

16th Annual Graduate Research Symposium

MARCH 24-25, 2017 SADLER CENTER



All presentations are free and open to the public.

www.wm.edu/as/grs

Sponsored by the Office of Graduate Studies and Research

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Schedule at a Glance

Thursday, March 23, 2017 -- Sadler Center

	Thursday, March 25, 2017 Gadier Genter				
6:00 pm - 8:00 pm	Journal Club — 3MT competition Commonwealth Auditorium				
	Friday, March 24, 2017 Sadler Center				
9:00 am - 9:30 am	Registration Second Floor Lobby				
9:30 am - 10:30 am	Concurrent Sessions Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room				
10:45 am - 11:45 am	Concurrent Sessions Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room				
12:00 pm - 1:00 pm	Luncheon Chesapeake AB				
1:00 pm - 2:00 pm	Concurrent Sessions Tidewater A, Tidewater B, James Room, and York Room				
2:15 pm - 3:15 pm	Concurrent Sessions Tidewater A, Tidewater B, James Room, and York Room				
3:30 pm - 5:00 pm	Professional Development Fair Chesapeake C				
4:30 pm - 6:00 pm	Poster Presentation and Networking Reception Chesapeake AB				
	Saturday, March 25, 2017 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, and York Room				
9:45 am - 10:45 am	Concurrent Sessions Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room				
11:00 am - 12:00 pm	Concurrent Sessions Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room				
12:00 pm - 1:30 pm	Luncheon & Awards Ceremony Chesapeake AB				



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

On behalf of the Graduate Research Symposium organizing committee, I would like to welcome you all to the 16th Annual Arts & Sciences Graduate Research Symposium at the College of William and Mary! In those sixteen "sweet" years, over 1,000 graduate students from across the country have presented their research to thousands of attendees. This year, 140 graduate students from the College of William and Mary and twelve visiting institutions will add to this distinguished record of presenting excellence in graduate student research.

The "Sweet 16" is often seen as a rite of passage into adulthood. In a similar vein, this year's symposium aims to assist graduate students in their passage into professionals. With a focus on professional development, the 16th Annual Graduate Research Symposium offers graduate students with important opportunities to develop the skills and networks that will serve them well into their professional careers. On Friday, March 24th from 3:30 to 5:00 in Chesapeake C, the Graduate Research Symposium will host a Professional Development Fair. This fair will give attendees the opportunity to polish their resumes, develop successful course syllabi, and learn the ins and outs of academic CVs. The Professional Development Fair overlaps with the annual networking reception, giving attendees the opportunity to continue their professional development.

The success of the Graduate Research Symposium for the past sixteen years owes to 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, I would like to personally thank all of the members of the Graduate Research Symposium committee for all of their hard work and dedication which went into making this year's symposium sweeter than ever!

Best,

Jenna Carlson Dietmeier

2017 Graduate Research Symposium Chair

Jenna K Calson Dutnere



OFFICE OF THE PRESIDENT

Dear Students and Friends,

Welcome to the sixteenth 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, "Preparing Scholars, Presenting Excellence," 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

2017 Graduate Research Symposium

Program Chair

Jenna Carlson Dietmeier, Anthropology

Graduate Student Committee

Adrienna Bingham, Applied Science Amrita Lamba, Psychology Cheng Li, Computer Science Summer Moore, Anthropology Alexis Ohman, Anthropology Erin Schwartz, Anthropology Emily Wells, History

Office of Graduate Studies and 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 Market Access International, Inc. Northrop Grumman Corporation

Special Thanks To:

Design Printers Advertising 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. Chandos Brown, American Studies

Dr. John Burton, Graduate Studies Advisory Board

Dr. Gerard Chouin, History

Dr. Kurt Erskine, Graduate Studies Advisory Board

Dr. Pam Hunt, Psychology

Prof. Elaine McBeth, Public Policy

Dr. Neil Norman, Anthropology

Dr. Betsy Sigman, Graduate Studies Advisory Board

Dr. Meghan Sinton, Psychology

Natural & Computational Sciences

Mr. Michael Bracken, Graduate Studies Advisory Board

Dr. Harmony Dalgleish, Biology

Dr. David Hood, Graduate Studies Advisory Board

Dr. Zhenming Liu, Computer Science

Dr. Saskia Mordijck, Applied Science

Dr. Cynthia Morton, Graduate Studies Advisory Board

Dr. Anh Ninh, Mathematics

Dr. Joshua Puzey, Biology

Dr. Jonathan Scheerer, Chemistry

Mentoring Awards: Humanities & Social Sciences

Dr. Pam Hunt, Psychology

Dr. Alexandra Joosse, Public Policy

Dr. Neil Norman, Anthropology

Dr. Francesca Sawaya, American Studies

Dr. Carol Sheriff, History

Mentoring Awards: Natural & Computational Sciences

Dr. Adwait Jog, Computer Science

Dr. Saskia Mordijck, Applied Science

Dr. Jeff Nelson, Physics

Dr. Anke van Zuylen, Computer Science (COR)

Dr. Matthew Wawersick, Biology

Dr. Douglas Young, Chemistry

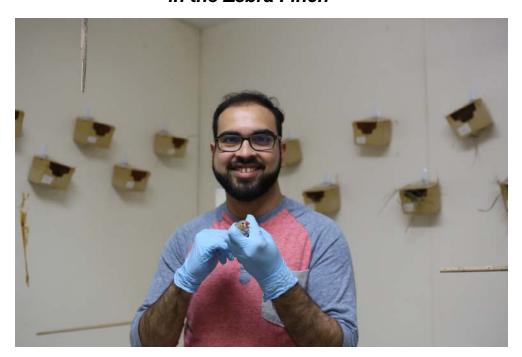
William & Mary Interdisciplinary Awards for Excellence in Research

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.

ANANDA MENON

Advisor: Dr. John Swaddle

The Effect of Mercury Pollution on Reproductive Function
in the Zebra Finch



As a M.S. student in the department of Biology at the College of William & Mary, Ananda's research focuses on the effects of mercury pollution on avian reproduction and behavior.

Join Ananda as he presents his award winning research Friday, March 24, 2017 4:30pm-6:00pm in Chesapeake AB

William & Mary Interdisciplinary Awards for Excellence in Research

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SUMMER MOORE

Advisor: Dr. Jennifer Kahn

Redesigning the Everyday: Household Spatial Organization and Domestic Practice at Nineteenth-Century Miloli'i, Hawai'i



As a Ph.D. Candidate in the department of Anthropology at the College of William & Mary, Summer's research addresses questions about life in Hawai'i in the post-contact period

Join Summer as she presents her award winning research Friday, March 24, 2017 1:00pm-2:00pm in James Room



Come see grad students present research in a fast-paced competition!



Thurs., March 23, 6-8PM Commonwealth Auditorium



The Arts & Sciences Graduate Studies Advisory Board at the College of William & Mary is a proud sponsor of the 2017 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 and 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 2017 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, 2016-17

President: Brian J. Morra '78 BA History

Vice-President: Robert Saunders '00 BS Physics

Past President: Diane Alleva Cáceres '87 BA Economics, '89 MA Government Chair, Communications and Advocacy Committee: Laura J. Terry, '03 BS Biology

Chair, Development Committee: Michael Bracken, '86 BS Mathematics

Chair, Recruitment Committee: Diane Alleva Cáceres

Chair, Student Professional Development Committee: Kathryn Caggiano '90 BS Math

John D. Burton '89 MA History, '96 PhD History

Jeffrey Deitrich, '04 BA Political Science

Kurt Erskine '92 BA Public Policy

Mike Hoak '02 MA History

David K. Hood '90 BS Chemistry, '92 MA Chemistry, '96 PhD Applied Science

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

Betsy Page Sigman '78 BA Government

Eleanor K. Silverman '85 BA Mathematics

Jeffrey Voas, '86 MS Computer Science, '90 PhD Computer Science

Edwin Watson II '68 BA History, '70 MA History

Gail Williams Wertz '66 BS Biology

http://www.wm.edu/as/graduate/about/gradadvisoryboard/index.php

William & Mary Award Recipients for Excellence in Scholarship

These awards acknowledge William & Mary graduate students whose research presentation demonstrates original investigation and the integration of knowledge, and distinguished excellence in scholar-ship 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 the College of William & Mary.



MARKET ACCESS INTERNATIONAL, Inc. (www.marketaccessintl.com) is an international trade, investment and enterprise growth consulting firm. The company was founded by Arts & Sciences Graduate Studies Advisory Board member Diane Alleva Cáceres (W&M '87 BA Economics, '89 MA Government).

MARKET ACCESS INTERNATIONAL, Inc. Award for Excellence in Scholarship in the Humanities and Social Sciences

DAVID LAWRENCE WARD

Ph.D. Candidate - Department of History Advisor: Dr. Paul Mapp

Continental Army: Leadership School for the early Republic



Join David as he presents his research Friday, March 24, 2017 9:30am-10:30am in James Room



16th Annual Graduate Research Symposium

William & Mary Award Recipients for Excellence in Scholarship

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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 the College of William & Mary.



NORTHROP GRUMMAN CORPORATION (www.northropgrumman.com) Northrop Grumman Corporation is a leading global security company whose 120,000 employees provide innovative systems, products, and solutions in aerospace, electronics, information systems, shipbuilding and technical services to government and commercial customers worldwide.

NORTHROP GRUMMAN CORPORATION Award for Excellence in Scholarship in the Natural and Computational Sciences

CHENG LI

Ph.D. Candidate - Department of Computer Science Advisor: Dr. Qun Li You Are What You Tweet



Join Cheng as he presents his research Friday, March 24, 2017 2:15pm-3:15pm in Tidewater B

The College of William & Mary Award Recipients for Excellence in Scholarship

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

REBECCA CAPOBIANCO

History, Advisor: Dr. Hannah Rosen
"In the Bosom of the Storied Blue Ridge Mountains:"

Contesting the Future of American Culture in Shenandoah National Park, 1924-1936

William & Mary Honorable Mentions

JENNA CARLSON DIETMEIER

Anthropology, Advisor: Dr. Neil Norman

Knackered Nags and Mislaid Mounts:

The Scarcity of Equine Remains in 18th-Century Faunal Assemblages

OLANREWAJU LASISI

Anthropology, Advisor: Dr. Neil Norman
A Stratigraphic Look at the History of Medieval Ife: Perspectives from Recent Investigations
at Yemoo Grove

JAMES J. RICK

History, Advisor: Dr. Charles McGovern
"Masters of Light and Flight: The Spectacle of Invention in U.S. Popular Culture, 1876-1920."

Visiting Scholar Award for Excellence in the Humanities & Social Sciences

LAURYN WALKER

Health Behavior and Policy, Virginia Commonwealth University, Advisor: Dr. Peter Cunningham

The Impact of Dental Insurance on Emergency Department Visits

Visiting Scholar Honorable Mentions

MANDAR BODAS

Health Behavior and Policy, Virginia Commonwealth University, Advisor: Dr. Tiffany Green Inter-generational Smoking Behaviors Among Asian Immigrants: Do Region of Ancestry and Gender Matter?

SUPARNA DUTTA

Government and Public Affairs, Virginia Commonwealth University, Advisor: Dr. Nancy Stutts

Can Gender Sensitive Local Development Projects Improve the Subjective Well-being

of the Participating Communities?

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The College of William & Mary Award Recipients for Excellence in Scholarship

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

SOFYA ZAYTSEVA

Applied Science, Advisor: Dr. Leah Shaw
Pattern formation in marsh ecosystems modeled through the interactions of
marsh vegetation, mussels and sediment

William & Mary Honorable Mention

EDEN MANESS

Psychology, Advisor: Dr. Joshua Burk

Effects of N-desmethylclozapine on attentional performance following loss of basal forebrain corticopetal cholinergic inputs

Visiting Scholar Award for Excellence in the Natural & Computational Sciences

AMANDA BROMILOW

Fisheries Science, Virginia Institute of Marine Science, Advisor: Dr. Romuald Lipcius Predation on Juvenile Blue Crabs (Callinectes sapidus) in the York River, Virginia

Visiting Scholar Honorable Mentions

KATHERINE BEMIS

Fisheries Science, Virginia Institute of Marine Science, Advisor: Dr. Eric Hilton Comparative anatomy of the dentition of Ocean Sunfishes (Molidae) and Porcupinefishes (Diodontidae)

MIRIAM JENKINS

Forestry and Environmental Conservation, Clemson, Advisor: Dr. Robert Baldwin Enhancing Native Pollinator Populations for Watermelon Production in Coastal South Carolina



The College of William & Mary 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.

Award for Excellence in the Humanities and Social Sciences

HOWARD ESTES

Public Policy, M.P.P., Advisor: Dr. John McGlennon
Dispensaries of Democracy: How Four States Experience the New Frontier
of Legal Marijuana

YOON YOUNG SIM

Psychology, M.A., Advisor: Dr. Todd Thrash
The Effect of Mortality Salience and Motivational Orientation on Attitudes toward Work

Awards for Excellence in the Natural and Computational Sciences

GRANT HAINES

Biology, M.S., Advisor: Dr. S. Laurie Sanderson Swimming kinematics facilitate ram suspension feeding in a model American paddlefish

ABBEY HUMPHREYS

Biology, M.S., Advisor: Dr. Randolph Chambers Sea level rise induced distribution changes of Phragmites australis and Spartina alterniflora in tidal freshwater marshes



The College of William & Mary 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.

