homelands by both the French and British governments, arrived in North American cities that feared and mistrusted them because of their ethnic origins and religious predilections. My project focuses on the experiences of the exiles that sailed to Philadelphia, looking at how they shifted and maintained different aspects of their tenuous identity. I intend to highlight the roles violence played in causing transatlantic migration and how that same violence was destructive in both Nova Scotia and Philadelphia for the Acadians. The intolerance shown towards the Acadians by the people of Philadelphia and the Pennsylvania government mired the ethnogenesis or assimilation of the Acadian exiles, forcing the Acadians into a position where they were denied the privileges of being French and the opportunities of being British. This position, exasperated by the Acadians' desire to maintain their linguistic and religious traditions, developed due to the same fears and misgivings that resulted in their expulsion from their homeland. The story of the Acadian exiles in Philadelphia highlights how inter-colonial violence resulted in fears that destroyed Acadian communities in Nova Scotia and inhibited their ability to form new homes in Philadelphia.

Ryan Langton is a M.A. student in the History Department at William & Mary. His research interests include Atlantic migration during the eighteenth century and the political, cultural, and religious transformations caused by the movement of people throughout the Atlantic world. He holds a B.A. in History and Political Science from the University of Notre Dame.

The Public Face(s) of Albinia Hobart, Countess of Buckinghamshire: Vice, Theatrics, Politics, and the Press

Presenter: Alexandra M. Macdonald
Advisor: Nicholas Popper
William & Mary,
History

In the twenty years between 1784 and 1804, Albinia Hobart (1738-1816), later Countess of Buckinghamshire (1793), appeared in over fifty extant satirical prints. Satirised for her participation in the public sphere and her apparent corporeal excess, representations of Albinia were part of a wave of popular imagery produced in London in the latter decades of the eighteenth century to dialogue with the uneasy, complex, inconsistent, and, at times, paradoxical fascination with women's public behavior. Despite being a near-permanent fixture in print shop windows in the 1780s, 1790s and early 1800s, Albinia has been largely overlooked in historical and art historical scholarship. However, the combination of longevity and satirical breadth present in her representations offers a unique opportunity to examine a single historical figure to map major societal debates that took place in England in the final decades of the eighteenth century. While her behaviour was not entirely unique for the period, the fact that she was involved in, and consequently satirised for, so many different types of public and semi-public behaviours makes Albinia an exceptional normal. Undertaking both a quantitative and qualitative analysis of the extant prints and newspaper mentions, this study will provide the first detailed examination of the ways in which Albinia was represented in print culture. In so doing, it will, to paraphrase Linda Colley, chart the world of eighteenth-century London in a life and a life in the world of eighteenth-century London.

Alexandra M. Macdonald is a Ph.D. student in the History Department at William & Mary. Her scholarly interests include the relationship between politics and material culture in the long eighteenth-century, the intersections of material and intellectual culture, and the role of gossip and scandal in the British Atlantic World.

True Religion on the Isle of Errors: Religious Conflict in Colonial Rhode Island, 1636-1763

Presenter: Mark Mulligan
Advisor: Christopher Grasso
William & Mary,
History

Due to the influence of dissenting colonists from Massachusetts Bay, early Rhode Island developed a patchwork legal tradition of protecting various groups' rights to worship. However, how did the legal establishment of religious liberty influence religious sects' views of their own religious convictions as well as those of others? Evident in church records, sermons, and correspondence between religious leaders, various Protestant denominations in the colony viciously argued over which represented the truest form of Christianity. While similar discourse existed elsewhere in New England and English North America, separation of legal and ecclesiastical authority made Rhode Island's disagreements particularly volatile as each group vied for political power and social influence. As such, Rhode Islanders were sensitive to outside perceptions of their colony as in the throes of anarchy and sought to establish a reputation of secular civic order. This examination of the social and theological implications of Rhode Island's early religious liberty sheds light on religious liberty in the English Atlantic world and contributes to broader historical questions about the relationship between law and society.

Mark Mulligan is a fifth-year Ph.D. candidate in the History Department at William & Mary. His research interests include the history of religion, Atlantic history, early New England, and the relationship between religion and geography. His dissertation explores Atlantic cosmologies in seventeenth and eighteenth-century Rhode Island. He holds a B.A. in History from Assumption College and an M.A. in History from William & Mary.

The Invasion of Quebec and the Fate of Roman Catholicism in Revolutionary America

Presenter: Mitchell Oxford
Advisor: Christopher Grasso
William & Mary,
History

In 1775, the Continental Army began its ill-fated invasion of Canada. Amid the invasion, the Second Continental Congress commissioned Benjamin Franklin, Samuel Chase, John Carroll, and Charles Carroll of Carrollton to travel to Canada to persuade the Quebecois to join the Patriot cause. The Carrolls's inclusion in this commission came at the Congress's expressed hope that by sending prominent Roman Catholic Marylanders as emissaries its promise of religious toleration for the Roman Catholic Quebecois in exchange for their support for the American resistance to Great Britain would gain credence. The invasion ended in disaster—and the commission along with it—by the summer of 1776. Nevertheless, this paper argues, these events were a significant watershed in the history of American Catholicism. Congress's offer of the freedom of religious practice to the Quebecois opened intellectual space for the toleration of American Catholics in the overwhelmingly Protestant United States. Moreover, Congress's inclusion of the Carrolls—who, despite their vast wealth in land and enslaved persons, as Catholics, could not hold office in their native Maryland—at the outset of the Revolution portended the participation of at least elite Catholics in American political life.

Mitchell Oxford is a Ph.D. candidate in the History Department at William & Mary. He received a B.A. from Florida State University and an M.A. from the University of South Carolina, both in history. His current research examines the role of France in the shaping of American Catholicism in the late eighteenth and early nineteenth centuries.

Agents of the Devil?: Women, Witchcraft, and Medicine in Early America

Presenter: Jewel Carrie Parker
Advisor: Judkin Browning
Appalachian State University,
History

While much has been written on women accused of witchcraft during the seventeenth and eighteenth centuries, very little has been written on women healers. My most recent project, my master's thesis, is on women healers' involvement in Early American witchcraft trials. I selected this topic when I became familiarized with the story of Virginia's only accused witch, Grace Sherwood of Princess Anne County. Sherwood's 1706 trial interested me because I knew she was a healer, but the initial court documentation I discovered was unclear about why she was accused of witchcraft. I wanted to know more and soon discovered that her accuser also believed her to have caused a miscarriage. From my research, I believe that women healers were more susceptible to accusations of witchcraft because they practiced magical healing and had power over life and death, especially during childbirth. However, women healers were also well-respected in their communities. They were often called to court to testify as character witnesses, to revel the true paternity of a child, or inspect accused witches for marks of the devil. As no historian has focused on the wider roles of women healers' specifically in American witchcraft trials, this serves as my contribution to scholarship. I want to tell the untold stories of colonial women healers in that their roles are significant for understanding the evolution of healthcare and the mysteries of early American witchcraft trials.

Jewel Parker is a second-year M.A. in History candidate in the History Department at Appalachian State University. Her research areas include early/ colonial American history, women's history, and healthcare history. Her thesis topic is women healers' involvement in early American witchcraft trials. She holds a B.A. (History) from Appalachian State University, with minors in Political Science and Women's Studies.

"Miss Rebecca Story's Book": A Portal to a Boundless World

Presenter: Anne Powell
Advisor: Karin Wulf
William & Mary,
History

This paper examines the commonplace book of a young girl in the early years of the American republic. Rebecca Story recorded in this book literary excerpts that she encountered in her reading practices, excerpts that demonstrate an international awareness reinforced by transatlantic connections through family, neighbors, and classmates. A close textual analysis of Rebecca Story's commonplace book in combination with her surrounding environment offers a methodological approach that simultaneously contextualizes and individualizes a nearly obscured life. This study reconstructs the world in which she lived and thought, a world that was inherently informed by her contemporaries' experiences but that also was uniquely her own. Her narrative begins in Marblehead, Massachusetts, the town of her birth, before moving twenty-five miles southwest to Medford, the town in which she attended school and commenced writing in her commonplace book. The intellectual imagination that informed Rebecca Story's world depended on her capacity to envision ideas, institutions, and places that superseded the concrete borders of Massachusetts and the abstract borders of gender roles at the turn of the century. An analysis of the literature she read, the people she met, and the places she lived shows Rebecca Story's connections to an expansive network of wider geographic, political, and intellectual worlds in the late eighteenth century. Creating a record of these linkages that span the Atlantic world and beyond demonstrates just how small a vast early American world could be.

Anne Powell is a first-year Ph.D. student in the History Department at William & Mary. She is broadly interested in early American social history, with a particular focus on gender and print culture. She earned degrees in history and English from Cornell University in 2016.

Agricultural Machines and the Material Culture of the Transition to Capitalism in the Nineteenth-Century Midwest

Presenter: James J. Rick
Advisor: Charles McGovern
William & Mary,
History

This paper explores the place of mechanical reapers, mowers, and threshers in the social and cultural world of the rural Midwest in the second half of the nineteenth century. Agricultural machines formed a part of and operated within sociotechnical systems alongside humans, animals, land, and markets in the context of westward expansion and the development of American capitalism. A material culture analysis of nineteenth-century Midwesterners' interactions with agricultural machines reveals that they often occupied a place in between capitalist and non-capitalist social relations and ideology, as well as in between the rural and the urban and the East and the West. In pursuing a material culture analysis, this paper asks questions concerning the intersection of culture and political economy with machine design as well as about the social space occupied by machines. As material sites of social and cultural mediation and conflict, farm machines made and embodied points of connection and contention between different aspects of sociotechnical, economic, and ideological systems in the turbulent second half of the nineteenth century.

Jim Rick is a Ph.D. student in the History Department at William & Mary. He received his B.A. in History and Anthropology from Butler University in 2015. He received his M.A. in History from William & Mary in 2017. Jim's research interests are within the study of the nineteenth-century United States, particularly in the social and cultural history of technology, industrialization, labor and capitalism.

Reds, Rights, and Firing Lines: The Southern Negro Youth Congress and the Anti-Communist Crusade, 1936-1949

Presenter: David Cameron Rothmund
Advisor: Scott Poole
College of Charleston,
History

The primary objective of this paper is to argue that Southern radical left social movements paved the way for the civil rights movements of the 1950's and 1960s, even with Cold War disruption. This paper argues that the long civil rights movement can provide context for radical activism within the African American social movements of the 20th century. Additionally, this paper will argue that radical liberalism and progressivism were able to survive the anti-communist crusade through ideals that became manifested in organizations and institutions. In addition to examining the anti-communist crusade, this paper will discuss the appeal of the Communist Party USA (CPUSA) to youth leaders. This paper will tell the history of the Southern Negro Youth Congress (SNYC), and will argue that a youth-oriented, politically left and communist infused radical movement shaped the trajectory of the civil rights movement while largely being ignored in American memory. This article examines the leaders and events within the growing African American left during the New Deal/WW2 era through a social and labor historical lens. This paper will provide context on early twentieth-century social movements and the way in which they have been preserved in the memory of American history.

David Rothmund is a second-year M.A. student in the History Department at the College of Charleston. His research interests include American Labor & Social Movements. He is currently exploring the Southern Negro Youth Congress, American Communist Party, and other radical left political groups active in the New Deal/WWII era. He holds a B.A. in History from Elmhurst College in Elmhurst, Illinois, and is originally from Chicago.