Award for Excellence in Undergraduate Mentoring in the Humanities and Social Sciences

EDEN MANESS
Psychology Department, M.A.
Advisor: Dr. Joshua Burk

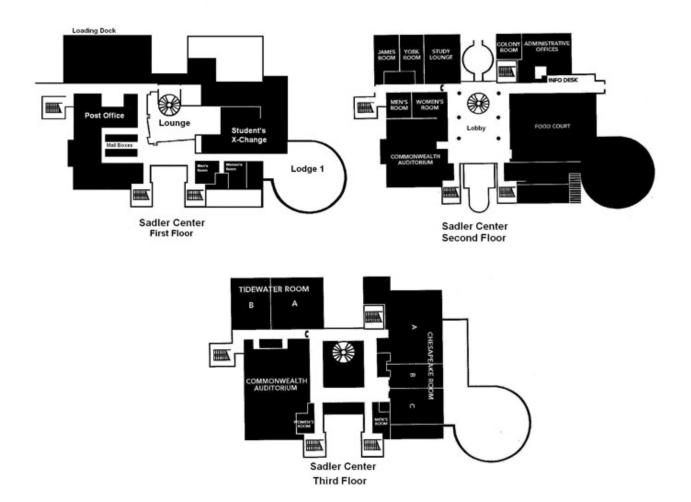
MORGAN THOMPSON Psychology Department, M.A. Advisor: Dr. Danielle Dallaire

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

JENNA A. TAN
Chemistry Department, M.S.
Advisor: Dr. Kristin Wustholz

NIKOLAS C. VANN Applied Science Department, Ph.D. Advisor: Dr. Christopher Del Negro

William & Mary Sadler Center



Getting ready for that next step? The Cohen Career Center and GRS are here to help!

GRADUATE RESEARCH SYMPOSIUM PROFESSIONAL DEVELOPMENT FAIR

Need help with a resume? Want to ace a job interview? Come to the Graduate Research Symposium's Professional Development Fair! Staff from the Cohen Career Center and faculty members from W&M will be there to answer your questions on developing a syllabus, crafting a curriculum vitae, acing interviews, writing resumes, and the process of submitting grant proposals!

Friday, March 24th 2017, 3:30-5:00pm Sadler Center, Chesapeake C





16th Annual Graduate Research Symposium Schedule at a Glance

Thursday, March 23, 2017

Highlighted names indicate award winners

6:00-8:00	3MT Competition - Commonwealth Auditorium
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Friday, March 24, 2017 BIOL/APSC/PSYC **CSCI** ANTH/HIST AMST/PUBP PSYC/APSC/BIOL 9:30-10:30 Tidewater A **Tidewater B** Chesapeake C **James Room** York Room **Eden Blake-Lea Maness** Jenna Kay Carlson Dietmeier **Howard Pettit Estes** Jenna L Spackeen Zijiang Hao Elizabeth Anne Rogers Bin Nie Victoria Akins Jacob Dean Harris Jennifer N. Ross Matthew R. Femia **David Lawrence Ward** Mandar V. Bodas Adrienna N Bingham Ji Xue Amrita Lamba Shasha Wen Cyril Anyetei-Anum Chair: Denys Poshyvanyk (CSCI) Chair: Liz Allison (BIOL) Chair: Audrey Horning (ANTH) Chair: Helen Murphy (BIOL) Chair: Charles McGovern (AMST) *Proctor:* Qijue Wang **Proctor:** Sean Koebley Proctor: Ananda Menon **Proctor:** Summer Moore **Proctor:** Lauren Liegey AMST/ANTH BIOL **HIST/AMST** ANTH/BIOL PSYC/PUBP 10:45-11:45 Tidewater A Tidewater B Chesapeake C James Room (10:45-12:00) York Room Thomas Bilbo Alexis Ohman Ibrahim Habib Keita Patrick Lee Johnson Makiki A Reuvers Katherine Elliott Bemis **Ohad Jonathan Paris** Christopher J. Slaby Megan Rhodes Victor Patricia Anne Trotta Juan M Botero **Grant Emerson Haines** Lauren Alston Bridges Holly Lynn Gruntner Matthew Steven Preda Nicholas Mark Masto Diego Francisco Biston Vaz Chair: Kathleen Bragdon (ANTH) Chair: Hiroshi Kitamura (HIST) Chair: Brad Weiss (ANTH) Chair: Matthias Leu (BIOL) Chair: Danielle Dallaire (PSYC) Proctor: Ananda Menon Proctor: Mallory Moran Proctor: Lauren Liegey Proctor: Jenna Carlson Dietmeier Proctor: Lena Wadsworth

12:00-1:00 Luncheon - Chesapeake AB



Friday, March 24, 2017

		Highlighted names indicate award winners			
	HIST/AMST	CSCI		ANTH	PUBP
1:00-2:00	Tidewater A	Tidewater B		James Room	York Room
	Anna Leigh Todd	Christopher Vendome		Summer Moore	Lauryn Walker
	Emily Wells	Michele Tufano		Nick Belluzzo	Sombo Muzata Chunda
	Mariaelena DiBenigno	Shanhe Yi		Olanrewaju Blessing Lasisi	Laura Mallison
		Kevin P. Moran			
	Chair: Kathrin Levitan (HIST)	Chair : Xu Liu (CSCI)		Chair : Chandos Brown (HIST)	Chair: Alexandra Joosse (PUBP)
	Proctor: Zarah Quinn	Proctor: Matt Femia		Proctor: Alexis Ohman	Proctor: Jennifer Ellis
	ANTH/CHEM/BIOL	PUBP/AMST/CSCI		AMST/HIST	PSYC
2:15-3:15	Tidewater A (2:15-3:30)	Tidewater B		James Room	York Room (2:15-3:30)
	Madelynn von Baeyer	Kelsey Robarts		Zarah Quinn	Grant Michael Ostrander
	Mariah Parker	Nabeel Siddiqui		Lindsay Dealy Garcia	JoEllen Blass
	Bianca Silva Santos	Cheng Li		Katherine Cartwright	Will Belzak
	Amanda Bromilow	Nicholas Jorge Van Balen			Megan Jessie Buys
	Chair: Andrea Wright (ANTH)	Chair: Elaine McBeth (PUBP)		Chair : Francesca Sawaya (AMST)	Chair: Cheryl Dickter (PSYC)
	Proctor: Matt Femia	Proctor: Peter Quinn-Jacobs		Proctor: Jennifer Ellis	Proctor: Lena Wadsworth
3:30-5:00	0 Professional Development Fair - Chesapeake C				
4:30-6:00	Poster Presentation and Networking Reception - Chesapeake AB				
	Nicolas A Abrigo	Wendel Matthew Friedl	Molly Penrod	Lena Marie Wadsworth	
	David Reed Beverstock	Eric Ginsburg	Jonathan C Perkins	Haonan Wang	
	Rachel Marie Blasé	Emil Saber Iqbal	Nicholas Race	Qiong Wu	
	Margaret Eileen Cameron	Darbi Jones	Andrew Peter Rotunno	Peng Zhang	
	James Cassidy	Heajin Lee	Yoon Young Sim	Tao Zhang	
	Shuangli Du	Ananda Menon	Meaghan Kathleen Smith		



Saturday, March 25, 2017

		Highlighted names indicate award winners			
	PHYS	CSCI	PSYC	HIST	HIST/ANTH
8:30-9:30	Tidewater A	Tidewater B	Cheaspeake C	James Room	York Room
	Zhen Xing	Lele Ma	Morgan Jane Thompson	Cody Nager	Rebecca Capobianco
	Patrick McArdle	Jianing Zhao	Sean Vanhille	Frances Bell	Emily Bagdasarian
	Brandon Kyle Eskridge	Nadia Aly	William Hayes	Connor Fenton	
	Victoria Owen	James Christopher Bieron			
	Chair: David Armstrong (PHYS)	Chair: Kathryn Caggiano	Chair: Betsy Sigman	Chair : Ed Watson	Chair: Sarah Glosson
	Proctor: Amrita Lamba	Proctor:	Proctor: Sean Koebley	Proctor: Mitch Oxford	Proctor: Holly Gruntner
	PHYS/APSC	BIOL/APSC	AMST/HIST	CSCI/PHYS	HIST/AMST
9:45-10:45	Tidewater A	Tidewater B	Chesapeake C	James Room	York Room
	Andrew J. Pyle	Caitlin McCaig	Leah Kuragano	Robin M. Givens	David J. Marquis
	Mahmoud Samy Amin	Leanna Rinehart	James J Rick	Sudip Paudel	Jamie Alistair Mansbridge
	Demetrious Thomas Kutzke	Ronald D. Smith	Kayla D. Meyers	Mobolaji Williams	Travis Harris
	Nikunjkumar Prajapati	Angela Marie Ricono			
	Chair: Eleanor Silverman	Chair: Rob Saunders	Chair : Brian Morra	Chair: Kathryn Caggiano	Chair: Sarah Glosson
	Proctor : Qijue Wang	Proctor : Ananda Menon	Proctor : Zarah Quinn	Proctor : James Bieron	Proctor: Emily Bagdasarian
	PHYS/APSC	BIOL/APSC	AMST/HIST/PUBP	AMST/HIST	HIST
11:00-12:00	Tidewater A	Tidewater B	Chesapeake C	James Room	York Room
	Wiliam W. Dickinson	Miriam Jenkins	Jan Huebenthal	Renee Michelle Kingan	Phillip Louis Emanuel
	David Lahneman	Abbey Humphreys	David Cameron Rothmund	Kaila Knight Schwartz	Mitchell Edward Oxford
	Qijue Wang	Pamela Hope Braff	Suparna Dutta	Brian Christopher David	Sarah Elaine Thomas
		Sofya Zaytseva			
	Chair : George Miller	Chair : Linda Schaffner	Chair: Sarah Glosson	Chair : Gail Wertz	Chair :
	Proctor: Mahmoud Amin	Proctor : Adrienna Bingham	Proctor: Kayla Meyers	Proctor: Emily Bagdasarian	Proctor: Emily Wells

12:00-1:30 Luncheon & Awards Ceremony - Chesapeake AB



Saturday, March 25, 2017

		Highlighted names indicate award winners			
	PHYS	CSCI	PSYC	HIST	HIST/ANTH
8:30-9:30	Tidewater A	Tidewater B	Cheaspeake C	James Room	York Room
	Zhen Xing	Lele Ma	Morgan Jane Thompson	Cody Nager	Rebecca Capobianco
	Patrick McArdle	Jianing Zhao	Sean Vanhille	Frances Bell	Emily Bagdasarian
	Brandon Kyle Eskridge	Nadia Aly	William Hayes	Connor Fenton	
	Victoria Owen	James Christopher Bieron			
	Chair: David Armstrong (PHYS)	Chair: Kathryn Caggiano	Chair: Betsy Sigman	Chair : Ed Watson	Chair: Sarah Glosson
	Proctor: Amrita Lamba	Proctor: Vicki Thompson Dopp	Proctor: Sean Koebley	Proctor: Mitch Oxford	Proctor: Holly Gruntner
	PHYS/APSC	BIOL/APSC	AMST/HIST	CSCI/PHYS	HIST/AMST
9:45-10:45	Tidewater A	Tidewater B	Chesapeake C	James Room	York Room
	Andrew J. Pyle	Caitlin McCaig	Leah Kuragano	Robin M. Givens	David J. Marquis
	Mahmoud Samy Amin	Leanna Rinehart	James J Rick	Sudip Paudel	Jamie Alistair Mansbridge
	Demetrious Thomas Kutzke	Ronald D. Smith	Kayla D. Meyers	Mobolaji Williams	Travis Harris
	Nikunjkumar Prajapati	Angela Marie Ricono			
	Chair: Eleanor Silverman	Chair: Rob Saunders	Chair : Brian Morra	Chair: Kathryn Caggiano	Chair: Sarah Glosson
	Proctor : Qijue Wang	Proctor : Ananda Menon	Proctor : Zarah Quinn	Proctor : James Bieron	Proctor: Emily Bagdasarian
	PHYS/APSC	BIOL/APSC	AMST/HIST/PUBP	AMST/HIST	HIST
11:00-12:00	Tidewater A	Tidewater B	Chesapeake C	James Room	York Room
	Wiliam W. Dickinson	Miriam Jenkins	Jan Huebenthal	Renee Michelle Kingan	Phillip Louis Emanuel
	David Lahneman	Abbey Humphreys	David Cameron Rothmund	Kaila Knight Schwartz	Mitchell Edward Oxford
	Qijue Wang	Pamela Hope Braff	Suparna Dutta	Brian Christopher David	Sarah Elaine Thomas
		Sofya Zaytseva			
	Chair: George Miller	Chair : Linda Schaffner	Chair: Sarah Glosson	Chair : Gail Wertz	Chair: Mike Hoak
	Proctor: Mahmoud Amin	Proctor : Adrienna Bingham	Proctor: Kayla Meyers	Proctor: Emily Bagdasarian	Proctor: Emily Wells

12:00-1:30 Luncheon & Awards Ceremony - Chesapeake AB

Friday, March 24, 2017

9:30 AM

Tidewater A – **EVOLUTION: THINK SMALL**

Elevated Temperature and CO₂ Effects on Nitrogen and Carbon Uptake in a Coastal California Microbial Community

Jenna L. Spackeen

The Antibacterial and Biofilm Disruption Activity of Novel Amphiphiles

Elizabeth Anne Rogers

Using a Trojan Horse Strategy to Disrupt the Growth of Yeast Biofilms

Adrienna N. Bingham

Modeling Cooperative Decision-Making Using Bayesian Cognition and Evolutionary Dynamics

Amrita Lamba

Tidewater B – HOW FAST CAN YOU GO?

EdgeEngine: An Efficient and Customizable Framework for Edge Computing

Zijiang Hao

Exploring and Exploiting the Interplay among Temperature, Power and GPU Errors

Bin Nie

Tale of Tails: Anomaly Avoidance in Data Centers

Ji Xue

REDSPY: Exploring Value Locality in Software

Shasha Wen

Chesapeake C – THE INFORMATION EXCHANGE



Effects of N-desmethylclozapine on Attentional Performance Following Loss of Basal Forebrain Corticopetal Cholinergic Inputs

Eden Blake-Lea Maness

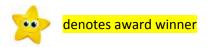
Expression of Ion Channels on Dbx1 Neurons that may Facilitate Respirate Rhythm Generation in Mice

Victoria Akins

Nuclear Receptors and Transcriptional Elements: Shifts in Localization Caused by MED1-TR Interaction

Matthew R. Femia

Acetylation Controls the Intracellular Localization of Thyroid Hormone Receptor Cyril Anyetei-Anum



Friday, March 24, 2017

9:30 AM

James Room – BRING IN THE CAVALRY



Knackered Nags and Mislaid Mounts: The Scarcity of Equine Remains in Eighteenth-Century Faunal Assemblages

Jenna Kay Carlson Dietmeier

Out-Politicked: How Colonel Francis Marion's Ambush of Major Robert McLeroth Shifted the Southern Balance of Power

Jacob Dean Harris



Continental Army: Leadership School for the early Republic

David Lawrence Ward

York Room – **GENERATIONS OF HEALTH**

We Still Call It Home: Complicating the Flint Water Crisis

Jennifer N. Ross



Dispensaries of Democracy: How Four States Experience the New Frontier of Legal Marijuana

Howard Estes



Inter-generational Smoking Behaviors Among Asian Immigrants: Do Region of Ancestry and Gender Matter?

Mandar V. Bodas

10:45 AM

Tidewater A – ECOLOGY AND TOXICOLOGY

Bt Transgenic Corn and Its Effects on the Larvae of the Corn Earworm (Helicoverpa zea)

Thomas Bilbo

The Effects of Mercury Exposure During Development on Songbird Reproductive Success

Ohad Jonathan Paris

The Role of Mercury in Oxidative Stress: An Analysis Using Exercised Zebra Finches

Juan M. Botero

Biomass and Diversity of Submersed Aquatic Vegetation in Managed Wetlands in Coastal South Carolina

Nicholas Mark Masto

Tidewater B – CULTURE, IDENTITY, AND COLONIALISM

Changing Yamasee Ceramic Practices in the Colonial Southeast

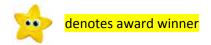
Patrick Lee Johnson

Makataimeshekiakiah Goes East

Christopher J. Slaby

Commodity Culture: the Formation, Exchange, and Negotiation of Early Republican Period Identity in the Spanish New World

Lauren Alston Bridges



Friday, March 24, 2017

10:45 AM

Chesapeake C – THE LAST FRONTIER

A Devil of a Fright: Fear and Containment through Narrative and Language in the 17th and 18th Century Mississippi Valley

Makiki A. Reuvers

The Saloons Speak: Activity Areas at Highland City, Montana Revealed

Megan Rhodes Victor

Defenceless Wives and Female Furies: Periodicals' Depictions of Women on the

Eighteenth Century Frontier

Holly Lynn Gruntner

James Room – **SOMETHING'S FISHY**

Hunting and/or Gathering: Gender and Fishing Practices in French Polynesia

Alexis Ohman

Comparative Anatomy of the Dentition of Ocean Sunfishes (Molidae) and

Porcupinefishes (*Diodontidae*)

Katherine Elliott Bemis

Swimming Kinematics Facilitate Ram Suspension Feeding in a Model American ••• Paddlefish

Grant Emerson Haines

Systematic Inferences Of The Post-Cranial Skeleton Of *Batrachoiformes*

Diego Francisco Biston Vaz

York Room – **POLICY AND EQUALITY**

Decision Making in the Public Sector and the Crutch of Expectation

Ibrahim Habib Keita

Title IX's Endeavors to Create an Equitable Environment for NCAA Student Athletes

Patricia Anne Trotta

The Effects of Observer Race on the Categorization of Racially Ambiguous Targets

Matthew Steven Preda

Chesapeake A & B - LUNCH 12:00 PM

1:00 PM

Tidewater A – **BEHIND THE VEIL**

"A Second Offense of This Kind": Female Sexual Recidivism in Colonial New England

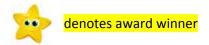
Anna Leigh Todd

Reading the "Gothic" at Madame Rivardi's Seminary

Emily Wells

Excavating the Ghost: Haunted Houses and the Recovery of Hidden Histories

Mariaelena DiBenigno



Friday, March 24, 2017

1:00 PM

Tidewater B – **SOFTWARE TESTING AND MOBILE PHONES**

License Usage and Changes: A Large-Scale Study of Java Projects on GitHub

Christopher Vendome

An Empirical Investigation into the Nature of Test Smells

Michele Tufano

PrivScreen: Defending against Shoulder Surfing via Near-eye Display Offloading

Shanhe Yi

Improving Automated Crash Discovery, Reporting, and Reproduction for Android Apps

Kevin P. Moran

James Room – **DIGGING PLACES**, **ARRANGING SPACES**



Redesigning the Everyday: Household Spatial Organization and Domestic Practice at Nineteenth-Century Miloli'i, Hawai'i

Summer Moore

A besos a beluu: the Archaeological Signature of Competitive Sociopolitical Balance

Nick Belluzzo



A Stratigraphic Look at the History of Medieval Ife: Perspectives from Recent Investigations at Yemoo Grove

Olanrewaju Blessing Lasisi

York Room – **DUE DILIGENCE**



The Impact of Dental Coverage on Emergency Department Utilization Among Low-Income Adults

Lauryn Walker

Uncovering Corruption in the Public Service: Review of the role played by the Office of the Auditor General of Zambia, Africa

Sombo Muzata Chunda

Compulsory Voting Laws: A Necessary Evil to Solve Voting Woes?

Laura Mallison

Friday, March 24, 2017

2:15 PM

Tidewater A – FLORA, FAUNA, AND CHEMICAL PHASES

In the Weeds: The Thorny Question of Crop Processing and Dung Fuel Use at Late Chalcolithic Çadır Höyük, Turkey

Madelynn von Baeyer

Gas-Phase Investigations of Reduced Metal Complexes Via Sequentially Coupled Ion/ion-Ion/Molecule Reactions

Mariah Parker

Identifying Locations of and Mechanisms for Sea Turtle Mortality from Stranding Data Using Ocean Drift Models

Bianca Silva Santos



Predation on Juvenile Blue Crabs (Callinectes sapidus) in the York River, Virginia

<mark>Amanda Bromilow</mark>

Tidewater B – HOW COMPUTERS ARE CHANGING US (U.S.)

Social Media as the New Early Warning System in Emergency Management

Kelsey Robarts

No Body Around: Posthuman Fantasies during the Personal Computer Revolution

Nabeel Siddiqui



You Are What You Tweet

Cheng Li

A Behavioral Biometrics Based Approach to Online Gender Classification **Nicolas Jorge Van Balen**

James Room – MIXED MEDIA MESSAGES

Escaping through *The Underground Railroad*

Zarah Quinn

awwww and AHHHHH! Bugs, Ideology, and Affect in Film, 1996-2006

Lindsay Dealy Garcia

"So little appeal for kids": Youth and the Movies in the Pre-Code Era

Katherine Cartwright

York Room – **CONNECTIONS IN PSYCHOLOGY**

The Impact of Fertility Cues on Intrasexual Competition and Threat Perception

Grant Michael Ostrander

Reducing Neural Attentional Bias Toward Homosexual Couples via Entitativity

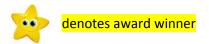
JoEllen Blass

Personality Similarity Between Writers and Readers: Predicting Reader Inspiration in a Cross-Classified Multilevel Framework

Will Belzak

The Interaction of Relational Mobility and Social Attractiveness: Impact on Depression, Self-Esteem and Life Satisfaction

Megan Jessie Buys



Friday, March 24, 2017

3:30 PM

Chesapeake C – PROFESSIONAL DEVELOPMENT FAIR

4:30 PM

Chesapeake A&B – POSTER SESSION AND NETWORKING RECEPTION

Development Of More Potent BRCA1 Inhibitors

Nicolas A. Abrigo

Thin Film Materials: Doorway to the Future of Superconducting Accelerator

David Reed Beverstock

Sideshow Deformities and Cultural Perception

Rachel Marie Blasé

Adolescents' Implicit and Explicit Attitudes towards Emotion Expression

Margaret Eileen Cameron

Rhodamine Dyes Adsorbed onto TiO₂: Principle Study of Molecular Aggregate Formation

James Cassidy

Ultracold Potassium for Atom Chip-Based Experiments

Shuangli Du

Evaluation of an ERP-based, Brief Neurometric Battery Derived Profile of Alzheimer's Disease

Wendel Matthew Friedl

The Functional Effects of the Interaction between Heparan Sulfate and Polynuclear Platinum Complexes

Eric Ginsburg

Ribosomal Incorporation of Backbone Modified Amino Acids via an Editing-Deficient Aminoacyl-tRNA Synthetase

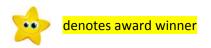
Emil Saber Iqbal

Impacts of Vaccination and Genetic Disease Resistance on Transmission of IHNV and Fp in Rainbow Trout

Darbi Jones

Development of Novel Fluorescent Kinase Inhibitors for Dynamic Imaging of HER2(+) Cells

Heajin Lee





The Effect of Mercury Pollution on Reproductive Function in the Zebra Finch

Ananda Menon

A Latent Factor Analysis of Distress Tolerance and its Relation to Borderline Personality Disorder

Molly Penrod

Improving the Synthesis of [2.2.2]diazabicyclic Alkaloids Using Radical Decarboxylation

Jonathan C. Perkins

Efficiency of Hydrogen Generation of Photocatalysts Functionalized with Fluorescein and Rhodamine-Based Chromophores.

Nicholas Race

Precision Microwave Source for AC Zeeman Experiments with Ultracold Atoms

Andrew Peter Rotunno



The Effect of Mortality Salience and Motivational Orientation on Attitudes toward Work.

Yoon Young Sim

Changes in the Immune System During Spawning in *Oncorhynchus Nerka* Anterior Kidney

Meaghan Kathleen Smith

Integrating Motivation and Imagination: Factor Structure and Nomological Net

Lena Marie Wadsworth

Managing Thread-level Parallelism for Efficient and Fair Multi-programming in GPUs

Haonan Wang

Machine Learning for Individualized Education

Qiong Wu

Functional Analyses of Potential Insect Virus Virulence Factors

Peng Zhang

In Search of The Real Clean Master: Can Popular Android Cleanup Apps Defend Against Data Residue Attacks?

Tao Zhang

Saturday, March 25, 2017

8:30 AM

Tidewater A – **DO YOU SWEAT THE SMALL STUFF?**

An Infrared View of Superconductivity in the Iron-Based Materials

Zhen Xing

Modeling Near-Field Infrared Microscopy Data

Patrick McArdle

Auxiliary-Field Quantum Monte Carlo Study of Transition-Metal Decorated Linear Carbon Chains

Brandon Kyle Eskridge

Parameterizing Main Detector Light Response for the Parity-Violating Qweak Experiment

Victoria Owen

Tidewater B – **LEARNING TO ANALYZE**

Exploring Main Memory Introspection of Docker System

Lele Ma

Quantifying Heterogeneous Causal Treatment Effects in World Bank Development Finance Projects

Jianing Zhao

Neonatal Sepsis Prediction in the NICU Using Supervised Learning Techniques

Nadia Alv

An Adaptive BRDF Fitting Metric

James Christopher Bieron

Chesapeake C – **DECISIONS**, **DECISIONS**, **DECISIONS**



Predicting Criminal Justice System Involvement: Parental Incarceration, Impulsivity, Planning, and Criminogenic Cognitions

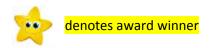
Morgan Jane Thompson

The Effect of Intuition on Performance and Understanding of the Iowa Gambling Task

Sean Vanhille

Can Merely Swishing a Glucose Solution Influence Decision-Making on the Iowa Gambling Task?

William Hayes



Saturday, March 25, 2017

8:30 AM

James Room – **DEFINING AND CHALLENGING "BELONGING" IN THE ATLANTIC WORLD**

Fear, Foreigners and Federalism: The Naturalization Act of 1790 and American Citizenship

Cody Nager

"Native Citizens:" Citizenship and Nationalism in Dessalines's Haiti

Frances Bell

Objection: Jamaican Maroon Legal Posturing in 1796

Connor Fenton

York Room – PRESERVING THE PAST FOR THE FUTURE



Constructing America: Defining American Culture through the Creation of Shenandoah National Park

Rebecca Capobianco

A Paradigm Shift within University Museums

Emily Bagdasarian

9:45 AM

Tidewater A – CAN YOU CATCH THE PARTICLE?

Discrete Momentum Sideband Generation with Ultracold Atoms Scattered off an Oscillating Barrier

Andrew J. Pyle

Thermal Interface Materials Reinforced by Boron Nitride Nanotubes (BNNTs) for Thermal Management of Electronics.

Mahmoud Samy Amin

Tailorable Dispersion in a Ring-Laser Cavity

Demetrious Thomas Kutzke

Reduction of four-wave mixing using Raman Absorption in Rubidium

Nikunjkumar Prajapati

Tidewater B – **KEEPING GENETICS SEXY**

Developmental Differences Between Two Independently Evolved Self-Fertile Hermaphroditic Nematodes

Caitlin McCaig

Characterizing Chinmo: Structure-Function Analysis of a Stem Cell Sex-Maintenance Factor

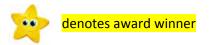
Leanna Rinehart

Likelihood Ratio Tests for Homeolog Expression Bias

Ronald D. Smith

Population Genetic Assessment of Asclepias syriaca; the Common Milkweed

Angela Marie Ricono



Saturday, March 25, 2017

9:45 AM

Chesapeake C – MAKING AMERICA: INNOVATION AND REBELLION

Surfing Culture and Rebellion in Post-War America and Hawaii

Leah Kuragano



Masters of Light and Flight: The Spectacle of Invention in U.S. Popular Culture, 1876-1920.

James J. Rick

"She is built like a car": Ex Machina and White, Male Working Class Anxiety

Kayla D. Meyers

James Room – GRAPHING SCIENCE

Mixed-Weight Open Locating-Dominating Sets in Random Graphs

Robin M. Givens

The Role of Calcium Activity in Early Neural Development

Sudip Paudel

Statistical Physics of the Permutation Group

Mobolaji Williams

York Room – CLASSISM AND RACISM IN THE HISTORIC SOUTH

Well What the Hell is He Then? Race, Sexuality, and Class in the Piney Woods: The Brotherhood of Timber Workers, 1910-1916

David J. Marquis

Please Sir, I want some more - Charleston's Oliver Twists

Jamie Alistair Mansbridge

Dispossessing Blackness: The Removal of a Black Community, Again

Travis Harris

11:00 AM

Tidewater A – THINK THIN

Rapid, Inexpensive Optical Characterization of Nanosheet Materials

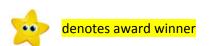
William W. Dickinson

Thickness and Substrate Dependence of the Optical Conductivity of Niobium Dioxide Films

David Lahneman

Anisotropic Mechanical Response and Failure of Spider Silk Reveals Its Hierarchical Structure

Qijue Wang



Saturday, March 25, 2017

11:00 AM

Tidewater B – MATH AND SCIENCE CAN SAVE THE ENVIRONMENT

Enhancing Native Pollinator Populations for Watermelon Production in Coastal S.C.