Memory, Family, and Tradition in the Lives of George Robert Twelves Hewes, Robert Twelves, and Boston's Old South Church

Presenter: Kaila Knight Schwartz
Advisor: Karin Wulf
William & Mary,
History

George Robert Twelves Hewes, familiar to scholars of the American Revolution as the central figure of Alfred Young's *The Shoemaker and the Tea Party*, had an unusually long name. Middle names were rare at the time of his birth, and multiple middle names rarer still. Why did Hewes' parents bestow such an unwieldy name on him? Although Hewes shared his name with his father, George Hewes, and uncle, Robert Hewes, another namesake, Robert Twelves (a distant relative, who built the original Old South Church), provided valuable social capital. However, the ties commemorated by the name did not remain transparent, and its meaning evolved over time. Just as Robert Twelves faded from memory in the Hewes family during the late nineteenth century, the caretakers of the Old South Meetinghouse revived his name to serve a new purpose. In saving the church from the threat of demolition, they reimagined its role in the nation's founding and attached it to a version of the past that celebrated great men, including its purported builder. Exploring the intertwined histories of Hewes, his namesakes, and the church where his family worshipped illuminates both the varied purposes a name could serve and the role of memory in reconstructing the past.

Kaila Knight Schwartz is a second-year Ph.D. student in the History Department at William & Mary. Her research interests include the social and cultural history of pre-twentieth-century America, historical memory, microhistory, digital humanities, quantitative history, Puritans, and New England history. She holds a B.A. (History) from Brandeis University, an M.A./M.L.S. (History/Archives Management) from Simmons College, and an M.A. (History) from William & Mary.

A Marketing Agency for Science? Capitalism and the Science Museum of Virginia in 20th and 21st Century America

Presenter: Kasey Marie Sease
Advisor: Charles McGovern
William & Mary,
History

In 2013, Richard Conti, director of the Science Museum of Virginia, told a reporter from the Richmond Times-Dispatch that he sought to rebrand the Museum as a "marketing agency for science." "We don't have to create the science," he explained. "We just have to promote it." The SMV would no longer focus its efforts on teaching the public about science—the original mission of the museum. Instead, its staff would inspire visitors to seek out scientific information on the internet or in the classroom, ultimately beyond the museum. Conti believed that the institution's new mission would save the SMV much -needed money and better suit the tastes of twenty-first century patrons. This project will delve into the history of the SMV to examine why this change, and others like it, are indicative of greater economic and cultural transformations in recent American history. Why did teaching museum patrons about science become too cumbersome by the 2000s? What was different about science education, the museum industry, or even Americans themselves that necessitated such a change? With the evolution of capitalism in twentieth- and twenty-first-century America, nonprofit corporations, like the SMV, face new challenges when attempting to teach non-specialists about science. How public educational institutions respond to those challenges can affect the very meaning and value of science in America.

Kasey Sease is a fourth-year Ph.D. candidate in the History Department at William & Mary. Her research interests include the history of nonprofit corporations, capitalism, and public science education in modern America. She holds an M.A. in history from William & Mary and recently completed an institutional history of the Science Museum of Virginia for the Virginia Academy of Science.

The Cultural Cartography of Yankeedom and Dixie: Mapping Loyalty in the Civil War Mid-Atlantic, 1861-1865

Presenter: Charles R. Welsko
Advisor: Jason Phillips
West Virginia University,
History

As the Civil War began, residents of Maryland, Pennsylvania, Virginia, and West Virginia scrambled to understand the shifting landscape around them. This paper explores the reactions of soldiers and civilians, freedmen and slaves, Unionists and Confederates to the emergence of competing national allegiances. Throughout the war, they mapped loyalty. In their personal writings and print culture, ordinary people charted their impressions of allegiance. They noted the people and places that supported their nation, crafted verbal and imagined maps of loyalty or disloyalty. Additionally, Mid-Atlantic residents also incorporated cultural observations into their discussions. Most strikingly, these cartographers noted evaluations of physical beauty in their observations. Confederates tended to connect differences of national allegiance to the physical appearance of a person, as they argued that people born in Yankeedom looked less appealing than those of Southern stock. Comparatively, Unionists charted their notions of loyalty onto physical spaces, as they found the disloyal soil and vegetation of Dixie inferior to the superior, improved lands of the North. This paper intends to push our conceptualization of loyalty beyond the traditional boundaries of political or national ideology. Instead, it places the issue of allegiance at the heart of daily life for Unionists and Confederates, as they pulled from a shared history and common experiences to make sense of their new, war-torn world. To do so, they crafted maps with words and paper, charting loyalty and disloyalty as they went.

Charles Welsko is a fourth-year Ph.D. candidate in the History Department at West Virginia University. His research focuses on the cultural and social history of the United States. His dissertation examines how all residents—Unionists, Confederates, freedmen, and enslaved persons—of the Mid-Atlantic constructed definitions of loyalty during the Civil War Era (1850-1900). He holds an M.A. (History) from West Virginia University and a B.A. from Moravian College.

A Study of the Microstructural Effects on Optical Parameters and Quantum Efficiency in VO_2 Thin Films on TiO_2 and TiO_2:Nb

Presenter: Jason Creeden
Co-Authors: D. Beringer, S. Madaras, M. Beebe, I. Novikova
Advisor: Ale Lukaszew
William & Mary,
Physics

The experiment goal is to optimize the photosensitive properties of VO_2 thin films in the ultraviolet (UV) and near-UV regions; following the recent demonstration that VO_2 grown on niobium doped TiO_2 (TiO_2:Nb) substrates can push the photoconductive response into the visible spectrum. By controlling the microscopic structure of the films, we optimize the VO_2 growth for TiO_2 and TiO_2:Nb substrates. In doping the substrates, we push the monoclinic structure in the insulating VO_2 phase toward the tetragonal structure in the metallic phase. Using X-ray diffraction, we determine that films grown on TiO_2:Nb exhibit a ~.25° shift in peak location compared to the undoped films suggesting a straining of the insulating monoclinic structure toward the metallic tetragonal structure. Under a 405 nm laser, the VO_2 on TiO_2:Nb exhibits sharp and comparatively large optical responses, through the thermally induced insulator to metal transition, to those seen with VO_2 on TiO_2. The films also exhibit a photocurrent (light-induced current), upon 405 nm illumination, for both the doped and undoped films with a greater quantum efficiency associated with the optimized doped films. Suggesting that the optimized doping enhances the near-UV optical response and quantum efficiency of the film. The enhancement of these parameters is in line with the overall project goal of creating more efficient neutron detectors.

Jason Creeden is a Ph.D. candidate in the Physics Department at William & Mary. His research areas include condensed matter physics and material physics. He is currently investigating vanadium dioxide and its potential uses as the next generation of ultrafast switches and neutron detection.

Vibration Insensitive Laser

Presenter: Savannah Cuozzo
Advisor: Eugeniy Mikhailov
William & Mary,
Physics

Lasers are a critical component of many scientific experiments and technological developments. Their frequency must be stable and insensitive to the many environmental factors that can cause undesirable effects. The goal of the project is to further research how we may enhance lasers using dispersive cavities. This is done by introducing Rubidium-87 (a dispersive medium) into the cavity, such that the light-atom interaction with auxiliary lasers allows us to control the dispersion and thus reduce sensitivity of the laser's frequency to vibrations. We analyze how experimental parameters like laser power and detuning affect the pulling factor (the ratio of the laser frequency shift to the empty cavity frequency shift). We find a region where the generated lasing frequency is unchanged by changes in cavity length: a vibration insensitive laser.

Savannah Cuozzo is a first-year Ph.D. student in the Physics Department at William & Mary. Her broad research interests are in the field of quantum optics, specifically quantum enhanced measurements. She holds a B.S. in physics, and a B.A. in math from the University of South Florida.

Graphene as Two-Dimensional Surfactant

Presenter: William W. Dickinson
Advisor: Hannes Schniepp
William & Mary,
Physics

Graphene has been the subject of intense interest in the research community since it was first produced in 2004. The strongest material ever tested, it is also nearly transparent and both thermally and electrically conductive. A two-dimensional sheet of carbon atoms, graphene sheets naturally occur stacked together as the commonly known graphite. However, the sheets are fiercely resistant to exfoliation, difficult to disperse, and have a worrying propensity to restack. All these problems contribute to the great difficulty this fascinating material has encountered leaving the lab and entering commercial use. Existing production methods either produce minute quantities, require huge amounts of energy, or involve chemical treatments that ruin its properties. Here, we investigate a method that instead harnesses these difficulties. We force the graphene to exfoliate itself at the interface between two immiscible solvents, stabilizing the interface and acting as a surfactant with a two-dimensional morphology. For the first time, we are able to characterize this interaction in a rigorous fashion using force spectroscopy with graphene-functionalized colloidal probes at the surface of pinned droplets of heptane in water. Our experiments improve the understanding of this method, enabling the production of pristine graphene at large scale and low cost to revolutionize systems such as nanocomposites, solar cells, sensors, and flexible electronics.

Will Dickinson is a Ph.D. candidate in the Physics Department at William & Mary. His research focuses on using force spectroscopy to investigate interfacial properties, applying it to a multitude of systems, including nanosheet materials and oil/mineral interactions. He holds a B.S. (Physics/Mathematics) from the University of Mary Washington and an M.S. (Physics) from William & Mary.

Ultracold Potassium for Atom Interferometry

Presenter: ShuangLi Du
Co-Authors: A. Pyle, A. Rotunno
Advisor: Seth Aubin
William & Mary,
Physics

We report on progress to cool potassium to Bose-Einstein condensation (BEC) for atom interferometry experiments. Atom interferometers are the most precise instruments for force and potential measurements. We are developing a spin-dependent atom interferometer based on AC Zeeman traps, which will have enhanced sensitivity and spatial resolution due to the use of trapped atoms. Potassium isotopes are well suited for manipulation via AC Zeeman force. In particular, ^{41}K has a small hyperfine splitting of 254 MHz, which is low enough to enable easy coupling to an atom chip. Also, ^{41}K benefits from suppressed sensitivity to detrimental magnetic field noise at 24 G and 45 G. A magnetic Feshbach resonance at 51 G can be used to tune and suppress atom-atom interactions, which can dephase an interferometer. Our apparatus uses an atom chip to trap ultracold atoms about 100 microns from the chip surface. This close proximity to the chip ensures that the atoms experience the strong radio-frequency field gradients that are necessary for using AC Zeeman potentials. We have successfully trapped over 1.5×10^6 ^{41}K atoms at 100μK with a phase space density of 10^{-6}. At present, we are working to cool ^{41}K directly or with sympathetic cooling with Rubidium. Once the ^{41}K atom have been cooled to sub-microKelvin levels, or to BEC, then they can be used for interferometry experiments. An interferometer based on ^{41}K BEC is a stepping stone towards the creation of multi-mode interferometer that work with ultracold thermal atoms or a degenerated Fermi gas (with ^{40}K).

ShuangLi Du is Ph.D. Candidate in the Physics Department at William & Mary, who works on the potassium ultracold atom interferometer.

Broadband Near-Field Infrared Spectroscopy with a High Temperature Plasma Light Source

Presenter: David Lahneman
Advisor: Mumtaz Qazilbash
William & Mary,
Physics

Scattering-type scanning near-field optical microscopy (S-SNOM) has enormous potential as a spectroscopy tool in the infrared spectral range where it can probe phonon resonances and carrier dynamics at the nanometer lengths scales. However, its applicability is limited by the lack of practical and affordable table-top light sources emitting intense broadband infrared radiation in the 100 cm^{-1} to 2,500 cm^{-1} spectral range. This talk introduces a high temperature plasma light source that is both ultra-broadband and has much more radiant power in the infrared spectral range than conventional, table-top thermal light sources such as the globar. We implement this plasma lamp in our near-field optical spectroscopy set up and demonstrate its capability as a broadband infrared nano-spectroscopy light source by obtaining near-field infrared amplitude and phase spectra of the phonon resonances of thin films and bulk crystals down to 400 cm^{-1}.