Miriam Jenkins

Sea Level Rise Induced Distribution Changes of *Phragmites australis* and *Spartina alterniflora* in Tidal Freshwater Marshes

Abbey Humphreys

Modeling the Vulnerability of Headwater Wetlands to Climate Change in the Coastal Plain of Virginia

Pamela Hope Braff

Pattern Formation in Marsh Ecosystems Modeled through the Interactions of Marsh Vegetation, Mussels and Sediment

Sofya Zaytseva

Chesapeake C – CIVIL RIGHTS, GENDER, AND ACTIVISM

Activist Feelings: The ACT UP Oral History Project and the Biopolitics of Affect

Jan Hüebenthal

The Rough Road to Radicalism: A History of the Radical Civil Rights Social Movements of the 1930's and 1940's

David Cameron Rothmund



Can Gender Sensitive Local Development Projects Improve the Subjective Well-being of the Participating Communities?

Suparna Dutta

James Room – **HISTORY IN MIND AND MYTH**

"I Cannot Find You Anywhere": Jayne Cortez's Musical/Poetic Response to Genocide

Renee Michelle Kingan

Salem's Giles Corey in Fact and Fiction

Kaila Knight Schwartz

Inventing Saladin: The Myth and Memory of a Muslim Leader in the Western World

Brian Christopher David

York Room – BUREAUCRATS, BALTIMOREANS, AND BUILDING PRACTICES

"[T]he diligent man becomes necessary," Samuel Pepys and the Self-Conscious Creation of the Professional Bureaucrat

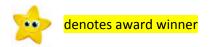
Phillip Louis Emanuel

The Significance of French Refugees to Catholic Education in the Early American Republic

Mitchell Edward Oxford

Long Gone Buildings and Indifferent Improvements: The Fleeting Material Culture of Mid-Eighteenth Century Shenandoah County

Sarah Elaine Thomas



16th Annual	Graduate	Research Sy	ımposium

Notes



Excavating the Ghost: Haunted Houses and the Recovery of Hidden Histories

Presenter: Mariaelena DiBenigno Advisor: Susan Donaldson College of William & Mary, American Studies

Recent American literature often concerns itself with haunted houses. From Beloved to The Shining, contemporary authors structure their narratives around sites where supernatural activity reveal histories that have been erased, misremembered or repressed. Instead of focusing on the ghosts, some popular haunted houses narratives zoom in on the structure-as-entity, as an organic protagonist with work in the world. These works of fiction reveal how haunted houses are not always structures of demonic revenge but rather agents of historical awareness and self-actualization. Within these novels, the haunted house becomes a teaching tool that aids historical recovery and discovery. This paper proposes to explore popular haunted house narratives set in and around the haunted plantation house; this is a unique site for ghosts of the past to manifest in the present. Using fictional museums and historic houses, these popular novels incorporate historical narratives within familiar tropes of gothic haunting. I will focus on four recent novels, all set in the South: Attica Locke's The Cutting Season (2013), Tiya Miles' The Cherokee Rose (2015) and Barbara Michaels' Be Buried in the Rain (1985). Each novel uses increasingly volatile and gendered ghosts to gesture from the past toward injustices in the present; they also utilize independent, academicminded female protagonists to propel the ghost from its shadowy existence. These story lines argue that the past is not so removed from the present, that histories simmer just below the surface, and that excavation is necessary for future growth and edification.

Mariaelena DiBenigno is a Ph.D. Candidate American Studies at the College of William & Mary. After several years teaching middle school, she completed her English M.A at the University of North Carolina Wilmington; her thesis explored the relationship between folklore and tourism in the coastal Carolinas. Mariaelena is currently working on a dissertation that examines how certain narratives haunt public history sites.

awwwww and AHHHHH! Bugs, Ideology, and Affect in Film, 1996-2006

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

This paper looks at four films from the decade of 1996-2006 where bugs are the main subject matter and in some cases, the main actor(s). I investigate how the bugs fit into their environment as well as how humans and bugs form relationships in the films. By considering the bugs as autonomous beings, instead of metaphors for different groups of humans, what can we learn about how bugs fit into contemporary ideologies and emotive responses, especially when it comes to power relations and animal death? A Bug's Life (1998) is a popular animated family film based on a well-known fable that features anthropomorphic ants trying to protect their labor, land rights, and food from unruly grasshoppers. Mimic (1997) stars giant humanized genetically-modified bugs (from termite and mantis species), designed to kill off deadly cockroaches, who end up threatening the safety of New York City. Joe's Apartment (1996), also set in New York, presents a supporting cast of animated talking and dancing cockroaches as they cohabitate, torture, and ultimately help the main protagonist find love. Bug (2006) is the only movie where the bugs are never actually visible even though they drive all of the main plot points and twists. Set in a motel roomturned-apartment in rural Oklahoma, a man and a woman continuously dive deeper into pseudoschizophrenic drug-addled hallucinations of bug infestation. When read together, these films teach us how cultural production generates human ideology and affect towards bugs in real life.

Lindsay Garcia is an artist and Ph.D. Candidate in American Studies at the College of William & Mary. Her research areas include contemporary art history, animal studies, and gender and sexuality studies. Her dissertation topic is the art, activism, and visual culture of the "pest." Garcia holds a B.F.A. (Sculpture) from Rhode Island School of Design, an M.A. (Contemporary Art) from Sotheby's Institute of Art, an M.F.A. (Visual Art) from SUNY Purchase, and an M.A. (American Studies) from the College of William & Mary.



Dispossessing Blackness: The Removal of a Black Community, Again

Presenter: Travis Harris Advisor: Michael Blakey College of William & Mary, American Studies

Africans and African Americans are a migratory people. The movement of Africans and African Americans causes a constant negotiation and renegotiation of space. In the context of America, movement and space have been and continue to be marked by racialized oppressive forces. Scholars have provided a considerable amount of attention to the transatlantic slave trade, migration from the South to the North, and gentrification. This expansive analysis of African American history does not directly account for the forced migration of Blacks in America. Between 1919 and 1942, three Black communities were located in Williamsburg, Virginia. This paper focuses on the creation of Camp Peary in 1942, which led to the literal destruction of a predominately Black town called Magruder. This community formed during reconstruction and the dispossession affected White families as well. Whereas some African American farmers were indirectly sabotaged and urban renewal focuses on the second half of the twentieth century, the dislodging of Blacks from Magruder entails demolition, forced segregation and directly connects Reconstruction to low-income Black communities that exist today. In this paper. I examine archival records located in Swem Library and at the Colonial Williamsburg Foundation and review existing interviews of the displaced. I contend that an analysis of Magruder reveals the material, psychological, existential and political dispossession that a particular Black community went through did not have the same effect on the White families that were removed.

Travis Harris is a Ph.D. Candidate in American Studies at the College of William & Mary whose research examines the intersection of race, religion, and Hip Hop. His dissertation, however, focuses on early twentieth-century African American history. He examines the dispossession of a predominately Black community in Yorktown, Virginia.

Activist Feelings: The ACT UP Oral History Project and the Biopolitics of Affect

Presenter: Jan Hüebenthal Advisor: Leisa Meyer College of William & Mary, American Studies

The history of ACT UP teaches us one thing above all else: feelings are political. Examining oral histories with ACT UP AIDS activists, this paper reads queer activist responses to the AIDS epidemic in relation to what may be called "biopolitics of affect." AIDS was a crisis of feeling as well as a medical crisis; Deborah Gould speaks of a gay and lesbian "emotion culture" involving feelings of fear, anger, marginalization, trauma, and neglect -- intensified by the 1986 Supreme Court decision Bowers v. Hardwick -- that animated the militant activism of ACT UP. In paying particular attention to African Americans and lesbians -- as exemplified by ACT UP's Majority Action Committee (MAC) and the Women's Caucus -- this paper suggests that AIDS engendered a multitude of emotional-political responses that were conditioned by gendered, raced, and classed locations. At the same time, the skills, leadership, and experience gained in civil rights and women's rights movements placed African Americans and lesbians at the center of early AIDS activism. If AIDS is inseparable from the discourses that constitute it, those discourses have latched on to broader histories of racial, sexual, and gendered vulnerability. For that reason, ACT UP oral histories suggests a transhistorical resonance between AIDS activism and other U.S. social justice movements that have sought disrupt the biopolitical dispersions of life and death.

Jan Hüebenthal is a Ph.D. Candidate in American Studies at the College of William & Mary. His dissertation project, titled AIDS, Affect, Activism: Finding HIV in Times of Gay Equality, focuses on narratives, memories, and futures of HIV/AIDS activism and care and its uneasy relationship to neoliberal LGBT rights claims.



"I Cannot Find You Anywhere": Jayne Cortez's Musical/Poetic Response to Genocide

Presenter: Renee Michelle Kingan Advisor: Hermine Pinson College of William & Mary, American Studies

In her own words, poetic activist Jayne Cortez was one of many black American writers "protesting and calling for an end to self degradation, self fragmentation, self-corruption, and self-fear and selfishness [...] Poets using the image of Blackness to mean continuity, confidence, creativity and new possibilities." One way Cortez created these new possibilities was through musical collaborations involving her poems about humanitarian crises, including the 1994 Rwandan genocide that claimed millions of lives and displaced countless others. This paper presents "I Have Been Searching," Cortez's poetic response to the Rwandan genocide published in her 1996 book Somewhere in Advance of Nowhere. My textual analysis provides historical context then focuses on Cortez's poetic point of view and her use of progressive verbs to create perpetual motion throughout the piece. My musical analysis of her 1996 collaborative recording of the poem with music on the album Taking the Blues Back Home suggests possible interpretations of the piece's instrumentation that brings together West African musicians with the American free jazz musicians in her Firespitters band. I also analyze ways Cortez and the musicians interact with each other during the recording, highlighting some of the unique collaborative textual/musical practices she began in the 1960s and continued until her death in 2012. This paper adds to a growing body of critical work that contextualizes and presents Cortez's poetry and music in conversation with one another.

Renee Kingan is a Ph.D. Candidate in American Studies at the College of William & Mary. She teaches at the York County School of the Arts and works as a freelance woodwind doubler. She is writing her dissertation on Jayne Cortez's collaborations with the Firespitters, Her publication credits include chapters in Black Music, Black Poetry: Blues and Jazz's Impact on African American Versification and Feminist Superhero: Voice, Vision, Politics and Performance in the Poetics of Adrienne Rich and Jayne Cortez.

Surfing Culture and Rebellion in Post-War America and Hawai'i

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

In the 1950s and 60s, white Americans became obsessed with surfing. What began as an ancient Polynesian cultural practice grew into a global phenomenon and a central facet of the wide-spread countercultural movements of youth rebellion in the United States. Surfing was not only a sport, but a lifestyle and an identity that transcended the practice itself. Even those young people without access to a coastline and waves embraced surfing-related lingo, music, aesthetics, and attitudes. Simultaneously, native Hawaiians used surfing as a form of resistance against American cultural dominance. This project considers surfing culture as part of a larger moment of political, social, and economic struggle in the United States and Hawai'i that confronted issues of race, gender, and class. Using music, popular publications, and film as source material, I determine the ways in which Hawaiian culture became a vehicle for rebellion used by both Americans and Hawaiians. Hawaiii and its people remain under-represented in American history. This research contributes to a larger scholarly project that centers indigenous peoples in moments of history from which they have been erased.

Leah Kuragano is a Ph.D. student in American Studies at the College of William & Mary with a focus in American Cultural History as well as Race and Ethnic Studies. Her dissertation research concerns the complicated imperial history of America in Hawai'i as seen through popular culture.



"She Is Built Like a Car": *Ex Machina* and White, Male Working Class Anxiety

Presenter: Kayla D. Meyers Advisor: Francesca Sawaya College of William & Mary, American Studies

In Ex Machina (2015), Caleb is invited to administer a Turing Test to Ava, an Al with a female face and distinctly robotic body. As the movie progresses, Caleb questions his own corporeality, projecting his investigation of Ava onto himself. While Caleb becomes increasingly vulnerable, Ava seduces him and convinces him to help her escape. While fleeing, she seals Caleb in a room and kills Nathan, her creator. In the final shot, we see Ava navigating a city, her wiring concealed, blending with the crowd. The film was frequently critiqued for exploiting female sexuality. Natalie Wilson in Ms. magazine writes, "we can finally see inside a woman's body, and she is not that musty, smelly, hairy thing...no, she is built like a car," reinforcing the materiality and thus objectification of Ava. But even though she is "like a car," she resists tinkering and ultimately overpowers both men. Instead of reading Ava's mechanical insides as only a source of objectification, I assert that Ex Machina serves as a stage where male anxieties over blue-collar labor play out. Though women have made minor gains in the workforce since the 1980s and outsourcing has had more of an impact on the male workforce than new technologies, both become sites where blue-collar workers channel their frustrations. By contextualizing Ex Machina in our current economic climate and discourse, I believe we can better understand these frustrations, especially in the wake of the 2016 election.

Kayla Meyers is an M.A. student in American Studies at the College of William & Mary. She is interested in U.S. cultural history of the twentieth and twenty-first centuries. Her work examines intersections of popular culture and media, capitalism, and the cultural left.

Escaping through The Underground Railroad

Presenter: Zarah Quinn Advisor: Susan Donaldson College of William & Mary, American Studies

I explore Colson Whitehead's recent historical fiction novel *The Underground Railroad* to theorize "escape" as a complicated, imperfect, but valuable movement of survival and political resistance. I will additionally link the practice of reading fiction as an iteration of escape. I hope to reinvigorate "escape" as a movement and demonstrate the political implications of engaging neo-slave narratives.

Zarah Quinn is a second-year M.A./Ph.D. student in American Studies at the College of William & Mary. Her research centers on American literature and its role in mediating place.