David Lahneman is a fourth-year Ph.D. candidate in the Physics Department at William & Mary. His research includes nano-scale experimental condensed matter physics applied to strongly correlated electron materials. He holds a B.S. (Applied Physics) from Towson University and an M.S. (Physics) from William & Mary.

A New Mechanism for Vanadium Dioxide's Insulator to Metal Transition via Surface Plasmon Excitation

Presenter: Scott Madaras
Co-Authors: I. Novikova, J. Creeden, S. Kittiwatanakul, J. Lu
Advisor: Ale Lukaszew
William & Mary,
Physics

We investigate a plasmonic approach to cause a material phase transition in vanadium dioxide films. Vanadium dioxide films undergo a phase transition from an electrical insulating state to a metallic state when a temperature changes or when the material is exposed to strong electromagnetic radiation or electric field. We considered the effect of surface plasmons generated in a thin Au film as an alternative process to induce the phase transition in an adjacent thin layer of vanadium dioxide. Surface Plasmons are electron oscillations excited by coupling laser light via a prism into a Au film at a critical angle. The induced surface plasmons are associated with strong electromagnetic field at the Au- vanadium dioxide interface. We observe that illumination with laser light of wavelength 1064nm causes the phase transition in the vanadium dioxide. with laser powers as low as 5mW. A model of the surface plasmons electromagnetic field effect in vanadium dioxide coupled with the differences in fractional amounts of vanadium dioxide converted between metal and insulator states guided the design for the experimental samples, and fits the experimental results to within 50%. In addition to providing new insights into light-matter interactions in vanadium dioxide, our approach makes possible a new type of efficient photo switch, waveguide, or sensor.

Scott Madaras is a fourth-year Ph.D. candidate in the Physics Department at William & Mary. His research area includes experimental testing and modelling of condensed matter, studying the behaviors of strongly correlated materials such as the transition metal oxide, vanadium dioxide. He uses optical techniques such as surface plasmon generation and ultrafast laser testing to explore vanadium dioxide behaviors.

Modeling Near-Field Infrared Microscopy Data

Presenter: Patrick McArdle
Co-Author: D. Lahneman
Advisor: Mumtaz Qazilbash
William & Mary,
Physics

Infrared spectroscopy is widely used to study the physical properties of materials including electronic structure, charge dynamics, and optical phonons. In traditional infrared spectroscopy, we are constrained by the Abbe diffraction limit to a minimum attainable spatial resolution of the order of infrared wavelengths from about a micrometer to hundred micrometers. Near-field infrared microscopy and spectroscopy allows us to circumvent the diffraction limit and provides nanometer scale spatial resolution. This enables deeper insight into the local optical properties of materials. In near-field infrared microscopy, infrared radiation is directed towards the tip of an atomic force microscope (AFM). Strong nearfields are induced at the tip apex which interact with the sample located in close proximity of the tip. The tip rescatters radiation following this interaction, and a detector measures this far-field radiation. Proper modeling of this process allows for the extraction of the sample's local optical properties. Current models fail to include certain aspects present in experiments such as directional dependence of material properties, multi-layered structures, surface roughness of the sample, and realistic geometry of the AFM probe. I will present numerical results obtained from the electromagnetic solver FEKO. Accurate tip geometries have been used based on SEM scans of our AFM tips. I will present numerical results on the phonon-polariton in oxides and compare to experimental data.

Patrick McArdle is a third-year Ph.D. candidate in the Physics Department at William & Mary. He is currently working on the modeling of near-field microscopy data and optical microscopy.

Blood Pressure Waveform Analysis for Predictive Monitoring of ICU Patients

Presenter: Denise Erin McKaig
Advisor: John Delos
William & Mary,
Physics

Blood pressure is one of the vital signs always measured in routine clinical visits and in critical care. More complex is the blood pressure waveform, which is thought to contain a wealth of information that physicians could use for diagnosis of patients in intensive care. This research aims to use waveform analysis algorithms to calculate a patient's stroke volume at regular intervals. Stroke volume (SV) is the volume of blood that the heart pumps with each beat, and changes of stroke volume give warning of hemorrhage or heart failure. However, direct measurement of stroke volume is complex and highly invasive, and therefore cannot be done continuously. An algorithm has been proposed which claims to calculate stroke volume by analyzing the blood pressure waveform over a period of minutes. We are applying this algorithm to data collected from intensive care units at the University of Virginia hospital. Its usefulness will be discussed.

Denise E. McKaig is a fourth-year Ph.D. candidate in the Physics Department at William & Mary. Her research area is computational medical physics with a particular focus on predictive medicine. She holds a B.S in Physics and Mathematics from James Madison University and an M.S. in Physics from William & Mary.

The DarkLight Experiment at LERF

Presenter: Sahara Jesmin Mohammed Prem Nazeer
Co-Authors: A. Liyanage, T. Cao, T. Patel, B. Dongwi
Advisor: Michael Kohl
Hampton University,
Physics

The DarkLight experiment has been proposed to search for a heavy photon A' in the mass range of 10-100 MeV/c^2 produced in electron scattering. Phase-1 of DarkLight consists of three sub phases. Phase-1A of DarkLight has started to take place in 2016 at the Low Energy Recirculator Facility (LERF) at Jefferson Lab. LERF delivered a 100 MeV electron beam onto a windowless hydrogen gas target. The Phase-1A detector tracks leptons inside the DarkLight solenoid with a set of Gas Electron Multiplier (GEM) detectors, combined with segmented scintillators for triggering. The GEM telescope consists of four 10x10 cm^2 triple layer GEM chambers with 2D readout strips, mounted in a slightly angled fixed frame about 12 cm tall. For Phase-1C a setup of two magnetic spectrometers is designed for a targeted search for a protophobic boson in the mass region near 17 MeV/c^2 where a signal was recently reported by a Hungarian group, interpreted as a fifth force particle. The group is developing customized GEM detectors to instrument the Phase -1C setup with a tracking detector system for the electron positron pair originating from the decay of the A'. The performance of the 10x10 cm^2 GEM telescope will be discussed, with a status update of the preparation of the Phase 1C detector.

Jesmin Nazeer is a fourth-year Ph.D. candidate in the Physics Department at Hampton University. She is currently working in the DarkLight Collaboration on GEM detectors.

Weak Parity-Violating Electrons to Probe the Distribution of Neutrons in Lead

Presenter: Victoria Owen
Advisor: David Armstrong
William & Mary,
Physics

The Lead Radius Experiment (PREX) at Jefferson Lab will exploit the power of the weak interaction and parity violation to determine if the excess of neutrons in the nucleus of lead-208 leads to a larger average radius for the neutron distribution compared to that of the protons. In effect, is there a "neutron skin" on such a heavy nucleus, and if so, how thick is it? PREX will overcome both precision and radiation challenges in order to test fundamental nuclear theory and provide the physics community with a value that calibrates heavy-ion collision results, constrains physics theories beyond the standard model, and has implications for the mass and size of neutron stars. Preparation efforts and progress will be discussed.

Victoria Owen is a second-year Ph.D. candidate in the Physics Department at William & Mary. She specializes in parity-violating experimental nuclear physics happening at Jefferson Lab and is currently participating in efforts to prepare an upcoming experiment.

Intensity Difference Squeezing in Rubidium Vapor

Presenter: Nikunjkumar Prajapati
Co-Author: N. Super
Advisor: Irina Novikova
William & Mary,
Physics

We utilize a non-linear interaction between light and hot Rubidium vapor called Four-Wave Mixing (FWM) to look at intensity difference squeezing. Two optical fields, a strong pump and weak probe, form a lambda system coupling the two hyperfine ground states of Rb via a two-photon Raman transition. The redistribution of atomic population and coherence by a strong pump field results in the amplification of the probe field and simultaneous generation of a new optical field (stokes). Because the four-wave mixing process requires that the stringent phase-matching conditions are obeyed, the probe and stokes fields follow a well-defined geometry and are generally correlated in intensity. By measuring the noise of the difference in intensities of the two fields, we were able to achieve the common-mode noise reduction below what is achievable with two independent perfect laser fields of nearly -3dBm, known as two-mode intensity squeezing. This is aby a factor of two reduction of relative intensity noise. We are currently optimizing the setup to increase squeezing further by probing various pump/probe frequencies and powers. After optimization, we will use the setup to look at the level of entanglement of our beams.

Nikunj Prajapati is a third-year Ph.D candidate in the Physics Department at William & Mary. He is researching quantum optics and its role in quantum information technologies. He has a bachelor's degree in Physics from Stockton University.

Atom Chip AC Zeeman Potentials: Spin-Dependent Trapping and Interferometry

Presenter: Andrew Peter Rotunno
Co-Authors: S. Du, A. Pyle
Advisor: Seth Aubin
William & Mary,
Physics

In recent years, the compactness of atom chips and the electromagnetic near fields they produce have allowed for new advances in atom cooling and trapping. We present here a new tool in atom-chip technology, utilizing the AC Zeeman force to push, pull, or trap any spin state using AC magnetic fields near atomic hyperfine resonances. This force can be applied to inter-manifold or intra-manifold transitions, allowing operation at a few MHz up to microwave (6.8 GHz for 87Rb) frequencies. We evaluate multiple chip and microstrip designs for use in atom trapping and interferometry, and evaluate the effects of conductor roughness, state mixing, and the AC Stark effect on the viability of trapping and interferometric schemes. All trapping schemes involve sending multiple alternating currents with tunable power, frequency detuning, and relative phase through atom chip traces, creating a local AC magnetic near-field minimum which can individually target spin states, allowing for state-specific trapping and transport. Spin-dependent traps allow for atoms in coherent superpositions of different spin states to be separated and recombined, making an atom Mach-Zehnder interferometer for probing of very weak forces near surfaces and inertial forces such as gravitational acceleration and rotation. A simpler interferometer scheme involves creating regions of linear AC Zeeman gradient in combination with a laser dipole trap. We also investigate the AC skin effect as a correction to the current distribution in flat conductors.

Andrew Peter Rotunno is a fourth-year Ph.D. candidate in the Physics Department at William & Mary. He works with ultracold atoms. He graduated from Fordham University in 2014.

WILLIAM & MARY
Four William & Mary faculty members from diverse disciplines are stranded on a desolate island with only a one-person life raft to escape to civilization. Who should survive for the sake of humanity?
THE ANNUAL
RAFT DEBATE
Fabrício Prado
for the Humanities
Doug Young
for the Natural and Computational Sciences
Jaime Settle
for the Social Sciences
Pieter Peers
as the Devil's Advocate
Virginia Torczon
as the Judge
THURSDAY, MARCH 15, 2018 @ 6:30PM
COMMONWEALTH AUDITORIUM
The Debate is free and open to the public.
Sponsored by the Office of Graduate Studies & Research

Second-Year Evaluation of the Impact of a Required Agricultural Mechanics Unit of Instruction on Pre-Service Teachers

Presenter: Curtis H. Berry
Advisor: Alex Byrd
Clemson University,
Agricultural Sciences

The purpose of this research was to assess the confidence and self-efficacy levels of pre-service agricultural education teachers in their field placement before and after taking a required unit of agricultural mechanics classes. Participants consisted of agricultural education pre-service teachers during two consecutive years at Clemson University. Data were collected using two separate Likert-type scales measuring student teacher self-efficacy within classroom management and confidence in teaching required content. Results from this study indicate that a required unit of agricultural mechanics is beneficial to pre-service teachers prior to their student teaching experience. Students demonstrated an overall increase in self-efficacy and confidence; however, the researchers also found a slight decline in self-efficacy for certain data points pertaining to classroom management. These findings lead us to conclude that more courses in classroom management or time in the field would be beneficial to pre-service teachers. This study will be continued for a third year in order to further assess the needs of the program and to determine how to better prepare pre-service teachers in South Carolina and across the nation. These assumptions align with prior notions of self-efficacy theory in teaching, which requires experience throughout several years to master classroom management components.

Curtis Berry is a second-year M.S. student in the Agricultural Sciences Department at Clemson University. His research includes areas of agricultural education and agricultural mechanization. He holds a B.S. in pre-veterinary medicine from Clemson University and plans to lecture at a university or technical college.

Effects of Medial Prefrontal Cortical Administration of an Orexin-2 Receptor Antagonist on Attentional Performance in Rats

Presenter: Sarah A. Blumenthal
Co-Author: A. Tapp
Advisor: Josh Burk
William & Mary,
Psychological Sciences

Orexin neurons project to a number of brain regions that are implicated in attentional performance, including to the medial prefrontal cortex (mPFC). In particular the right mPFC specifically has been found to be crucial for attention and vulnerable to age-related dysfunction, resulting in cognitive and attentional deficits. Orexin receptor blockade in the basal forebrain impairs attention, whereas orexin A administration may be beneficial. However, the role of mPFC orexin receptors in attention is unknown. Based on the results from experiments in the basal forebrain, orexin receptor blockade is hypothesized to impair attentional performance, particularly in the right hemisphere. Two orexin receptor subtypes exist, orexin 1 and orexin 2 (Ox1R and Ox2R, respectively). While the role of Ox1Rs in attention has been examined in several studies, the contribution of Ox2Rs has not been assessed. The present study examined the effects on attentional performance of an Ox2R antagonist, TCS-OX2-29, in the left or right mPFC. Rats were trained in a two-lever sustained attention task that required discrimination between visual signal and no signal trials. Cannula were implanted into the left or right mPFC and, after recovery and re-establishing baseline performance, TCS-OX2-29 was intracranially administered (0 nM, 1 nM, 10 nM, 20 nM). Preliminary results support our hypothesis; however, attention was enhanced at the lowest dose of the drug. We speculate that mild antagonism of Ox2Rs may increase receptor sensitivity for subsequent orexin transmission, leading to improvements in attention.

Sarah Blumenthal is a first-year M.S. student in the Psychological Sciences Department at William & Mary. Her research areas include cognitive and behavioral neuroscience, where she is primarily interested in attention, motivation, and cognitive decline. Her current research focuses on the orexin/hypocretin system and its role in attention. She holds a B.A. in Psychology and German from Wake Forest University.

The Impact of Contextual Factors on Confrontations of Online Homophobia

Presenter: Emily Braun
Advisor: Cheryl Dickter
William & Mary,
Psychological Sciences

When a prejudicial action occurs, confronting the perpetrator of that action can make the perpetrator feel guilty about their behavior and reduce their bias. However, not all confrontations are equally effective, and there are social costs associated with confronting. Calm, collected confrontations of prejudice are beneficial; the confronter is less likely to face negative responses and observers view the perpetrator more negatively, making egalitarian norms more salient. Research on confronting behavior has focused largely on in-person interactions, and less has examined confrontations of prejudice online. Because responses to prejudice on social media are often visible to other people and can thus effectively communicate norms of egalitarianism, it is important to examine contextual factors that affect online confrontations. In the current study, 400 young adult participants will view hypothetical tweets via Twitter containing homophobic comments and will be given a short or long period of time to respond to the perpetrator. The consensus of tweets in response to the comment (e.g. number of supportive comments) and the tone of comments present (e.g. calm vs. hostile) will be manipulated. It is hypothesized that participants with more time to respond and who see egalitarian comments from others will confront more often and respond with less hostility than those without much time and with less egalitarian comments.

Emily Braun is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. She is primarily interested in stereotyping and prejudice, especially prejudice reduction strategies. Her past research has focused on prejudice and social media. Her current work focuses on confrontations of prejudice and the factors that make confrontations more effective in online contexts.

Assessing and Responding to Lethal Means Access & Adolescent Suicidal Risk

Presenter: Rachel Elizabeth Capps
Co-Author: J. Jameson
Advisor: Kurt Michael
Appalachian State University,
Psychology

Suicide is one of the leading causes of death among adolescents. Rates of suicide among rural youth are nearly double that of urban youth, emphasizing suicide among rural adolescents as a major public health concern. School mental health (SMH) programs, which provide psychological services to students in schools, address many barriers to accessing psychological treatment in rural areas and may include suicide prevention efforts. However, there is a need for effective school-based crisis response protocols that include methods for lethal means restriction. In response, the prevention of escalating adolescent crisis events (PEACE) protocol was developed and revised to provide a thorough risk assessment for school-based clinicians. The PEACE protocol was utilized for 78 crisis events involving 58 students who presented to a SMH program with suicidal and/or homicidal risk during the 2016-2017 school year. Results revealed that approximately half of events were relatively low -risk. However, the majority (66.1%) of students endorsed access to means (e.g., firearms, knives, medications). Notably, 23.7% of events involved report of firearm access. To address risk, 43.6% of crisis events included engaging caregivers in lethal means restriction. Most importantly, there were no completed suicides following assessment and response with the PEACE protocol. These results lend support to the feasibility and effectiveness of implementing the protocol in schools and highlight the need for thorough risk assessment, including lethal means access, and means restriction.

R. Elizabeth Capps is a third-year master's candidate in Clinical Psychology at Appalachian State University. Her research interests include school mental health and family influences on child and adolescent psychopathology and treatment. Her master's thesis examines the effect of perceived criticism on adolescent psychotherapy outcome. She holds a B.S. in Psychology with concentrations in Neuroscience and Health Care Delivery from Roanoke College.

Cognitive Intervention and Mild Cognitive Impairment: The Effects of Cognitive-Linguistic Intervention

Presenter: Madelyn Leigh Elliott
Advisor: Kimberly McCullough
Appalachian State University,
Speech-Language Pathology

The dementia population has accumulated to 47 million people, creating an $818 billion global expense. Approximately 20% of people 65 and older are living with mild cognitive impairment (MCI), a pre-dementia stage of Alzheimer's disease. Cognitive intervention strategies have the potential to reduce the prevalence of dementia due to their ability to slow the conversion to frank dementia. As specialists trained in language and cognition, speech-language pathologists are uniquely positioned to identify and treat cognitive impairments. If intervention strategies could delay the onset of dementia by 5 years, there could be a 57% decrease in those living with dementia. A single group, pre/post-test design was used. Thirty-six elders at-risk for cognitive decline participated. Eight weeks of group-based, cognitive-linguistic intervention was administered, implementing language stimulation, social engagement, and person-centered memory strategies. Measures of memory, linguistic comprehension and production, mental status, and visuospatial skills were administered pre- and post-intervention. Data was analyzed using paired samples t-tests. Significant differences were found of assessment measures of linguistics comprehension, linguistic production, and visuospatial skills following the intervention. Results nearing significance were found on assessment measures of memory. These results support the hypothesis that group-based, cognitive-linguistic intervention programs have the potential to improve cognitive-linguistic functioning. Additional research in this area is merited.

Madelyn Elliott is a second-year master's student in the Speech-Language Pathology Department at Appalachian State University in Boone, North Carolina. Her research areas include cognitive intervention, dementia, and mild cognitive impairment. She holds a B.S. in Communication Science and Disorders from Appalachian. She has a passion for the evaluation and treatment of geriatric populations.

Implicit Cognitive Responses to Fruit and Vegetables in Food Neophobic Children

Presenter: Repairer Etuk
Advisor: Catherine Forestell
William & Mary,
Psychological Sciences

Children struggle to eat the daily recommended servings of fruits and vegetables, often resulting in poor nutrient intake. This is especially a problem in children who are food neophobic (i.e., have a fear of eating new foods). Previous research has found that unfamiliar foods may induce feelings of threat or anxiety, which in turn may reduce children's willingness to try them. The goal of the present study is to determine if food neophobic children have attentional biases towards certain food stimuli, which might indicate feelings of threat towards and a reduced willingness to try novel foods. We will use the dot-probe task to measure implicit attentional bias, and the affective misattribution procedure (AMP) to assess affective responses to fruit and vegetables in young children (aged 5-8) with unfamiliar and familiar food stimuli. In addition, we will include an ad libitum food consumption task in which children will be presented with a range of fruits and vegetables and will be asked whether they are willing to try them. We hypothesize that neophobic children will attend more to the novel food items and will have more negative evaluations of these foods and that these cognitive implicit responses will be associated with children's willingness to consume these foods. This study will contribute to our understanding of the implicit cognitive factors that contribute to food neophobia in children.

Repairer Etuk is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. His research areas include obesity, stress, chronic disorders and other health related outcomes. He holds a B.A. from the University of Texas-Austin.

Examining the Effects of Stereotypes on Legal and Moral Judgments of Sexual Victims and Perpetrators

Presenter: Ciera Ferrone
Advisor: Twila Wingrove
Appalachian State University,
Psychology

Stereotyping is the most cognitive component of attitudes. To stereotype is to socially categorize, which may be harmful because mental shortcuts reduce cognitive processing. Prejudice is the most affective component of attitudes; for example, sexism is the subjection of someone on the basis of their sex. One practical implication of gender inequality lies in the legal system. Researchers have consistently shown that juries are reluctant to convict in sexual assault trials. Jurors enter the courtroom with preexisting beliefs about sexual assault victims and perpetrators that are informed by stereotypes. Rape myths are a prime example; rape myths are "prejudicial, stereotyped, or false beliefs about rape, rape victims, and rapists [which] absolve the perpetrator of guilt and increase the victim's responsibility for the assault" (Burt, 1980; Hildebrand & Najdowski, 2015). Ultimately, rape myth acceptance is a prevalent element of rape culture, and is reinforced by social norms regarding sexual scripts, which dictate how men and women are expected to behave in a sexual interaction. This study is an experimental examination of victim and perpetrator stereotypes, and the potentially harmful effects on legal judgments. Mock jurors read a court transcript of a sexual assault trial, involving a stereotypical or counterstereotypical victim and perpetrator; this study uses a 2 (victim type) x 2 (perpetrator type) between-subjects factorial design. Jurors rendered legal and moral judgments, such as guilt and blame.

Ciera Ferrone is a second-year M.A. candidate in Experimental Psychology at Appalachian State University, where she earned her B.S. in Psychology and Statistics. Her master's thesis topic is the role of gender and sex role stereotypes on legal and moral judgments of sexual assault victims and perpetrators. Ciera hopes to enter a research Ph.D. program in the fall.

Dissociating Alzheimer's Disease from Amnestic Mild Cognitive Impairment Using Time-Frequency Based EEG Measures

Presenter: Wendel Matthew Friedl
Advisor: Paul Kieffaber
William & Mary,
Psychological Sciences

This work explores the utility of using magnitude, phase angle, and cross-frequency coupling indices derived from electroencephalogram (EEG) recording using spectral decomposition as unique biomarkers of Alzheimer's Disease (AD) and amnestic mild cognitive impairment (aMCI), respectively. Experimental stimuli included both auditory and visual oddball discrimination tasks, elicited during a brief (approximately 20-minute) recording session. Participants were 60 older adults from an outpatient memory clinic diagnosed with either aMCI (n = 29; M = 73.0; SD = 9.32) or AD (n = 31; M = 78.29; SD = 8.28) according to NIA-AA criteria. These results contribute to a growing body of literature seeking to document illness-related abnormalities in time-frequency EEG signatures that may serve as reliable indicators of the pathophysiological processes underlying the cognitive deficits observed in AD and aMCI-afflicted populations.