"We Still Call It Home": Complicating the Flint Water Crisis

Presenter: Jennifer N. Ross Advisor: Charles McGovern College of William & Mary, American Studies

This paper examines the simultaneous life and death of the residents and city of my hometown of Flint, Michigan. I seek to complicate the narrative of the Flint water crisis, tracing the city's gradual decay through fifty years of deindustrialization, crime, and the current water crisis. I also endeavor to wriggle into the interstitial spaces between catchphrase issues seized upon by the national media in order to give voice to what remains unsaid: this city—polluted, burned, poisoned, mocked—is our home. With our city, our home, so embedded in personal identity, what does it mean to experience—to live—its destruction, and how are attachments to home remade through processes of destruction?

Jennifer Ross is a Ph.D. Candidate in American Studies at the College of William & Mary. She completed her master's degree in American literature at the University of Michigan-Flint, where she also received a BA in Honors English and History. Her work focuses on the intersections of literature, race, biopolitics, and neoliberalism in the half-decade between September 11 and Hurricane Katrina.

No Body Around: Posthuman Fantasies during the Personal Computer Revolution

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

After the launch of the personal computer revolution in the late 1970s, tinkerers and computer hobbyists debated the possibilities of the device and prognosticated about the impact of its widespread use. In these discourses, the disabled body served as a recurring object of obsession, fear, and fascination. Commentators saw disability as a source of shortage and inadequacy that they needed to make "whole." Yet, why was the disabled body such an object of interest? Some may argue that attempts at "curing" the disabled were simply forms of benign altruism on the part of early computer adapters. While this is true to some extent, it fails to demonstrate the cultural factors involved in framing ablebodiness. Ableism's power comes not only from its dictation of normativity but also from its power to shield the able-bodied from their own potentiality to become disabled and reliant. As Dan Goodley argues, "the disabled individual queers and crips the normative pitch of the autonomous citizen." Specifically, I analyze the 1981 John Hopkins First National Search for Applications of Personal Computing to Aid the Handicapped as a juncture point where disability activists and computer enthusiasts used technology to reassess disabled bodies. Ultimately, I argue that the search resulted in a failure by both the disability community and early microcomputer adopters to assert the disabled body's legitimacy without technological intervention and reaffirmed posthumanist utopian fantasies that perpetuated biocapitalist intrusion into the lives of the disabled.

Nabeel Siddiqui is a Ph.D. Candidate in American Studies at the College of William & Mary. His research focuses specifically on the cultural history of media, new media studies, information studies, and the digital humanities. He is currently finishing his dissertation on the historical relationship between the personal computer and the American private sphere.



Makataimeshekiakiah Goes East

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

Through the mid-nineteenth century and into the twentieth, white settlers in Wisconsin created a sense of place based on Native American history and identity. Much of this referred to the Black Hawk War of 1832. When Makataimeshekiakiah, known in English as Black Hawk, and a number of Sauks and Meskwakis protested removal from their traditional lands by returning, fear turned settlers violent. The settlers won and Makataimeshekiakiah became a military prisoner. Despite a diverse Native population, the Black Hawk War and its namesake were the primary focus of a mythologized Wisconsin past, in paintings, official state histories, and many other forms. This "Blackhawkification" of the Wisconsin past suggests that settlers were the agents of history, but that is only part of the story. Makataimeshekiakiah was a military prisoner for a few months, but it was his trip home that was remarkable. He was paraded around major Eastern cities to impress him with the might of the United States. Yet this detour turned into a celebrity sighting for locals. Makataimeshekiakiah was a sensation, mobbed by curious onlookers in every city he visited. Then, upon returning home he dictated his autobiography, which became a bestseller. This paper uses primary sources to connect these two events following the war with the migration of settlers from the Eastern United States, who carried with them to Wisconsin their earlier impressions of Makataimeshekiakiah. Such an account restores to Makataimeshekiakiah a kev role in how the Wisconsin past was and still is represented and remembered.

Christopher Slaby is a Ph.D. student in American Studies at the College of William & Mary. His research examines the intersection of history, memory, popular representation, and the environment, primarily in the Native American Northeast.



A Paradigm Shift Within University Museums

Presenter: Emily Bagdasarian Advisor: Danielle Moretti-Langholtz College of William & Mary, Anthropology

This research examines the role of university museums in the United States and its relationship to the members of the academic and local communities as well as its impact on a national and international level. The purpose of this study is to identify how changes in educational, social, and cultural issues have affected the role of university museums in the United States during its almost two hundred and fifty years of evolution and which audiences (academic and/or public) they chose of focus on. Taking a multi-faceted approach, this research studies three museums from Ivy League institutions: The University of Pennsylvania Museum of Archaeology and Anthropology, The Peabody Museum of Archaeology and Ethnology at Harvard University, and The Peabody Museum of Natural History at Yale University. Three major research questions were derived for this study: (1) What function or role do university museums play? And how has it changed over time? (2) What were the reasons for the development and growth in university museums? (3) How and why do university museums include or exclude certain audiences? Ultimately, this study provides an in-depth examination of the role and function of university museums in the United States since the 18th century.

Emily Bagdasarian is an M.A. Candidate in Anthropology specializing in Historical Archaeology at the College of William & Mary. She graduated in May 2015 from James Madison University with her B.S. in Cultural Anthropology and Media Arts and Design for Journalism. She has worked at several art galleries and museums during her undergraduate and graduate career.

A Besos Me a Beluu: The Archaeological Signature of Competitive Social Balance

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

Palauan society was portrayed by European explorers as a binary chiefdom consisting of either elites or commoners. This is consistent with Western conceptions of political formations at the time, such as Service's unilineal stages of social evolution, notions which continue to infuse modern scholarly work. Yet, Palauan oral traditions and ethnographic research counter the presence of a traditional hierarchical chiefdom. As I will argue, the Palauan indigenous worldview identifies several nested layers of balanced quadripartite divisions: at the cosmological-scale; at the regional-scale; at the village-scale; and even at the scale of the individual structure. This paper re-conceptualizes Palauan sociopolitical formations during the Stonework Era (c. AD 1250-1800) through an assessment of the spatial arrangement of village sites. This assessment is informed by critical linguistics and a re-analysis previous ethnographic research. The subsequent interpretations are informed by elements of house society and orderly anarchy. I construct a folk taxonomy covering the built environment of Stonework villages, based upon consultation with Palauan cultural authorities and a critical analysis of the grammar and vocabulary of Palauan language. The results are mapped upon Palauan Stonework village sites in order to transcend strictly formal interpretations of spatial arrangement and document functional purposes. Through incorporating Palauan worldviews, archaeological interpretations which privilege traditional chiefly society are re-assessed, eliciting the archaeological signature of sociopolitical features intentionally employed to inhibit the emergence of self-aggrandizing elite.

Nick Belluzzo is a Ph.D. student in Anthropology. 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.



Sideshow Deformities and Cultural Perception

Presenter: Rachel Marie Blasé Advisor: Rashni Sadana George Mason University, Anthropology

Research will examine the correlation of the shift in cultural attitude towards the deformities that were put on display in side shows and the advancements in medical science. Literature on sideshows, medical studies, and other media will be consulted. The archives of the Mutter Museum, a medical college, will be utilized as well. The intent of this research is to learn how advancements in medical science have changed how deformity is viewed and represented in culture. Is medical science still in charge of that perception, or has something else taken charge of it instead?

Rachel Blasé is an M.A. student in Anthropology at George Mason University. Her thesis will examine the relationship between how teratology and medical science affected the cultural view of deformities.

Commodity Culture: The Formation, Exchange, and Negotiation of Early Republican Period Identity in the Spanish New World

Presenter: Lauren Alston Bridges Advisor: Kathleen Bragdon College of William & Mary, Anthropology

During the Early Republican Period, the sugar industry increasingly connected a fledgling Salvadoran country to a global market. A creolized labor force produced sugar on large estates known as haciendas. The hacienda was a crossroads of indigenous, African, and European interests as evidenced in the ceramic landscapes of the Rio Ceniza Valley. The extensive organization of labor, on a periphery of the Spanish Empire, was underscored by a complex set of power relations. This research focuses on the transitional period of Salvadoran independence; a volatile time when individuals reshaped their social, economic, and political identities. The control and consumption of commodities may be one way individuals reshaped identity, or perhaps it is the physical manifestation of the ways in which identities were wrought. This paper is an exploration of identity and agency, or lack thereof, at a 19th-century hacienda within a larger, possibly illicit, ceramic landscape of western El Salvador.

Lauren Alston Bridges is an historical archaeologist and currently a second-year Ph.D. student in Anthropology at the College of William & Mary. Her work attempts to synthesize archaeological and ethnographic work concerning the entanglement of ethnicity, materiality, and nationhood in nineteenth-century El Salvador.





Knackered Nags and Mislaid Mounts: The Scarcity of Equine Remains in Eighteenth-Century Faunal Assemblages

Presenter: Jenna Kay Carlson Dietmeier Advisor: Neil Norman College of William & Mary, Anthropology

Horses were ubiquitous in the colonial Chesapeake and Lowcountry. Despite their popularity in both regions as riding, working, and breeding animals, horses are shockingly rare in the archaeological record. This research explores the reasons behind this archaeological rarity, comparing evidence from probate inventories and faunal assemblages from eighteenth-century plantations within the Chesapeake region of Virginia and Maryland and the South Carolina Lowcountry. The evidence suggests that equine remains are scarce in the archaeological records of North American domestic sites because of consumption practices, disposal patterns, and taphonomic processes. Most excavated deposits include kitchen refuse, and, as animals that are rarely consumed, horses seldom end up in kitchen refuse. Furthermore, horses may have been disposed of through knackering or buried on the far reaches of plantations, areas which have not yet received attention from archaeologists. Finally, taphonomic process and other post-depositional processes affect which remains are ultimately recovered in colonial faunal assemblages.

Jenna Carlson Dietmeier is a Ph.D. Candidate in Anthropology at the College of William & Mary. Her dissertation analyzes the working oxen, horses, and mules on eighteenth-century plantations in the Chesapeake and Lowcountry. In her dissertation, she explores the entanglement of humans' and animals' lives in terms of working animal husbandry and the incorporation of working animals into structures of power and negotiations over authority.

Changing Yamasee Ceramic Practices in the Colonial Southeast

Presenter: Patrick Lee Johnson Advisor: Kathleen Bragdon College of William & Mary, Anthropology

Yamasees emerged as a Native American group in the mid-seventeenth century and migrated from Georgia to the Charleston area of South Carolina to St. Augustine and Pensacola in Florida to seize diplomatic opportunities and develop new ceramic traditions. Their mobility led them to adopt new forms of material culture but also allowed them to marry into other Native American groups, outnumber those other groups, and become the Native Americans most essential for the Spanish and British. Their mobility also challenges assumptions frequently made by archaeologists. Archaeologists often assume that ceramics became simpler after European contact, that a pottery assemblage was made by a recognizable ethnicity of people, and that pottery designs at times reflect conscious depictions of the supernatural. However, Yamasee ceramics show a persistence of pre-Contact motifs and vessel forms well into the late eighteenthcentury and changes in ceramic designs, additives, and forms after only a few generations. Analysis of these traits demonstrates that at Yamasee sites, hybridized daily practices combined new and old materials, techniques, and designs in ways distinctive from those used to tattoo or otherwise distinguish leaders and warriors. Further, while perhaps at times depicting belief systems, ceramics did so in a largely unconscious and way, since these supernatural designs appear most frequently on pots made to trade with Europeans. In short, Yamasee ceramic practices challenge common archaeological assumptions by changing dramatically through time, demonstrating connections to the past in select ways, and using supernatural motifs for trade rather than ritual practice.

Patrick Johnson is a Ph.D. Candidate in Anthropology at the College of William & Mary. He is interested in the mechanics of colonial Native American authority and daily ceramic practices. His dissertation studies the Yamasees of South Carolina, Georgia, and Florida, and his presentation focuses on ceramic changes in time and space.





A Stratigraphic Look at the History of Medieval Ife: Perspectives from Recent Investigations at Yemoo Grove

Presenter: Olanrewaju Blessing Lasisi Advisor: Neil Norman College of William & Mary, Anthropology

Ife is an exception in the historiography of medieval West Africa, with an extensive and detailed sociopolitical history during the first half of the second millennium C.E. This rich historiography is based on three categories of sources: the archaeological record; an outstanding selection of the material record of ancient Ife usually referred to as 'art'; and a large corpus of oral traditions. In this paper, I reflect on the stratigraphy of Ile-Ife and what it tells us about the long-term history of the city. Working with the team of archaeologists from France, Nigeria, UK and USA (directed by Professor Gerard Chouin of the Department of History, William & Mary), our data derives from archaeological work conducted in 2015 and 2016 on one of Ife's defensive ditch-andbank systems at the site of Ita Yemoo. Three levels were identified. The oldest level belongs to the twelfth and thirteenth centuries C.E., while the most recent belong to the post mid-19th c. era. In between, a thick layer of rich, dark soil including charcoals and evidence of burnt wood may correspond to a layer of destruction and abandonment, followed by colonization by woody plants. In many ways, the stratigraphy of Ita Yemoo appears comparable to that of other excavated sites at Ife and suggests a long period of abandonment of the city at the end of its classical/florescent period. This contrasts with the previously dominant narratives about continuity between medieval and post-medieval Ife.

Olanrewaju Lasisi is a Ph.D. student in Anthropology at the College of William & Mary. His research interest is on the urbanization processes that took place in the forest of West Africa during the medieval period with a particular focus on the historical archaeology of West Africa through the studies of earthworks, and defensive ditches in Nigeria.