Wendel Friedl is a second-year M.A. candidate in the Psychological Sciences Department at William & Mary. His current research and thesis topic involves characterizing neuronal oscillatory patterns - or brain rhythms - observed in scalp-recorded EEG as a potential means of differentiating the clinical conditions of Mild Cognitive Impairment and Alzheimer's Disease. He holds a B.S. (Economics) from Arizona State University and a B.A. (Sociology) from Wisconsin.

Recovery of Psychiatric Illness from the Perspective of Mental Health Personnel in Mexico City

Presenter: Veronica Valencia Gonzalez
Advisor: Elia Jazmin Mora-Rios
University of California-Irvine,
Criminology, Law and Society

Objective: In this study, we explore recovery and factors which facilitate relapse in individuals with severe mental disorders from the perspective of mental health service personnel working in Mexico City. Participants: For this study 95 mental health personnel were recruited from mental health and addiction treatment facilities in Mexico City using convenience and snowball sampling. Of those recruited to participate in the study 64.2% were female. The average age of participants was 39.79 years with a range of 24 to 68 years of age. Method: Semi-structured individual interviews were used to collect information from participants. The interviews were audio recorded and generally lasted about 90 minutes in length. Interviews included open-ended questions and the Opinions about Mental Illness (OMI) Scale questionnaire (Cohen & Struening, 1962). Interviews were subsequently transcribed and analyzed for thematic content regarding the concept of recovery and the factors which facilitate relapse in people with severe mental disorders. Categories were then developed from the thematic analysis (Braun and Clarke, 2006). Results: Of the respondents, 19% did not believe that recovery was possible for individuals with severe mental disorders; one-third of respondents believed that recovery was possible and 46.6% believed that recovery to be factor dependent. From the thematic analysis of the recovery related responses eight categories were developed. Meanwhile 12 categories were established for responses pertaining to relapse facilitation factors.

Veronica Gonzalez is a first-year Ph.D. student in the Department of Criminology, Law and Society at the University of California-Irvine. Her research interests include the impact of mental illness stigmatization in institutional settings. She is also interested in intimate partner violence (IPV) broadly, the impact of IPV on family members who experience/ witness IPV, and intervention programs for IPV perpetrators.

"Startling" Insights into the Effect of Fear on Learning and Emotional Reactivity in Adolescents and Young Adults

Presenter: Shannon Elizabeth Hahn
Co-Author: S. Bottari
Advisor: Elizabeth Raposa
William & Mary,
Psychological Sciences

Fear reactivity and learning in adolescence has been remarkably understudied considering the pivotal role that fear plays in disorders ranging from anxiety (fearfulness) to antisocial behavior (fearlessness). Fearlessness in particular is one of the primary characteristics of callous-unemotional (CU) traits; an especially severe, treatment resistant cluster of behaviors that have been linked to increased risk for violence. Additionally, previous research has identified deficient fear-learning as a potential risk factor for pathological fearlessness and CU traits. Despite the compelling evidence, little research has examined the link between fearlessness, CU traits, and deficient fear learning in adolescence, prior to the development of clinically-significant conduct disorders. Furthermore, there has been little to no research to date that has examined individual differences in emotional reactivity and fear-learning on the full continuum of fearfulness to fearlessness. The current study will use an associative learning task to explore whether fearlessness predicts a reduced startle response and slower fear acquisition. A sample of 75 adolescents and young adults will undergo a standard associative learning task to test for deficiencies in emotional responding and fear learning. Having a better understanding of the role of fear mechanisms early in life will help researchers and clinicians to identify adolescents with high risk for aggressive and violent behaviors, and to develop more effective interventions for these youth.

Shannon Hahn is a second-year M.A. candidate in the Psychological Sciences Department at William & Mary. She has a broad interest in studying the etiology of childhood externalizing disorders by using a diverse array of research methods. Additionally, she's interested in identifying genetic and environmental risk factors to aid in identifying at risk youth, improve assessment, and inform treatment.

The Power of Making Friends: The Influence of Relational Mobility on the Well-Being of Individuals with Disability

Presenter: Lauren C. Howard
Advisor: Joanna Schug
William & Mary,
Psychological Sciences

What factors influence well-being among individuals with disability? This study examines whether opportunities to form new social relationships in a society or social context influences well being among individuals with a disability. To do so, we measured participants' perceptions of relational mobility, i.e., the amount of opportunities for others in one's society to form new relationships. We also measured personal mobility, i.e., the degree to which participants thought that it would be possible for themselves personally to form new relationships. We find that people who have a disability report that have fewer opportunities to form new relationships, although their perception of relational formation opportunities did not differ from individuals who did not have a disability. Furthermore, we find that individuals with a disability who perceive their society as providing many opportunities for relationships have higher levels of well-being, and this relationship is mediated by satisfaction with one's friendships. These results provide initial evidence that societal levels of relational mobility may provide individuals who have a disability with more opportunities to form relationships and gain social support.

Lauren Howard is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. Her research areas include cross cultural psychology, stress and well-being, and health psychology. She is currently exploring the relationship social ecology plays in anxiety and depression in different cultural contexts. She holds a B.S. (Psychology) and a B.A. (Asian Studies) from the University of North Carolina-Chapel Hill.

Play Hard, Sleep Harder: Relationship between Time Spent Playing Videogames and Sleep

Presenter: Amanda Hudson
Advisor: Mary Ballard
Appalachian State University,
Psychology

The use of electronics, including videogames, has been shown to affect sleep; however, previous results have been inconsistent. The current correlational study used a college-aged sample to look at the relationship between several variables (e.g. time spent playing videogames, morningness-eveningness, social goals/pressures, etc.) on aspects of sleep (e.g. sleep onset latency, sleep quality, sleep quantity). Measures included the Pittsburg Sleep Quality Index (PSQI), the Morningness-Eveningness Questionnaire (MEQ), a sleep app, and sleep and videogame play surveys. Measures were used to collect data over the course of a three-day period. The surveys were designed to measure pre-bedtime videogame play—including social aspects of game play—each evening prior to sleep and to measure quality and quantity of sleep upon awakening. A hierarchical multiple regression model was used to assess sleep quality, sleep quantity, and sleep onset latency. It was hypothesized that amount of time spent playing videogames before bed and amount of gaming during the hour before bed would predict sleep quality, sleep quantity, and SOL, when controlling for PSQI and MEQ score. It was additionally hypothesized that social goals/ pressures would moderate the relationships between the videogame and sleep variables. The results of this study may suggest that the use of electronic devices, namely videogames, especially during the hour before bedtime predict detriments in sleep outcomes. Being unable to discontinue gameplay due to social factors may partially explain this relationship between playing times and aspects of sleep.

Amanda Hudson is a second-year M.A. student in the Experimental Psychology program at Appalachian State University. Her research interest lies broadly in the topic of sleep, with specific interests in sleep deprivation and underlying mechanisms regulating sleep/wake cycles. She is currently investigating the relationship between videogame usage and sleep outcomes.

Behavioral Distress Tolerance: Associations with Borderline Personality Symptoms

Presenter: Maria A. Larrazabal
Advisor: Christopher Conway
William & Mary,
Psychological Sciences

Distress tolerance (DT), or an individual's perceived or actual ability to withstand aversive internal experiences, is central to borderline personality disorder (BPD). Most studies to date have relied on self-report measures of DT and largely suggest that self-perceptions of DT are moderately inversely correlated with BPD features. A smaller set of studies has utilized behavioral measures of DT and suggests inverse, albeit inconsistent, links between behavioral DT and BPD. Studies utilizing one behavioral DT measure, the Cold Pressor Test (CPT), have reported an opposite pattern. Individuals with higher BPD symptoms exhibit higher tolerance of pain induced by the CPT, suggesting increased DT. One explanation for these unexpected results for the CPT concerns sampling, because the CPT tasks were administered to BPD patients with an extensive history of self-harm. This group of individuals may be less sensitive to physical pain, an integral component of the CPT, because of desensitization occurring as a result of regular self-injury. Thus, the increased DT observed may be exclusive to this population. The present study aims to test this proposition by examining the relationship between BPD symptoms and cold tolerance among undergraduates. We expect elevated BPD symptoms to be associated with diminished behavioral DT, as indexed by decreased persistence on the CPT. Findings from this study could inform our understanding of the impairments associated with various levels of BPD symptomatology.

Maria Larrazabal is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. Her research is focused on uncovering transdiagnostic factors which increase the risk for emotional disorders such as anxiety, depression, and borderline personality disorder. She is currently exploring different modes of measurement for psychological constructs.

The Effects of Alcohol Priming and Alcohol-Related Cues on Subsequent Alcohol Preferences

Presenter: Kathleen R. Owens
Advisor: Jessica Owens
James Madison University,
Psychology

The purpose of the current study is to investigate the effects of alcohol priming and alcohol-related cues on subsequent alcohol preferences. Participants will include 75 university students. Researchers will randomly assign participants to 1 of 3 conditions ($N_{condition}$ = 25): alcohol delivered in a red disposable plastic cup (AC; alcohol cue), alcohol delivered in a cafeteria cup (AN; neutral cue), or alcohol placebo (P) delivered in a red disposable plastic cup. Participants will consume the assigned beverage, and then complete the Multiple Choice Procedure (MCP), a procedure that allows participants to make choices between a standard alcoholic beverage and increasing amounts of a concurrently available alternative monetary reinforcer. Researchers expect the alcohol in a red disposable plastic cup to reveal the highest MCP cross-over point (i.e., highest "value" placed on alcohol) than the other conditions; additionally, researchers expect the placebo in the red disposable plastic cup will reveal a higher crossover point than the alcohol in the cafeteria cup as a result of cue-induced responding. Findings may suggest that substance-related cues may be important for preventing lapse and relapse among substance users.

Kathleen Owens has graduated from James Madison University with a bachelor's degree in Psychology and a concentration in Behavior Analysis. She has a broad interest in behavior modification and intervention, especially when used to improve the lives of at-risk youth. She has also contributed to a number of research protocols, including research on a choice study using the multiple-choice procedure to determine the value of alcohol in an alcohol priming paradigm.

Misalignment of Diverse Measures of Distress Intolerance

Presenter: Molly Penrod
Co-Authors: A. Williams, G. Pugsley
Advisor: Christopher Conway
William & Mary,
Psychological Sciences

Distress intolerance (DI) is the ability to withstand aversive states. Studies in community and clinical populations have linked DI to anxiety, depression, substance misuse, and self-harm. Researchers alternately use DI to refer to the perceived capacity to effectively manage aversive internal states (e.g., intrusive thoughts, painful emotions) and the behavioral act of withstanding uncomfortable scenarios. A potentially problematic feature of this field is that we do not yet know the extent to which these various indices of DI agree with one another. The concordance of these measures needs to be quantified so that investigators can understand whether they are capturing the same underlying construct with these diverse assessment methods. We recruited three samples from two universities and administered a variety of self-report and behavioral tests of DI. The behavioral tests included frustrating computerized tasks that asked people to trace outlines of shapes on a screen or to perform rapid mental arithmetic as well as physiological tasks like submerging their hand in very cold water or holding their breath. Analyses revealed that self-reported DI was virtually uncorrelated with behavioral and physiological indices across samples, with no correlations exceeding .10. Diverse measures of DI were not as concordant as expected across a series of studies. While this problem is not unique to DI, it does threaten to limit the validity of DI assessment in etiological and treatment research, especially studies that rely solely on self-report inventories.