Redesigning the Everyday: Household Spatial Organization and Domestic Practice at Nineteenth-Century Miloli'i, Hawai'i

Presenter: Summer Moore Advisor: Jennifer Kahn College of William & Mary,

Anthropology

The organization of domestic space in colonial settings has long been a topic of interest to archaeologists. Because the structure of household space both reflects and shapes social practices, the study of domestic spatial organization can illuminate the changing nature of daily practices in indigenous households. Scholars have yet to fully investigate the shifting use of domestic space in post-contact East Polynesia, including Hawaii. While researchers have identified widespread architectural changes, including the addition of a verandah or and the joining of separate structures into a single sleeping area, we have little understanding of how or if Hawaiian families adapted household activities in conjunction with these changes. Using two nineteenthcentury house platforms in Miloli'i Valley, Hawai'i, I address the organization of household practices in early post-contact Hawaiian households. An assemblage of domestic artifacts, including fragments of glass, ceramics, metal, shell, and bone, was recovered from the surface of these platforms. I examine the relative density of these artifacts in different areas of each structure. On both house platforms, artifact density was highest on the lanai, although the sleeping platform yielded few artifacts. I argue that Hawaiian families in nineteenth-century Miloli'i continued the traditional Hawaiian practice of limiting domestic activities in the sleeping area while moving domestic chores to the lanai. By focusing on the spatial analysis of household artifacts at nineteenthcentury Miloli'i, this project sheds light on patterns of continuity and change in the organization of postcontact Hawaiian domestic activities.

Summer Moore is a Ph.D. Candidate in Anthropology at the College of William & Mary. She holds an M.A. in Anthropology from the University of Denver. Her dissertation research addresses questions about life in Hawai'i in the post-contact period. Her project combines data from archaeological legacy collections and recent excavations to investigate how Hawaiians negotiated emerging social, economic, and political realities during this time.



Hunting and/or Gathering: Gender and Fishing Practices in French Polynesia

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

The man-the-hunter versus woman-the-gatherer dichotomy has been discussed and debated within anthropology for decades. However, recent research has actively sought to challenge these narratives in demonstrating the more complex subsistence strategies at work across a wide range of cultures. Fishing in particular occupies a unique intersection between hunting and gathering, a trait typically hinging on different methods of acquisition. In Polynesia, tuna (family Scombridae) are well-known as one of the most prized animals, and as such is often included in research questions pertaining to ritual, political, and economic nuance for foodways patterns and taboo/tapu systems. However, pufferfish (family Diodontidae) are one of the most commonly recovered fish specimens in archaeological contexts due to the exceptionally durable nature of their jaw bones. Ethnographically, pufferfish have been noted as a fish that can be "gathered" by women and children due to the ease in collection once stunned, in stark contrast to the tuna "hunts" that men embarked on. This paper seeks to engage in a discussion about gender and fishing in Polynesia via the archaeological evidence from a site on Mo'orea, Society Islands and comparative ethnoarchaeological data.

Alexis Ohman is a Ph.D. Candidate in Historical Archaeology at the College of William & Mary. Her dissertation research investigates marine resource use in Antigua, West Indies via comparative faunal analysis of a pre-contact site, a plantation site, and a fort site. Additional projects she has worked on during her time at William & Mary include faunal analysis for sites in Jamaica, Montserrat, and French Polynesia.

The Saloons Speak: Activity Areas at Highland City, Montana Revealed

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

The frontier location of resource extraction communities irrevocably changed and shaped their inhabitants' interactions, just as they themselves altered the landscape and resources around them. As spaces of constant and dynamic exchanges of goods and ideas, frontier spaces, especially resource extraction communities like fishing and mining towns, act as ideal locations to examine the negotiation of local regimes of value and social hierarchy. With my third and final year of excavations completed for my doctoral research, I am now able to share newfound activity areas at Highland City, which have proven to be crucial in comparing the site to Smuttynose Island, Maine. Identifying domestic, saloon, and even opium using areas on the site, I can now compare drinking spaces at these two sites and, in doing so, shed light onto some of the transactions taking place within the local microeconomy of these two towns - transactions which are, in fact, very similar, despite the years and miles that separate the two towns.

Megan Victor is a Ph.D. Candidate in Anthropology at the College of William & Mary, and a Project Archaeologist at Colonial Williamsburg. Her research focuses most on drinking spaces and the way that individuals negotiated their social status and less savory "under-the-table" deals within these institutions — especially on the frontier. She received her B.A. from the University of Michigan in 2010 and her M.A. from the College of William & Mary in 2012.



In the Weeds: The Thorny Question of Crop Processing and Dung Fuel Use at Late Chalcolithic Çadır Höyük, Turkey

Presenter: Madelynn von Baeyer Advisor: Alexia Smith University of Connecticut, Anthropology

My work uses archaeobotany, the study of the relationship between ancient plants and people, to explore the social, political, and economic organization of the Late Chalcolithic (L.C.) period at Cadır Höyük, a large mounded site located in the central Anatolian plateau that has been excavated since 1994. The site dates from the Middle Chalcolithic (5300 B.C.E.) through the Byzantine (1100 A.D.) periods. I am examining the weed (non-economic crop) seed assemblage from 35 contexts dating to 3600-3100 B.C.E. to assess the role of crop processing and dung fuel use at Cadir during the LC, a period of shifting economic, political, and social organization. Weeds enter into the archaeobotanical assemblage in primarily one of two ways: 1) as discard from food preparation that can inform us on the spatial distribution and communal labor of plant use or 2) as discard from burning dung fuel that can inform us on field management strategies, animal foddering, and seasonal growing patterns. This talk will use quantitative methods, architectural context, spatial distribution of samples, and ethnoarchaeological models to determine whether or not the weed assemblage is indicative of crop processing, dung fuel use, or both, and how this can inform broader questions of social complexity.

Madelynn von Baeyer is a Ph.D. Candidate in Anthropology at the University of Connecticut. Her research focuses on using ancient plant use as a way to discuss new dimensions of social complexity. Her dissertation work is on the Late Chalcolithic archaeobotanical assemblage from Çadır Höyük, a site in central Turkey, but she is involved in projects across Turkey and Greece.



Expression of Ion Channels on Dbx1 Neurons that May Facilitate Respirate Rhythm Generation in Mice

Presenter: Victoria Akins Advisor: Christopher Del Negro College of William & Mary, Applied Science

Breathing is an essential behavior for all mammalian life, yet the underlying mechanisms for respiratory rhythm generation remains incompletely understood. The pre-Bötzinger complex (preBötC), a bilaterally distributed nucleus located in the ventral medulla of the brainstem generates the inspiratory phase of the respiratory rhythm. Rhythm-generating neurons in the preBötC are derived from a single genetic line expressing precursors for Dbx1 (Developing Brain Homeobox-1) hereafter denoted as Dbx1 neurons. Respiratory rhythm generation may depend on the calcium activated non-specific cation current ICAN and the persistent sodium current INaP. The most likely ion channel to generate INaP in Dbx1 preBötC neurons is Nav1.6 and a leading candidate ion channel for ICAN is TRPC3. These data show that Nav1.6 and TRPC3 ion channels are present on Dbx1 preBötC neurons, making it expressly possible for ICAN and INaP to play a role in respiratory rhythm generation.

Victoria Akins is a Ph.D. Candidate in Applied Science at the College of William & Mary studying Systems Neuroscience. She graduated from James Madison University with a B.S. and M.S. in Integrated Science and Technology.

Thermal Interface Materials Reinforced by Boron Nitride Nanotubes (BNNTs) for Thermal Management of Electronics

Presenter: Mahmoud Samy Amin Advisor: Hannes Schniepp College of 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. Through this work, advanced thermal interface materials (TIMs) are prepared using different polymer matrices reinforced with boron nitride nanotubes (BNNTs) for improved heat dissipation, so that heat can be guided away from these components more efficiently. The thermal and electrical conductivities of the composites are studied using scanning thermal microscopy (SThM) and atomic force microscope (AFM) at spatial resolutions of 100 nm and 5 nm, respectively. Moreover, the thermal stability of the composites is investigated using thermal gravimetric analysis (TGA). Furthermore, the coefficient of thermal expansion is studied to tailor the thermal expansion behavior of TIMs.

Mahmoud Amin is a Ph.D. Candidate in Applied Science at the College of William & Mary. He finished his master's thesis before coming to the US 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 and scanning thermal microscopy (SThM) as an advanced technique for thermal monitoring on the nanoscale.



Thin Film Materials: Doorway to the Future of Superconducting Accelerators

Presenter: David Reed Beverstock Advisor: Michael Kelley College of William & Mary, Applied Science

Important research is conducted with accelerators based on superconducting radio frequency (SRF) cavities. The cavities are fabricated from pure niobium (Nb) and operate at 2 Kelvin above absolute zero. The construction and operation of the cavities is prohibitively costly for next-gen machines. New materials are needed to improve cavity power and efficiency. Niobium-tin (Nb₃Sn) is a very promising alternative superconductor. Nb₃Sn is brittle, consequently it must be used as a thin film deposited on a substrate, like Nb. Thomas Jefferson Accelerator Facility is experienced in tin vapor diffusion techniques to obtain a film of Nb₃Sn on Nb cavities. Films prepared by the diffusion technique can't explore Nb₃Sn's full properties and potential. The ideal cavity film is topographically smooth, free of impurities, free of voids, having large grains and of uniform composition. Or simply said perfect crystal structure. Depositing perfect crystals is difficult and usually results in impurities, voids, and grain boundaries, which can lower the superconducting properties. Hollow cathode magnetrons can operate at low pressure and with self sputtering will lower the number of impurities in the thin film. Adding RF power to the magnetrons plasma delivers enough energy to close voids and support grain growth. The study of deposition of thin films of Nb₃Sn on Nb when complete will allow accelerators to be more powerful, efficient and affordable.

Reed Beverstock, is a Ph.D. Candidate in Applied Science at the College of William & Mary. His research interests include thin films and materials characterization. Reed's current research is on niobium-tin thin films for a new generation of superconducting radiofrequency cavities. In his spare time, he gardens and builds reef aquariums.

Using a Trojan Horse Strategy to Disrupt the Growth of Yeast Biofilms

Presenter: Adrienna N. Bingham
Co-Authors: A. Lenhart, A. Sur, H. Murphy
Advisor: Leah Shaw
College of William & Mary,
Applied Science

Recent studies have shown that many microorganisms prefer social interactions, such as cooperation, over solitary lifestyles. Cooperation can occur when a microbial strain produces a public good for use by all strains in the environment. This cooperation can lead to the formation of biofilms, a community of one or more species that is protected by an extracellular matrix and attached to a surface. These biofilms can be hazardous to human health by growing on medical implants, such as catheters, and potentially causing infection. The extracellular matrix provides a protective barrier for the biofilm against antibiotics and other environmental hazards, making eradicating hazardous biofilm difficult. We propose that a cheater strain, a strain that does not contribute to the community but still partakes in the public goods, can be introduced into the biofilm to disrupt it. Our project works with the yeast, Saccharomyces cerevisiae, in order to understand the communication process involved in yeast biofilm formation. This talk focuses on the computational aspects of the project. We present Monte Carlo simulations of spatial growth and differential equation models to help determine growth and cooperation rates of the yeast strains. Combining this with an experimental approach allows us to investigate how well the cheater strain is able to disrupt the cooperativity of the yeast biofilm and how feasible it will be to introduce a Trojan Horse strategy in which a strain produces a toxin and a self-protective antitoxin in order to more quickly disrupt the biofilm.

Adrienna Bingham is a Ph.D. Candidate in Applied Science at the College of William & Mary. She earned her B.S. in Mathematics at Angelo State University in SanAngelo, Texas, with minors in Computer Science and Spanish. Her research focuses on implementing control measures in epidemic and yeast biofilm growth models with minimal error.



The Role of Calcium Activity in Early Neural Development

Presenter: Sudip Paudel Advisor: Margaret Saha College of William & Mary, Applied Science

Development of an organism requires integration of highly regulated intracellular and extracellular molecular signals to direct embryonic cells towards a specific fate. One such signal is calcium, a ubiquitous and essential messenger that regulates wide array of processes throughout life of organism. Calcium plays an important role during various developmental processes. Particularly striking is the widespread calcium activity consisting of waves and spikes present in all vertebrate embryos during the earliest stages of neural development. While some progress has been made in characterizing and identifying molecular players regulating this activity, much remains unknown, including the molecular phenotype of the active cells and the regulation of this activity. Additionally, it is unknown whether there are stereotypical conserved spatial-temporal patterns of activity in all embryos at given stages. Our goal in this project is to address these questions by providing detailed analysis of calcium activity in normally developing embryos during neural development followed by identification of molecular phenotype of the active cells. We will then examine calcium activity in response to perturbations to determine if calcium plays a role in the wound response. We will employ time-lapse imaging using genetically encoded calcium marker(s) and molecular tools (in situ hybridization, immunocytochemistry and RNA-seg) in a system that allows access to embryos at earliest stages (Xenopus). Taken together these experiments will reveal whether there is stereotypical calcium activity in early neural development and will begin to uncover the molecular mechanisms governing this process.

Sudip Paudel is a second-year Ph.D. student in Applied Science at the College of William & Mary.



Likelihood Ratio Tests for Homeolog Expression Bias

Presenter: Ronald D. Smith Advisor: Gregory Smith College of William & Mary, Applied Science

Duplicated genes are common in eukaryotes and a likely contributor to the diversity of life on earth. There are several ways that a gene can be duplicated. In this talk we'll focus on Whole Genome Duplications (WGD), common to all plants, especially all major crops (corn, potato, rice,...). It is not well understood how duplicated genes evolve in function over time or in different tissues. In this talk I'll present a statistical method, using RNA-seq data, that can be used to measure "homeolog expression bias" (HEB) and HEB-shift (HEBS). Results from the monkeyflower Mimulus luteus (a tetraploid) will be shown, and we will also discuss the broad applicability of this approach. These techniques should be of interest to any researcher interested in the fate of duplicated genes.

Ron Smith is a Ph.D. Candidate in Applied Science at the College of William & Mary. He earned his B.S. in Applied Mathematics from SUNY Farming-dale in 2013. His current work includes mathematical and computer modeling in the realm of computational biology.

Anisotropic Mechanical Response and Failure of Spider Silk Reveals Its Hierarchical Structure

Presenter: Qijue Wang Advisor: Hannes Schniepp College of William & Mary, Applied Science

The origin of spider silk's outstanding mechanical properties, combining high strength and high extensibility, has been intensively studied for several decades. Although the protein sequence and macroscopic morphology of the silk fiber are known, there is currently no consensus model regarding structural organization for length scales in between. Protein micelles have been favored by some, whereas a nanofibrillar organization has been suggested by others. To better investigate the silk structure, we study the silk of the recluse (Loxosceles) spider. It has a ribbon-like morphology, with a thickness of less than 50 nm and a width of 6 µm. Being only a few protein layers thin, this unique structure is much simpler, and thus ideal to investigate the molecular makeup of silk. By breaking these silk ribbons and observing the structure of the rupturing locations via atomic force microscopy (AFM), we found that Loxosceles ribbon silk is entirely composed of 20-nm thin nanofibrils. On one hand, Loxosceles silk shares similar mechanical properties with some of the best-performing spider silks. On the other hand, our experiments fully revealed the hierarchy of its structure: proteins organized into nanofibrils that are further organized into ribbons. We also tested the anisotropic mechanical properties of the ribbons by force spectroscopy and compared the results to models and finite element simulations.