Molly Penrod is a second-year M.A. candidate in the Psychological Sciences Department at William & Mary. She is broadly interested in the classification of psychopathology and the shared features of psychological disorders.

Comparing Self-Report and Behavioral Measures of Hypodescent in Racial Categorization

Presenter: Matthew Steven Preda
Advisor: Cheryl Dickter
William & Mary,
Psychological Sciences

Black-White multiracials are often categorized, according to the pattern of hypodescent, as members of the socially subordinate (i.e. non-White) racial group, by perceivers from socially dominant groups. Members of racial minorities also engage in hypodescent, conferring in-group status to individuals whose belonging is somewhat ambiguous. Researchers have postulated that low-status perceivers use hypodescent in an inclusive manner or to increase their own group's social status. Several methods are used to measure hypodescent, but it is unclear whether they assess the same phenomenon. The proposed study compares an explicit self-report measure of hypodescent with a behavioral racial categorization task to provide evidence that the measures converge on a single hypodescent construct. Additionally, we will assess the relative effects of proposed moderators, including social dominance orientation, racial identification, essentialist beliefs, and the need to belong on both measures of hypodescent. The findings will address methodological concerns in this research area and inform future study of the processes underlying the social categorization of multiracials.

Matt Preda is a second-year M.A. candidate in Psychological Sciences Department at William & Mary. His work is focused on social cognition and person perception, particularly the perception of race in social contexts. He is especially interested in the effects of race and racial ambiguity on social evaluations and interpersonal interactions.

Reliability of Brief Neurometric Battery in EEG

Presenter: Rachel Scrivano
Co-Author: J. Cole
Advisor: Paul Kieffaber
William & Mary,
Psychological Sciences

Neurometrics are becoming increasingly popular for use in clinical settings as a potential diagnostic aid. For example, quantitative EEG (qEEG) has been used to make inferences about functional dissociations between clinical populations, and event-related potentials (ERPs) may be used to measure subtle differences in sensory/perceptual functions. However, little is known about the test-retest reliability of ERP components and/or measures to determine their stability over time. The present study utilized a 20-minute Brief Neurometric Battery (BNB) composed of auditory and visual computerized stimuli (80 dB sounds and pairs of numbers and letters) to measure both ERP and qEEG neurometrics. The battery was administered twice with each session separated by a one-week interval. Eight ERP components and 10 measures of qEEG were recorded at each session. After conducting intraclass correlations that used averaged waveforms within a window of time, it was found that only three of the eight components (mismatch negativity for frequency, P300, and P300b) were significantly reliable. However, regional spectral power in alpha, beta, theta, and gamma ranges were significantly reliable, as were several measures of oscillatory asymmetry. These results suggest that reginal spectral power and oscillatory asymmetry are more reliable measures, thus providing support for the use of EEG-based neurometrics in clinical applications.

Rachel Scrivano is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. Her research interests include adult development, aging, wellness, and cognition.

Social Valuation and the Measurement of Welfare Tradeoff Ratios

Presenter: Kelsey A. Shaffer
Advisor: Lee Kirkpatrick
William & Mary,
Psychological Sciences

Welfare tradeoff ratios (WTRs; Tooby, Cosmides, Sell, Lieberman, & Sznycer, 2008) are a measure of how individuals value one another and predict their social decision-making. Until recent years, we have only been able to approximate WTRs as relative high or low magnitudes; Delton (2010) developed a quantitative measure to provide a numerical approximation of how an individual weighs the welfare of a another with their own personal well-being, but this measure may not be appropriately considering the different types of social interactions and exchanges between individuals in social relationships. The present research tests a new model of measurement for welfare tradeoff ratios that accounts for both that 1) individuals weigh losses and gains differently in their decision processes (Kahneman & Tversky, 1992) and 2) a wider range of decisions that individuals face in everyday life. We expect to find that this modified measure correlates with other measures of social valuation than the original task and thus is a more valid measure of welfare tradeoff ratios. This work has implications for many fields that seek to understand social decisions (psychology, economics, etc.) as well as a wide domain of human behavior including generosity, forgiveness, anger and aggression, and gratitude, among others.

Kelsey Shaffer is a first-year M.A. candidate in the Psychological Sciences Department at William & Mary. Her research interests broadly encompass evolutionary psychology and the study of close relationships.

Motive Goal Congruence, Imagination, and Well-Being: A Longitudinal Analysis with a Structural Equation Model

Presenter: Yoon Young Sim
Advisor: Todd Thrash
William & Mary,
Psychological Sciences

The human motivational system is composed of two different, implicit and explicit, motivational systems. It is likely that an individual sometimes strives for goals that are congruent with one's implicit motives, whereas at other times an individual can commit oneself to goals that are incongruent with respect to one's implicit motive disposition. The previous research found that progress toward goals that are not congruent with implicit motives is related to lower levels of well-being constructs (i.e. life satisfaction) than progress toward goals that the two are congruent. However, the question remains open of which mechanisms promote this relationship. The present study posited spontaneous imagination as a mediator of the effect of motive-goal congruence on well-being, because 1) imagination has been explained as a conscious manifestation of unconscious process, and 2) many constructs of spontaneous imagination have been supported to have causal effect on promoting human flourishing outcomes. The fit of the proposed mediation model (motive goal congruence>>imagination>>well-being) will be analyzed using cross-lagged panel design. It is hypothesized that motive congruence will have a positive cross-lagged impact on imagination, and imagination will have a positive cross-lagged impact on well-being.

Yoon Young Sim is a second-year M.A. student in the Psychological Sciences Department at the William & Mary. She is interested in the positive effects of being absorbed in working (i.e. flow, creativity, productivity), the various mechanisms by which workers productivity is improved, such as goal striving, competition and rivalry.

Wait, Wait, Don't Tell Me: How Statistical Versus Summary Information May Reduce the Desirability Bias

Presenter: Cassandra Louise Smith
Advisor: Andrew Smith
Appalachian State University,
Psychology

Predictions are influenced by the option found most desirable. This is referred to as wishful thinking or a desirability bias. This can be costly when decisions require accuracy and objectivity. We investigated whether providing objective information might reduce the bias when making predictions about upcoming sporting games. Study one asked participants about their preferences, and then to make outcome predictions about Major League Baseball Games. Study two asked about professional football games. Participants were randomly assigned to one of three experimental conditions: no statistical or summary information, statistical but no summary information, or summary but no statistical information. Study two included a condition with both statistical and summary information. Analyses demonstrated that those in the statistical information condition exhibited the least amount of wishful thinking, and were more accurate in their predictions, suggesting that if people have to formulate their own conclusion based on the data provided, they will show less bias than if the conclusion is provided for them. This study is part of a block of studies investigating the interaction between wishful thinking and the amount/type of information.

Cassandra Smith is a first-year M.A. candidate in the Experimental Psychology Department at Appalachian State University. Her research interests include judgment and decision-making. Specifically, she is currently investigating how information influences biases in the decision-making process. She plans to pursue a Ph.D. after completing her master's in 2019.

Distinguishing Four Types of Chill Sensations: Goosebumps, Tingles, Coldness and Shivers

Presenter: Lena Marie Wadsworth
Co-Author: Y. Sim
Advisor: Todd Thrash
William & Mary,
Psychological Sciences

The chills literature has been plagued with null and inconsistent findings. However, recent findings reveal that these inconsistencies likely reflect an incorrect assumption of the chills as a unitary construct and the failure to distinguish among what are distinct chill sensations. Factor analyses have identified two higher-order ("Goosetingles" and "Coldshivers") and four lower-order ("Goosebumps," "Tingling," "Coldness," and "Shivering") factors of the chills. Goosetingles are elicited by approach-related stimuli, and involve positive affect. Coldshivers are elicited by avoidance-related stimuli and involve negative affect. Our current objective is to further distinguish between these four distinct types of chills by examining how they vary according to their elicitors, emotional correlates, facial expressions and physiological signatures. These findings may serve to expand our understanding of emotion beyond the limits of our vocabulary, while generating new questions regarding the evolutionary origins and adaptive functions of these four bodily sensations.

Lena Wadsworth is a second-year M.A. candidate in the Psychological Sciences Department at William & Mary. Her research interests include the chills, social emotions, morality, religion, xenophobia, and statistical modeling. She holds a B.S. in Biology from the College of Charleston, South Carolina.

Experience, Perception and Normalcy as Predictors of Traumatic Stress Anxiety (PTSD)

Presenter: Patrick Travis Woodruff
Advisor: Geri Miller
Appalachian State University,
Human Development and Psychological Counseling

This study will evaluate the effects that life experiences have on perception to 1) establish the range of what is perceived as normal at a given point in time for the individual and 2) to establish if there exists a necessary condition by which individuals develop traumatic stress anxiety, commonly referred to as PTSD. By investigating the histories of those presently being treated for PTSD it may be possible to determine why some develop traumatic stress anxiety following a perceived traumatic event and some do not. Establishing necessary conditions for onset PTSD will help lead to not only a better understanding of the condition but will also aid in treating the condition and possibly lessen the number of people who suffer from it, specifically in the military. The researcher believes that normality exists for each individual on a sliding scale based on experiences and perceptions and accepts research findings that emotion augments perception. One's concept of normalcy, based on this sliding scale, necessarily dictates what one perceives as normal and abnormal. How far removed an experience is from the limits of an individual's perception of normalcy will determine whether or not they deem a given experience as traumatic. Furthermore, depending on an individual's ability to incorporate the abnormal experience into their realm of normality will necessarily determine if that individual will develop traumatic stress anxiety, thereby meeting the criteria for being diagnosed with PTSD.

Travis Woodruff is a second-year M.A. student in the Department of Human Development and Psychological Counseling. Issues for military service members and veterans, specifically PTSD and emotionally augmented perception are his focus. A veteran of the U.S. Army (Desert Storm), Woodruff holds a dual B.A. (Philosophy and English) from Middle Tennessee State University, and an M.A. (Philosophy) from the University of Mississippi.

Mapping Gaps in Orange County Reentry Services

Presenter: Alex Aguirre
Advisor: Susan Turner
University of California-Irvine,
Criminology, Law and Society

California and national studies suggest that about 75% of individuals released from jails and prisons re-offend within three years of their release. Rehabilitative services and community programming have been shown to have some success in reducing recidivism. This study is intended to visually map the needs, availability and accessibility of social services in Orange County, California that an individual may need upon entering the community from prison, jail or Probation. Data requested from Orange County Probation, on the characteristics of the adult population released in FY 16-17, is expected in 2018. Mapping that overlays available community and government services has been completed and analysis of availability and accessibility has revealed preliminary themes of geographic strain and disparity within the County. Publicly available shape files containing geographic coordinates for public transportation routes and census information will further shed a light on contributing factors of potential patterns of geographic disparity and issues of accessibility. Specific population needs (i.e. type of offender, gender, ethnicity, etc.) will be mapped once data from Orange County Probation have been received. This type of visualization and analysis has not yet been done by OCREP or the Orange County Probation department but will be useful to them in developing and implementing better strategies for reentry services. Community service providers may also find this information useful to future strategic planning aimed at increasing availability and accessibility.

Alex Aguirre is a first-year doctoral student in the Criminology, Law and Society Department at the University of California-Irvine. Her research interests include community policing, evaluation, gangs and youth development programs. She is currently conducting research with Dr. Susan Turner, Professor of Criminology, Law and Society, at the University of California-Irvine.

Women's Property Rights in Georgia: De Jure Equality, De Facto Failure

Presenter: Lela Akiashvili
Advisor: Valerie Hudson
Texas A&M University,
Public Service and Administration

Background: Property rights are crucial for women's economic strength and social status all over the world, especially in middle-income and culturally homogeneous countries such as Georgia. Georgian legislation ensures de jure gender equality in regards to property and inheritance rights. However, de facto men own most of the real estate in the country. Property ownership has very practical implications for Georgian women: female property owners more often escape domestic violence, can take loans from a bank to start own business, have higher social status, are economically independent, and can build better future for their children. Purpose: To identify legal and practical barriers that prevent women from the realization of property rights and propose solutions. Methodology: Along with legislation analysis, I have collected and analyzed qualitative data from 129 interviewees such as lawyers, focus-groups, women rights activists, victims of domestic violence and other crimes, the staff at women's shelters, and policy-makers. Results: Unregistered marriages, lack of legal co-ownership between spouses on a jointly acquired property, stereotypical approach towards son as the only heir, strong cultural pressure, and lack of information have been identified as principal barriers. Implications: As a result, women can claim property neither in case of divorce nor in case of heritage, lack of legal co-ownership makes women extremely fragile, and lack of knowledge in combination with social pressure make women in Georgia, especially in rural areas, helpless.

Lela Akiashvili is a Fulbright Scholar at in the Master of Public Service and Administration Program of the Bush School of Government and Public Service, Texas A&M. Her concentration is public policy analysis. Lela has ten years of experience of working in governmental, nonprofit, and international organizations. Her current research interests include different aspects of women's rights, human rights, lobbying in the U.S., and artificial intelligence.

U.S. and U.N. Security Cooperation with China as Strengthening a Potential Adversary

Presenter: David An
Advisor: Andrew Yeo
Catholic University of America,
Politics

Why do the U.S. and U.N. work with China to hold enabling security cooperation (which is the type when one state urges another to do something), although such cooperation can strengthen a potential adversary? To deepen the research question, what conditions have led Beijing and Washington along with the U.N. to seek enabling cooperation on security matters? Does enabling cooperation actually strengthen the other side? To build on Tom Christensen's model from his dissertation and first book Useful Adversaries, I identify the cause of U.S. and U.N. strategy of security cooperation with China as to jointly address international challenges, and the need to work with other states to mobilize resources for global security. Hurdles of mobilization can be low, moderate, high, or too high; and this affects U.S. and U.N. cooperation strategies as outcomes. Based on the previous model, I offer the following three testable hypotheses: First, the U.S. and U.N. seek China's participation in security cooperation when China has the capabilities to supply and when there is a global security demand. Second, China builds on legitimate security cooperation to expand into new and unsanctioned applications of its newly acquired capabilities. Third, Chinas security cooperation activities contribute to its military rise and result in a stronger potential adversary. I examine the following cases of U.S. and U.N. cooperation with China: Chinas U.N. peacekeeping efforts, China's counter-piracy cooperation, Chinas participation in the RIMPAC military exercise, and US-China military diplomacy.

David An is a second-year Ph.D. student in the Politics Department at the Catholic University of America in Washington, D.C. His dissertation examines U.S. and U.N. security cooperation with China in the positive benefits of jointly addressing new global threats, but also drawbacks of possibly strengthening a potential adversary. He received his M.A. from the University of California-San Diego and his B.A. from the University of California-Berkeley.

Virginia Tax Revenue Forecasting

Presenter: Kody Carmody
Co-Author: T. Wiipongwii
Advisor: Rui Pereira
William & Mary,
Public Policy

Forecasting future tax revenue is crucial for state budgeting processes. Under-predicting has adjustment costs as the budget is revised, while over-predicting can have huge costs if state agencies are forced to make emergency mid-year cuts. In this research project, we examine the Virginia tax revenue forecasting process, as well as three approaches to improving it. First, we examine the effects of business cycles on forecast error rates and the relationship between revenue volatility and error, as well as methods to predict recessions in time for revenue forecasting. We have shown that much of the increase in errors during recessions can be attributed to increasing revenue volatility. Second, we examine different ways of modeling post-forecast policy tools such as the Nonwithholding Collar, which restricts how much of forecasted nonwithholding income tax revenue the state can budget for. Third, we test the current models being used against different model specifications and forecasting methods: different specifications of predictors, sample sizes and cross-validation, and data transformations; models from time series and Bayesian econometrics; machine learning methods; and different methods of forecast averaging. So far we have been able to improve significantly on the current Virginia Tax Department models using the above methods. We believe that ultimately the most promising avenue might be incorporating methods from information theory and signal processing to segregate revenue data into linear and nonlinear components that can be forecasted better individually.

Kody Carmody is in the fifth year of the accelerated BA/MPP program at William & Mary. His research areas include economic, science, and tech policy as well as their relation to human capital, productivity and growth, and business cycles.

The Relationship Between Fast-Tracking Students into Curriculum Math Using Multiple Measures and Subsequent Success Rates

Presenter: Chandra Noel Lehner
Advisor: Lisa Poling
Appalachian State University,
Educational Leadership Development

This quantitative study examined the relationship between fast-tracking students into college-level math using multiple measures and their subsequent success rates, while simultaneously looking at the success rates of students (with a comparable high school GPA) who were required to progress through a self-directed developmental math course sequence initially before taking the same college-level math class. Logistic Regression was used to analyze the collected data. The theory of self-directed learning was critically analyzed, along with its goals and effectiveness in a computer lab setting. Developmental math is the same concept educators have been debating for decades now, just different rhetoric. Multiple Measures for Placement is the latest North Carolina state policy that should help increase college graduation rates, as well as, reduce the cost of instruction by eliminating the need for so many developmental math courses. The history of developmental math was explored in this study, along with the responsibility of high schools as well as educators and administrators in their roles of increasing the success rates of college graduates nationwide.

Noel Lehner is an Ed.D. candidate in the Educational Leadership Department at Appalachian State University. Her dissertation topic studied the effects the Multiple Measure for Placement Policy had on Developmental students in a curriculum math course. Noel holds a B.A. in Mathematics and an M.A.T. with a math concentration from Florida Gulf Coast University in Ft. Myers, Florida. She earned an Ed.S. in Higher Education from Appalachian State University.

Critical Intersectional Studies: Policy Through the Lens of Feminism and Disability

Presenter: Laura Mallison
Advisor: Elaine McBeth
William & Mary,
Public Policy

I will be examining how disability studies complicate policy questions raised by feminist studies. Over the last couple decades, feminist studies have become increasingly intersectional, for example instead of questioning how an issue affects women, delving further to look at how it affects women of color or women who identify as LGBTQIA. However, the intersection of women with disabilities remains relatively unexplored in spite of the unique ways it brings necessary complexity to the dialogue. For example, questions such as whether the law should provide special or equal treatment for women are further complicated when factors such as ADA accommodations are brought into the discussion. I would like to investigate some of these questions that remain unanswered but are more now important than ever. The Census Bureau estimates one fifth of the U.S. population has a disability, and some of those disabilities disproportionately affect females in ways we have not discovered yet. I will be using a critical legal studies framework in my investigation, a school of thought that examines laws and policies through the lens of power dynamics. Critical legal studies has a wealth of literature on how one set of power dynamics like race or gender can affect policy application, but it still lacks depth in regards to the intersection of disability studies and feminism.

Laura Mallison is a second-year Master of Public Policy student at William & Mary with a concentration in International Development Policy. Her previous studies have focused on gender issues and Latin America, and lately she has been examining the nuance international law adds to those issues.

Aid Shocks and Immigration to the United States

Presenter: Kara Nicole Newman
Advisor: Elaine McBeth
William & Mary,
Public Policy

The literature is divided on the effect of foreign aid on immigration to the United States. However, it is well established that aid shocks, or extreme volatility in the amount of aid a state receives, can have a number of negative effects, including increased violent conflict, diminished economic growth and weaker institutional quality. This analysis considers whether aid shocks affect immigration to the United States, using established factors affecting migration as controls. Though the preliminary analysis finds that aid shocks have no effect on migration to the United States, future work could focus on regional migration or the longer-term effects of aid volatility.

Kara Newman is a second-year Master of Public Policy student concentrating in International Development Policy. Her interests include the intersection of conflict and development and technology for development, particularly in the context of Latin America. She holds a B.A. from William & Mary.

The U.S. Allies Under Fire: A Centre-Periphery Theory of Terrorist Target Selection

Presenter: Chen Wang
Advisor: Phillip Potter
University of Virginia,
Politics

The majority of research on why democracies tend to be more vulnerable to transnational terrorism is focused exclusively on institutional factors. Although democratic constraints and accountability make the perpetration of attacks and message delivery cheaper and easier, not all democratic states are capable to effectively meet terrorists end goals by changing their policies. This paper offers a new centre-periphery theory to explain how terrorists select targets among democracies. The United States and her allies constitute a centre-periphery structure. When the centre becomes increasingly hard to attack, the peripheries become more attractive despite less symbolic value, for periphery governments are perceived by terrorists as being both capable to effectively influence the centre and less resolved than the centre. The empirical tests of this paper indicate that the widely proved positive relationship between being a democracy and the probability of being targeted by transnational terrorists is actually driven by this special subgroup of democracy, which is democratic U.S. allies. They tend to experience significantly more transnational terrorist attacks than do both non-democracies and democratic non-U.S. allies. In addition, democratic non-U.S. allies do not experience significantly more attacks than do non-democracies. These findings confirm again that violence is only the tool not the goal; terrorists attack those who are able to meet their needs.

Chen Wang is a Ph.D. student in the Politics Department at the University of Virginia. His research interests center on international security, with a special focus on peacetime strategic interaction, state learning, crisis initiation, and terrorism. His current work explores the life cycle of state leaders' reputation for resolve.