Qijue Wang is a third-year Ph.D. Candidate in Applied Science at the College of William & Mary. He works in the nanomaterial and imaging lab. His main research project focuses on the mechanical properties, internal structure and their relationships of the recluse spider silk.





Pattern Formation in Marsh Ecosystems Modeled Through the Interactions of Marsh Vegetation, Mussels and Sediment

Presenter: Sofya Zaytseva Co-Authors: J. Shi, R. Lipcius Advisor: Leah Shaw College of William & Mary, Applied Science

Spatial patterning in multi-species communities can be critical to ensuring their proper function and survival, making the investigation of self-organization in ecology crucial for understanding the underlying interactions in various ecosystem communities and their ability to adapt to emerging environmental changes. In this presentation, we focus on fingerlike projections consisting of marsh vegetation, mussels and accumulated sediment observed on the marsh shorelines of the York River. Although we consider this specific location, similar structures may exist in other marsh communities. We propose a system of reaction-diffusion equations with nonlocal interactions to model the formation of these aggregations through interactions between marsh vegetation, mussels and sediment. The model presents a phenomenological approach, focused on the self-organization as a result of interactions between species. We analytically and numerically study the three-species system (marsh vegetationmussels-sediment), as well as the mussel-free subsystem, to gain understanding into the possible dynamics. In addition, snapshots of the system are analyzed along an erosion gradient to investigate the system's transition to a degraded state with increasing environmental stresses.

Sofya Zaytseva is a third-year Ph.D. Candidate in Applied Science at the College of William & Mary. Her research focuses on questions regarding pattern formation in ecology. She has a Master's Degree in Mathematics.



Acetylation Controls the Intracellular Localization of Thyroid Hormone Receptor

Presenter: Cyril Anyetei-Anum Advisor: Lizabeth Allison College of William & Mary, Biology

Thyroid hormone (T3) is important for many processes that occur within our bodies, such as growth and development. Its action is mediated by the thyroid hormone receptor (TR), a protein that binds to target genes and regulates their expression. Multiple 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. Prior studies 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. Here, we investigate how acetylation, a post-translational amino acid modification that occurs within one of the NLSs of TR, affects its intracellular localization. To test this, mutants of TR that mimic acetylation and nonacetylation were constructed with fluorescent protein tags and introduced into HeLa (human) cells. The intracellular localization of these mutants was visualized by fluorescence microscopy and the fluorescence intensity in the nucleus and cytoplasm of the cell was measured to obtain an average nuclear/cytoplasmic (N/C) ratio. The TR acetylationmimic showed a statistically significant cytoplasmic localization compared to wild-type TR, whereas the TR non-acetylation mimic and wild-type TR shared the same primarily nuclear localization. These findings point to the influence of acetylation on TR shuttling, and will extend understanding of how this interplays with TR-regulated processes of growth and development.

Cyril Anyetei-Anum is a first-year M.S. Candidate in Biology at the College of William & Mary. His research interests include molecular biology, genetics, and biochemistry.

Comparative Anatomy of the Dentition of Ocean Sunfishes (*Molidae*) and Porcupinefishes (*Diodontidae*)



Presenter: Katherine Elliott Bemis

Co-Author: W. Bemis Advisor. Eric Hilton

Virginia Institute of Marine Science,

Fisheries Science

The lower jaws of the Ocean Sunfish (Mola mola) and the Porcupinefish (Diodon hystrix) are fused at the midline. Instead of individual teeth, adults of both genera have a beak along the jaw margin. Molids and diodontids are thought to be closely related, based in part on the presence of a beak. Yet there are some older reports of striking anatomical differences in beak microstructure and growth. To explore these differences in more detail, we compared beak structure, development, and replacement in Mola and Diodon in specimens ranging from juveniles to adults using dissection, osteology, histology, and micro-CT scanning. The beak of Mola wears away from the top while new material is added from a large pulp cavity at its base. There are no discrete units within the single beak, and no parts are more calcified than others. This differs from the pattern in Diodon, in which the beak is composed of discrete plates surrounded by a less dense matrix when viewed using micro-CT reconstructions. These plates are stacked on top of one another and replaced from beneath. Posteriorly and between the fused dentaries of *Diodon* are large paired crushing plates that are replaced from below; nothing comparable is present in Mola. These differences in dental morphology suggest the possibility that beaks either: 1) evolved more than once within this small clade of fishes; or 2) that beak structure is more labile than previously thought.

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



Bt Transgenic Corn and Its Effects on the Larvae of the Corn Earworm (Helicoverpa zea)

Presenter: Thomas Bilbo
Co-Authors: J. Greene, D. Reisig,
M. Turnbull
Advisor: Francis Reay-Jones
Clemson University,
Plant and Environmental Sciences

The majority of corn and cotton planted in the United States has been genetically engineered to express Bt insecticidal proteins (Cry toxins). The primary threat to the success and longevity of Bt crops is the development of insect resistance. In order to delay resistance, it is essential to understand the ecological effects of various Bt corn hybrids on key pests such as the corn earworm (Helicoverpa zea). The objectives of this study were to relate H. zea larval development, survival, and feeding behavior to concentrations of Cry toxins in different corn tissues using ELISA. We hypothesized that concentration of Cry toxins would vary among tissue type and through time, and that higher tissue concentrations would have greater effects on H. zea larvae. These data will be incorporated into insect resistance management models, which can be used to improve risk management decisions regarding H. zea in Bt crops in the complex landscapes of the southern United States. Results will be discussed.

Tom Bilbo is an entomologist and Ph.D. Candidate at Clemson University. Prior to Clemson, he earned his M.S. at Texas Tech University where he studied mosquito ecotoxicology and addressed questions relating to density and pesticide interactions. At Clemson, his Ph.D. work focuses on managing important agricultural insect pests and the development of resistance to transgenic crops.

The Role of Mercury in Oxidative Stress: An Analysis Using Exercised Zebra Finches

Presenter: Juan M. Botero Co-Author: E. Bradley Advisor: Daniel Cristol College of William & Mary, Biology

Most avian mercury(Hg) research has focused on piscivorous birds, however, comparable levels of Hq can occur in insectivorous sonabirds in terrestrial landscapes. Hg inflicts damage on a wide array of physiological pathways including the immune system, reproductive success, and cognition. However, a limited understanding of the molecular mechanisms through which Hg induces deleterious effects leaves us with an incomplete picture of Hg toxicity. One proposed mechanism is mercury-induced oxidative stress (OXS), a shift in the pro-oxidant to antioxidant ratio towards the former. OXS, and in particular cumulative oxidative damage, is known to impose extensive physiological costs to longevity, immune response and physical activity. Our research addressed two questions by using exercise, a known inducer of OXS, as a positive control: (1) are non-lethal ways of quantifying OXS reliable, alternatively, are OXS biomarker levels comparable between liver tissue and blood? (2) are younger birds (50days) more likely to experience Hg-induced OXS than mature adults? Zebra Finches were put on a two-day exercise regimen through flight induction. Blood and organ samples were collected for both exercised and non-exercised birds. Blood samples were also collected from a separate group at the age of 50 days for age analysis. We analyzed shifts in the glutathione ratio and concentrations of superoxide dismutase as biomarkers of OXS. Our analysis highlights the difficulties of OXS research as it applies to Hg studies and field studies.

Juan Botero is an M.S. Candidate in Biology at the College of William & Mary. He has a B.A. in Wildlife Science from Virginia Tech. Juan has worked on several field crews focusing on community ecology, behavioral ecology, and toxicology remediation. He is currently interested in the mechanisms driving toxicological effects on songbirds in order to better shape conservation efforts in the future.



Modeling the Vulnerability of Headwater Wetlands to Climate Change in the Coastal Plain of Virginia

Presenter: Pamela Hope Braff Advisor. Carl Hershner Virginia Institute of Marine Science, Biological Sciences

Located at the interface between uplands and surface water networks, headwater wetlands play a critical role in maintaining the ecological integrity of downstream ecosystems. Headwater wetlands intercept shallow groundwater and surface runoff, acting as a natural filter to improve downstream water quality. Changes in catchment hydrology, due to land use and climate change, have contributed to the degradation of many aquatic ecosystems. However, it is unclear to what extent anthropogenic impacts will affect the hydrologic regime and ecosystem function of headwater wetlands. This research seeks to inform the conservation and management of headwater wetlands by identifying which wetlands are most vulnerable to climate change, and describing how the character and condition of headwater catchments influence wetland vulnerability. To describe wetland vulnerability, I have developed a GIS-based model to predict wetland presence/ absence in the York River watershed under current and projected future climate conditions. Wetland presence/absence is predicted based on a modeled depth to water table, assuming that wetlands form wherever the water table is within 30cm of the surface. This water table elevation is determined from a combination of data including the elevation of lakes, streams, and rivers, soil properties, land use, precipitation, evapotranspiration, and sea level. To validate the wetland vulnerability model, groundwater elevation monitoring wells will be installed at 10 headwater wetlands in the study area. I will present the wetland vulnerability model and findings, as well as preliminary results from the groundwater monitoring study.

Pamela Braff is a Ph.D. Candidate at the Virginia Institute of Marine Science. Her current research explores the vulnerability of headwater wetlands to climate change in the coastal plain.

Predation on Juvenile Blue Crabs (*Callinectes sapidus*) in the York River, Virginia



Presenter: Amanda Bromilow Advisor: Romuald Lipcius Virginia Institute of Marine Science, Fisheries Science

Nursery habitats play

Nursery habitats play a major role in the population dynamics of marine and estuarine species, with the blue crab Callinectes sapidus serving as a model invertebrate species. The current paradigm of blue crab habitat use postulates that juvenile survival decreases in submerged aquatic vegetation (SAV) as they grow, triggering an ontogenetic shift from SAV to unvegetated habitats. However, alternative mechanisms for this habitat shift have not been examined. We evaluated the paradigm of blue crab habitat use by conducting field tethering experiments using a broad range of juvenile size and SAV cover in York River nursery habitats. Cameras were deployed to identify key predators of juvenile blue crabs, and to assess the relative importance of predation and cannibalism as sources of juvenile mortality. Probability of survival increased significantly with crab size and marginally with SAV cover, with no interaction, indicating that juvenile survival increases additively with both crab size and SAV cover. Thus, the ontogenetic habitat shift by juvenile blue crabs is likely driven by a trade-off between perceived predation risk and foraging efficiency, rather than a reduction of suitably-scaled refuges as body size increases. In images of predation events, adult blue crabs, northern puffers Sphoeroides maculatus, striped burrfish Chilomycterus schoepfi, and oyster toadfish Opsanus tau were identified as predators of juveniles in seagrass beds and sand flats. The high frequency of successful predation by adult blue crabs suggests that cannibalism is a primary source of juvenile mortality, and possibly more influential to blue crab population dynamics than finfish predation.

Amanda Bromilow is an M.S. Candidate in the Fisheries Science Department at the Virginia Institute of Marine Science. Her thesis research focuses on juvenile blue crab survival and the influence of predators on juvenile mortality.



Nuclear Receptors and Transcriptional Elements: Shifts in Localization Caused by MED1-TR Interaction

Presenter: Matthew R. Femia Advisor. Lizabeth Allison College of William & Mary, Biology

Thyroid hormone receptor alpha1 (TRa1) and thyroid hormone receptor beta1 (TRB1) are nuclear receptors that respond to thyroid hormone by altering the transcription of target genes. While the primary role of both TRa1 and TRB1 is to function as transcription factors in the nucleus, they have been found to shuttle between the nucleus and the cytoplasm. Previously, we have characterized signal sequence motifs and proteins that facilitate both TR's import into and export out of the nucleus; however, characterization of protein interactions that promote nuclear retention of the receptor remain unclear. To determine an interaction that may promote nuclear localization of TR, we investigated the role of mediator complex subunit 1 (MED1), a subunit of the Mediator transcriptional regulatory complex, which has been shown to interact with TR. In addition, phosphorylation of MED1 by mitogenactivated protein kinase (MAPK)-extracellular signal -regulated kinase (ERK) enhances TR-dependent transcription. The effect of MED1 overexpression on TRa1/TRB1 nucleocytoplasmic distribution is being quantified using fluorescence microscopy. Additionally, verification of MED1 knockdown through RNA interference (RNAi) has been confirmed. Assays for both MED1 knockdown and how MED1 affects intranuclear mobility of TR are currently in progress. Together, our findings will provide comprehensive evidence of how MED1 affects nuclear retention of TR and ultimately provide insight into TR and T3related pathogenesis.

Matthew Femia is an M.S. student in Biology at the College of William & Mary. His research focuses on revealing factors affecting the nuclear localization of thyroid hormone receptor.

Swimming Kinematics Facilitate Ram Suspension Feeding in a Model American Paddlefish



Presenter: Grant Emerson Haines Advisor: S. Laurie Sanderson College of William & Mary,

Biology

Ram suspension feeding fishes, including menhaden, anchovies, and basking sharks, ingest small planktonic prey by capturing food particles in their open mouths as they swim forward. Many of these fish species are economically important and play key ecological roles, linking primary consumers to higher trophic levels. However, the filtration mechanisms used by these fish to separate particles from the water are not well understood. Among the most important problems yet to be solved are how ram suspension feeders prevent their filtering structures, the gill rakers, from becoming clogged with food particles, and how food particles are transported to the esophagus to be swallowed. Using computeraided design (CAD) software, I designed and 3-D printed a model of a paddlefish mouth. I then mechanized the model by connecting it to an Arduino microcontroller to test whether the kinematics of a swimming ram suspension-feeding fish facilitate transportation of food particles or prevent clogging of the gill rakers. Preliminary results indicate that swimming kinematics influence flow speed and pressure inside the mouth during suspension feeding, and that patterns of flow have a strong impact on particle retention and transport. This information could be used to determine the particle size selectivity of fishes' filtration structures, which could in turn be used for management of ram suspensionfeeding fish populations. In addition, industrial filtration devices may be improved by application of these findings.