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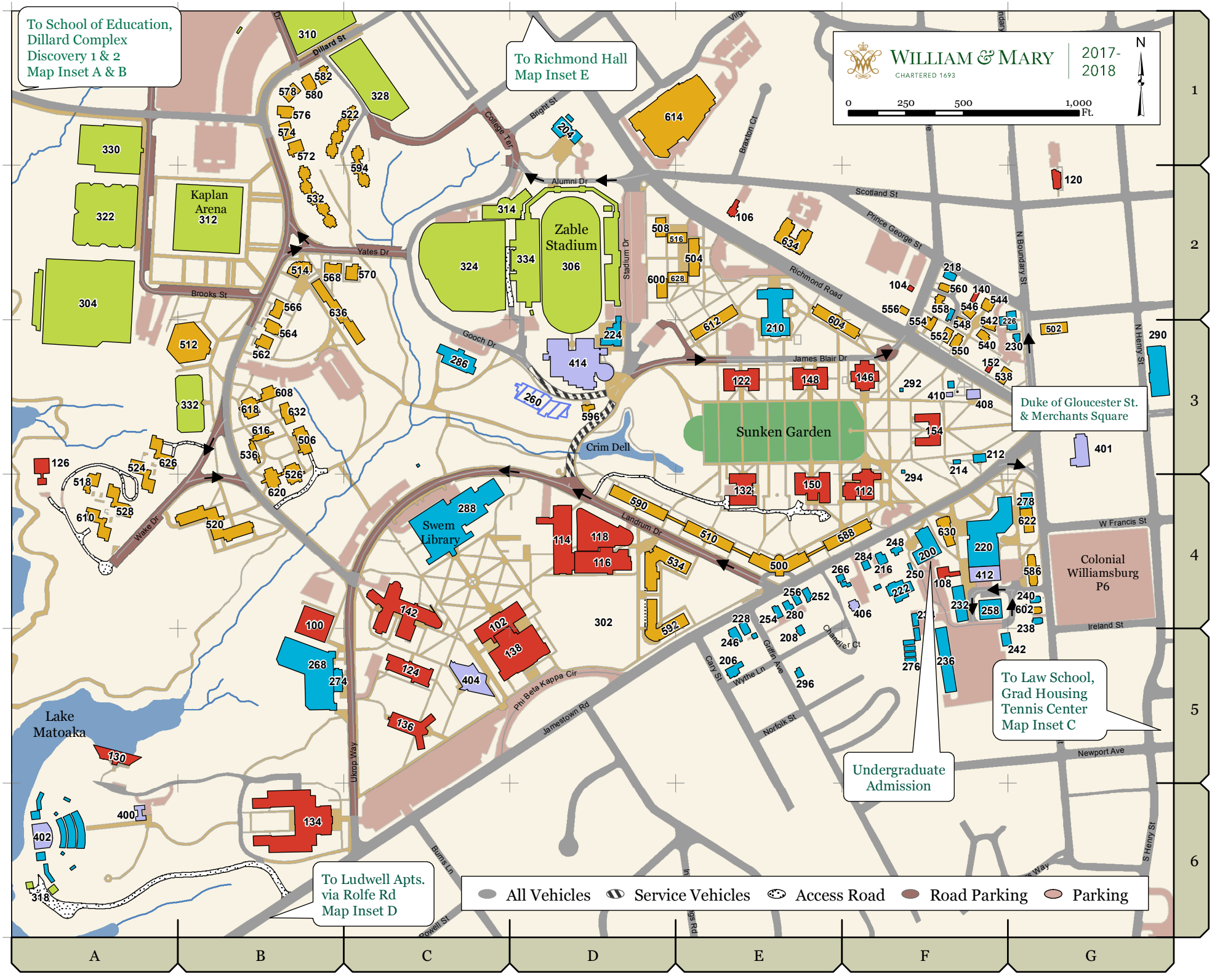
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Alumni Dr
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Scotland St
Prince George St
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Landrum Dr
Wake Dr
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Wythe Ln
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Norfolk St
Ireland St
W Francis St
Newport Ave
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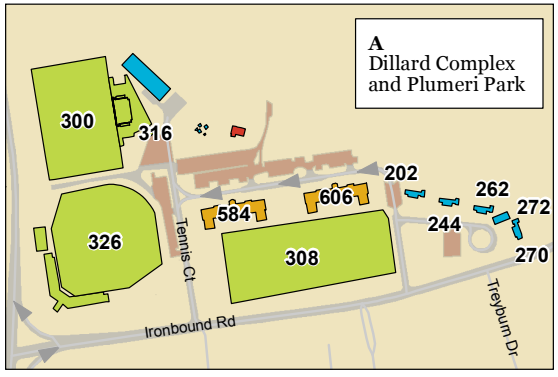

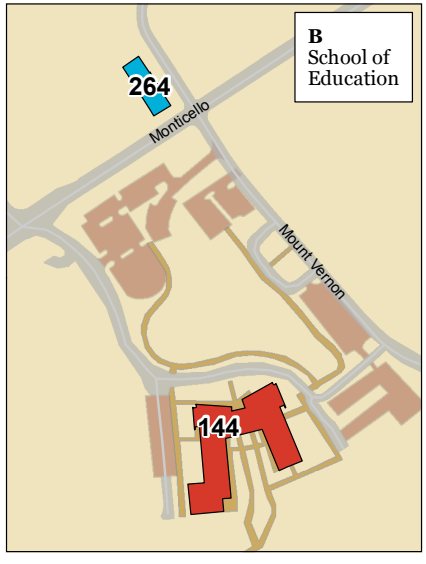

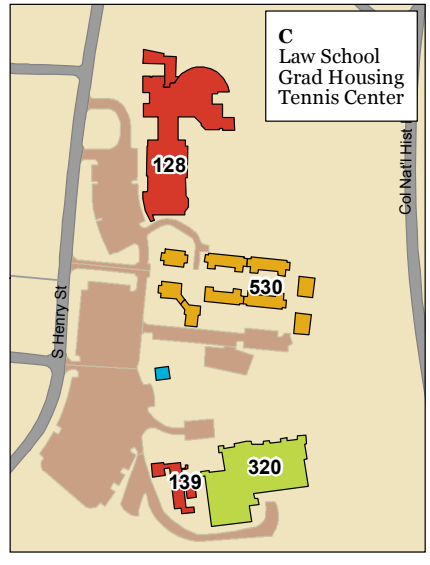

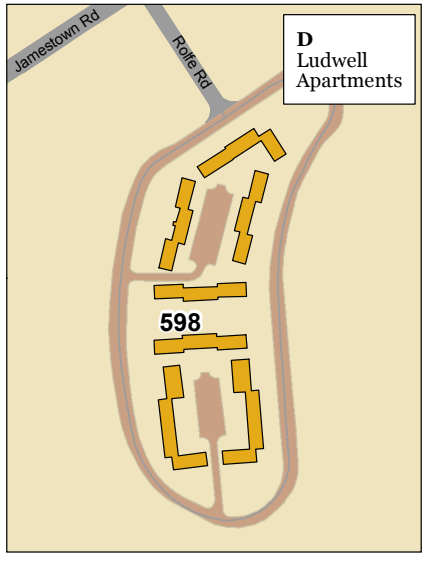

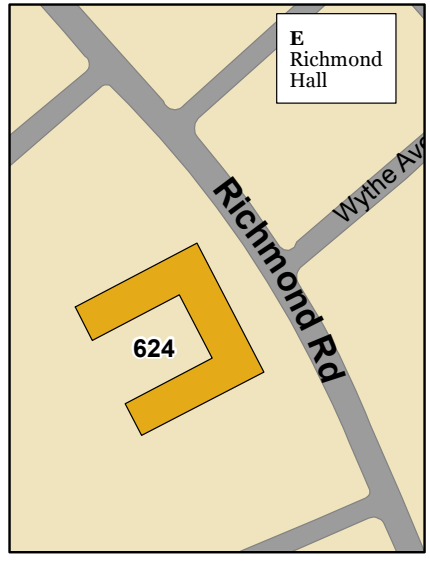

MAP#	BUILDING	GRID
	ACADEMIC	
100	Adair Hall	B4
102	Andrews Hall	C5
104	Bozarth Garage	F2
106	Ctr. for Archaeological Res.	E2
108	Ceramics Studio	F4
112	Ewell Hall	F4
114	ISC I	D4
116	ISC II	D4
118	ISC III	D4
120	ITPIR	G2
122	James Blair Hall	E3
124	Jones Hall	C5
126	Keck Env. Field Lab	A3
128	Law School	Ins C
130	Matoaka Art Studio	A5
132	McGlothlin-Street Hall	E4
134	Alan B. Miller Hall	B6
136	Morton Hall	C5
138	Phi Beta Kappa Mem. Hall	D5
139	Population Lab	Ins C
140	Prince George House	F2
142	Small Hall	C4
144	School of Education	Ins B
146	Tucker Hall	F3
148	Tyler Hall	E3
150	Washington Hall	E4
152	Western Union Building	F3
154	Wren Building	F3
	ADMIN & SUPPORT SERVICES	
200	Admission (undergraduate)	F4
202	Alexander Galt	Ins A
204	Alumni House	D1
206	Bell Hall	E5
208	Blank House	E5
210	Blow Memorial Hall	E2
212	Brafferton	F3
214	Brafferton Kitchen	F3
216	Bridges House	F4
218	Bull House	F2
220	Campus Center	F4
222	Child Care Center	F4
224	Cohen Career Center	D3
226	College Apartments	G2
228	Corner House	E5
230	Davis House	G3
232	Facilities Mgmt. Admin.	F4
234	Facilities Management Annex	F5
236	Facilities Management Shops	F5
238	Facilities Safety 1	G4
240	Facilities Safety 2	G4
242	Facilities Supervisors	G5
244	Gabriel Galt	Ins A
246	Griggs House	E5
248	Hoke House	F4
250	Hoke House Annex	F4
252	Holmes House	E4
254	Hornsby House	E4
256	Lambert House	E4
258	Main Power Plant	F4
260	McLeod Tyler Wellness Center*	D3

MAP#	BUILDING	GRID
262	Minson Galt	Ins A
264	Mount Vernon Complex	Ins B
266	Murray House	F4
268	Parking Deck	B5
270	Patrick Galt	Ins A
272	Patrick Galt Annex	Ins A
274	Police and Parking Services	B5
276	Quonset Huts	F5
278	Reves Center	G4
280	Rowe House	E4
282	Savage House	D1
284	Stetson House	F4
286	Student Health Center	C3
288	Swem Library	C4
290	W&M Bookstore	G3
292	Wren Outbuilding North	F3
294	Wren Outbuilding South	F3
296	Young House	E5
	ATHLETICS & ATHLETIC EVENTS	
300	Albert-Daly Field	Ins A
302	Barksdale Field	D4
304	Busch Field	A2
306	Cary Field	D2
308	Dillard Practice Fields	Ins A
310	Intramural Fields	C1
312	Kaplan Arena	B2
314	Laycock Football Center	C2
316	Martin Family Stadium	Ins A
318	Matoaka Boat House	A6
320	McCormack-Nagelsen Tennis Ctr.	Ins C
322	Millie West Tennis Facility	A2
324	Montgomery Field	C2
326	Plumeri Park	Ins A
328	Stimson Throwing Events Area	B1
330	Student Recreation Center	A1
332	Tennis Courts	B3
334	Zable Stadium	D2
	ARTS & EVENTS	
400	Amphitheatre Ticket Office	A6
401	Kimball Theatre	G3
402	Martha Wren Briggs Amphitheatre	A6
404	Muscarelle Museum of Art	C5
406	Plumeri House	F4
408	President's House	F3
410	President's Guest House	F3
412	Trinkle Hall	F4
414	Sadler Center	D3
	STUDENT HOUSING & SERVICES	
500	Barrett	E4
502	Brown	E2
504	Bryan	E2
506	Cabell	B3
508	Camm	D2
510	Chandler	E4
512	Commons Dining Hall	A3
514	Community Building	B2
516	Dawson	E2
518	Dinwiddie	A4
520	DuPont	B4
522	Eagle F-J	B1

MAP#	BUILDING	GRID
524	Fauquier	A4
526	Giles	B4
528	Gooch	A4
530	Graduate Housing	Ins C
532	Griffin A-E	B2
534	Hardy	D4
536	Harrison	B3
538	House 1	G3
540	House 2	F3
542	House 3	F3
544	House 4	F3
546	House 5	F2
548	House 6	F3
550	House 7	F3
552	House 8	F3
554	House 9	F3
556	House 10	F2
558	House 11	F2
560	House 12	F2
562	House 620	B3
564	House 630	B3
566	House 640	B2
568	House 660	B2
570	House 670	B2
572	House 710	B1
574	House 720	B1
576	House 730	B1
578	House 740	B1
580	House 750	B1
582	House 760	B1
584	Hughes	Ins A
586	Hunt	G4
588	Jefferson	F4
590	Landrum	D4
592	Lemon	D4
594	Lion K-M	B1
596	Lodge 2 (Daily Grind)	D3
598	Ludwell Apts. (100-700)	Ins D
600	Madison	D2
602	Meridian Coffee House	G4
604	Monroe	E3
606	Munford	Ins A
608	Nicholas	B3
610	Nicholson	A4
612	Old Dominion	E3
614	One Tribe Place	D1
616	Page	B3
618	Pleasants	B3
620	Preston	B4
622	Reves	G4
624	Richmond	Ins E
626	Spotswood	A3
628	Stith	E2
630	Taliaferro	F4
632	Tazewell	B3
634	Tribe Square	E2
636	Yates	B2

*denotes under construction