Grant Haines is a second-year M.S. student in Biology at the College of William & Mary. He completed his undergraduate degrees in Biology and Political Science at Colgate University in 2015. As a student at William & Mary, he has studied the functional morphology of suspension-feeding fish in Dr. S. Laurie Sanderson's lab, focusing on the biomechanical implications of locomotion. His research interests include functional morphology, freshwater ecology, and evolution.





Sea-Level-Rise-Induced Distribution Changes of *Phragmites australis* and *Spartina alterniflora* in Tidal Freshwater Marshes

Presenter: Abbey Humphreys Advisor: Randolph Chambers College of William & Mary, Biology

With ongoing sea-level rise (SLR), tidal freshwater marshes (TFMs) eventually will be flooded with more brackish water. The impact of more water and salt on the plant community of TFMs, however, is unknown. With SLR, both the invasive reed Phragmites australis and the native salt marsh grass Spartina alterniflora could become dominant species in TFMs. I am examining how increases in salinity and inundation caused by sea-level rise will impact the relative distribution of Phragmites and Spartina in tidal freshwater marshes in Southeastern Virginia. Using GIS, I summarized past expansion patterns by mapping the current and historical distribution of Phragmites and Spartina. With soil samples collected from 6 TFMs in James City County with established Phragmites stands, I tested the effects of salinity and flooding on the germination of Phragmites and Spartina seeds and the subsequent effects of competition under these environmental regimes. From my experiments to date, salinity has negatively impacted species richness and abundance more than inundation, which could mean a decrease in plant diversity as sea-level rise inundates TFMs with saltwater. Based on germination success and historical distributions, SLRcaused range shifts can be predicted for Phragmites and Spartina and provide crucial information for wetland management as tidal freshwater marshes convert to more brackish marshes with sea-level rise.

Abbey Humphreys is an M.S. student in Biology at the College of William & Mary. Her research interests are biogeography, conservation, and mitigating the negative impacts of climate change and invasive species.

Enhancing Native Pollinator Populations for Watermelon Production in Coastal South Carolina



Presenter: Miriam Jenkins Co-Author: B. Shephard Advisor: Robert Baldwin Clemson University,

Forestry and Environmental Conservation

Efforts to conserve biodiversity of pollinators are increasingly important when considering the rising demand for food production from a growing human population and the current issues facing domesticated honeybees. Thousands of species of native, wild pollinators are an integral part of ecosystems worldwide as well as important crop pollinators. In order for sufficient pollination of crops by native insects, farms must provide sufficient resources in terms of nesting and food for native pollinators to survive throughout the year. In the case of watermelon, a crop entirely dependent on insect pollination to set fruit, previous research has shown that creating farm conditions that are amenable to native pollinators enables them to provide sufficient pollination service necessary for crop production. Incorporating wildflower patches into crop fields increases the overall floral diversity and therefore the food resource availability to native pollinators. We hypothesize that this will have positive effects on the abundance and diversity of pollinator species on watermelon farms that are able to pollinate the watermelon crop. Preliminary results show that fields with wildflowers attract a greater abundance of certain genera of native bees such as the sweat bees Lasioglossum spp. to watermelon flowers. On average we collected 17 species of bees on our six watermelon fields, the most commonly collected species being Lasioglossum callidum. This research will help us further understand the role that native pollinators play in our agricultural system and the conditions on farms that are attractive to native pollinators, which are essential to the future of our food supply.

Miriam Jenkins is a Ph.D. Candidate in Wildlife Biology at Clemson University. Her research is focused on discovering the native bee fauna that pollinate watermelon fields in South Carolina and how to alter the agro-ecosystem to support wild pollinator populations and diversify the species we rely on for crop pollination. She holds an M.S. in Biology from the University of Akron.



Impacts of Vaccination and Genetic Disease Resistance on Transmission of IHNV and Fp in Rainbow Trout

Presenter: Darbi Jones Advisor: Andrew Wargo

Virginia Institute of Marine Science,

Aquatic Health Sciences

Globally, infectious diseases are responsible for major conservation and economic losses in wild and farmed animal populations. Prevention tools, such as genetically bred disease resistance and vaccination, are used in many systems to prevent mortality by such diseases. Studies are often done to evaluate the efficacy of a preventative method at reducing clinical disease, but the impact on transmission is rarely studied. Protection under diverse field conditions, such as variable pathogen exposure dosages, is also not fully understood. Furthermore, there is little information on how preventative methods alter host-pathogen relationships. For example, it is largely unknown how vaccination or selective breeding impact non-target pathogens that co-infect the host. These knowledge gaps make it difficult to infer the epidemiological impacts of disease prevention tools. In an attempt to fill these gaps, we are experimentally investigating the leading pathogens in rainbow trout (Oncorhynchus mykiss) aquaculture: infectious hematopoietic necrosis virus and Flavobacterium psychrophilum. We evaluated the impacts of vaccination and genetically bred disease resistance on mortality and shedding. This was done across a range of challenge dosages to accurately reflect field variability. We also evaluated how vaccination and selective breeding against one of the pathogens impacts the dynamics of the other during co-infection. These studies are aimed at developing a more robust framework for inferring the efficacy of disease prevention strategies in the field. Our results will also help to inform and improve disease management in one of the top aquaculture species in the United States.

Darbi Jones is a Ph.D. Candidate at VIMS working under Dr. Andrew Wargo in the Aquatic Health Sciences Department. She currently works with infectious diseases in rainbow trout. After graduating from the University of Miami, she did research at the Walt Disney World aquarium in EPCOT with a variety of animals. She currently works with the National Aquarium in Baltimore.

Biomass and Diversity of Submersed Aquatic Vegetation in Managed Wetlands in Coastal South Carolina

Presenter: Nicholas Mark Masto Advisor: Richard Kaminski Clemson University, Wildlife Ecology

Actively managed, impounded wetlands in coastal South Carolina provide significant foraging habitats for migrating and wintering waterfowl and other waterbirds in the Atlantic flyway. Managers of these impoundments manipulate water depth, hydroperiod, and salinity to promote growth of widgeongrass (Ruppia maritima) and other submersed aquatic vegetation (SAV), which are critical food resources for waterfowl and other waterbirds. Research on biomass, diversity, and true metabolizable energy (TME) of SAV are needed by partners of the Atlantic Coast Joint Venture of the North American Waterfowl Management Plan to estimate carrying capacity (i.e., duck energy days; DEDs) of coastal wetlands relative to targeted Atlantic flyway waterfowl species (e.g., American black ducks) and population levels. Thus, we will initiate a landscapescale survey of impoundments throughout coastal South Carolina (i.e., Santee Delta and ACE Basin) during 2017-2018, using a multistage sampling design and rake-and-core sampling to estimate fall of widgeongrass, dwarf spikerush (Eleocharis paravula), gulfcoast muskgrass (Chara hornemanni), and other available SAV enabling estimation of DEDs for habitat conservation planning and implementation. Additionally, we will collaborate with colleagues of the Illinois Natural History Survey to determine TME derived by mallards (Anas platyrhynchos) and gadwall (A. strepera) from these plants for use in DED models. Finally, we will evaluate use of remote sensing imagery to determine percent and areal coverage of SAV within surveyed wetlands. Percent cover data will be combined with (1) biomass data to estimate forage abundance (kg [dry]/ha) and (2) TME (kcal/g) estimates to derive DED estimates.

Nick Masto is a graduate research assistant with the James C. Kennedy Waterfowl and Wetlands Conservation Center at Clemson University, pursuing a M.S. degree in Wildlife Ecology and Management under the advisement of Drs. Richard Kaminski and Kyle Barrett.



Developmental Differences Between Two Independently Evolved Self-Fertile Hermaphroditic Nematodes

Presenter: Caitlin McCaig

Co-Author: X. Lin Advisor: Diane Shakes College of William & Mary,

Biology

Germ cells are the cellular link between generations because they produce gametes, either eggs or sperm. Gamete production is a complex process, but the simple gonad of roundworm nematode Caenorhabditis elegans is an excellent model for germ cell development. Their germ cells are linearly organized, where a cells position reflects its stage in development. However, C. elegans is a single nematode within a rapidly evolving and genetically diverse phylum. To address whether C. elegans germ cell development is similar to that in other nematodes, we compared the gonads of C. elegans to gonads of related nematode Rhabditis sp. SB347. These comparative studies identified several R. sp. SB347 features that are divergent from those of the model nematode. First, we found that the two species convergently evolved self-fertile hermaphrodites via different developmental strategies. Unlike C. elegans hermaphrodites, which produce sperm first and then make a one-time switch to oocyte production, R. sp. SB347 hermaphrodites continuously produce both sperm and oocytes. Second, we found that R. sp. SB347 sperm production includes spermatogonial cysts, a feature that, while absent from C. elegans sperm production, is shared with fly and vertebrate sperm production. Third, we found that a conserved RNA-binding protein, the Pumilio homolog FBF, is expressed in R. sp. SB347 spermatogonia. We conclude that distinct germ cell developmental processes independently evolved in each species reproductive strategies. This information can inform germ cell comparisons between other species, ultimately linking information discovered in simpler animals to the processes that contribute to human fertility.

Caitlin is a second-year M.S. Candidate in Biology at the College of William & Mary. Her research in Dr. Shakes's lab spans the fields of development, cell biology, reproductive biology, and evolution. Caitlin will graduate with her master's this year and hopes to do future research focusing on metabolic diseases.

The Effect of Mercury Pollution on Reproductive Function in the Zebra Finch



Presenter: Ananda Menon Advisor: John Swaddle College of William & Mary,

Biology

Mercury pollution is an emerging global problem, with significant consequences for the health of both humans and wildlife. In birds, exposure to mercury pollution has been linked to a disruption in mate pairing and courtship behavior, reduced levels of parental care and lower nestling survival. I research the effect of mercury pollution on reproductive function and fertility in the male zebra finch. Songbirds maintain their reproductive organs in a regressed state outside the breeding season, in order to reduce body weight as a flight adaptation. I have found that mercury might interfere with the ability and duration it takes for gonadal maturation and activation, by examining preserved specimens. I am investigating this experimentally by exposing male zebra finches to environmentally relevant doses of mercury from conception to adulthood and measuring reproductive impacts. A subset of these birds will be sacrificed to study patterns of testis maturation and examined for any cytotoxic effects of mercury. The remaining mercury-exposed males will be paired with non-exposed females and their courtship and mating behavior will be recorded. Additionally, semen samples will be collected from these birds and examined for sperm quantity, motility and integrity. The results will offer insights into the mechanism through which mercury pollution exerts effects on the male reproductive system, and has consequences both for conservation biology and public health.

Ananda Menon is an M.S. Candidate in Biology at the College of 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.



The Effects of Mercury Exposure During Development on Songbird Reproductive Success

Presenter: Ohad Jonathan Paris Advisor: Daniel Cristol College of William & Mary, Biology

Exposure to mercury during development can have long lasting consequences on critical physiological and behavioral functions. Mercury, a common anthropogenic contaminant, moves from rivers to soils, biomagnifying up the food chain. Songbirds, a taxon of immense cultural significance, public interest, and conservation importance, have been shown in several field and dosing studies to suffer profound mercury-related reductions in reproductive success and overall fitness. Yet, the effects of mercury exposure during development on the physiology and behavior of birds in adulthood remain largely unstudied. The following study will examine the reproductive success of breeding pairs of zebra finches (Taeniopygia guttata) that were exposed to methyl-mercury at different stages of development. Birds were placed in one of four exposure treatments, at 0 to 50 days of life, 50 to 114 days of life, 0 to 114 days of life, or non-exposed controls. Reproductive disruption will be determined by putting together a detailed picture of reproductive success during sequential reproductive attempts, and comparing treatments. During each attempt, data collection will follow the process of breeding and rearing offspring, beginning with pairing and ending with offspring sexual maturity. Between these two points in time, parameters associated with reproductive success, that have been shown in dose-driven studies to be affected by MeHg ingestion, will be monitored. The resulting comprehensive analysis will refine our understanding of the relationship between developmental stress, increasing environmental mercury contamination, and a prime measure of overall fitness, reproductive success.

Ohad Paris is a M.S. Candidate in Biology at the College of William & Mary pursuing a research career in avian conservation ecology.

Population Genetic Assessment of Asclepias syriaca, the Common Milkweed

Presenter: Angela Marie Ricono Advisor: Joshua Puzey College of William & Mary, Biology

Genetic assessments are predominately used to inform conservation management practices especially in threatened or endangered species. Such assessments, however, can also be useful for describing potential ecological, plant-herbivore, and intraspecific interactions on a finer scale. This type of lens has yet to have been used on Asclepias syriaca, although its counterpart, Dannaus plexippus, has been examined on a variety of levels. With D. plexippus currently at 80 percent of its previous numbers over the past several decades (Brower et. al, 2012), it is more imperative than ever to examine potential drivers behind these drastic declines. The recently proposed "Milkweed-Limiting Hypothesis" (Pleasants and Oberhauser, 2011) highlights the necessity of A. syriaca to D plexippus survivorship, as the butterflies lay their eggs only on this particular species of milkweed, and as larvae, sequester the toxic compound (cardenolides) produced by the plant for protection throughout lifetimes of the butterflies. As such, A. syriaca is crucial for the survivorship of future populations of D. plexippus, yet little is known about the population structure of A. syriaca, nor how these cardenolides are regulated on a genomic level. An in-depth population genetic analysis will allow us to answer pertinent questions such as:{i.} What level of genetic variation might exist throughout the broad distribution of A. syriaca in different ecoclines; ii. or across broad latitudinal patterns; iii. What degree of genetic differentiation might be prevalent in these populations; and finally, iii. how this might affect future populations of plant and herbivore.

Angela Ricono is a first-year M.S. student in Biology at the College of William & Mary. She is broadly interested in population genetics; however, more recently she has described the field of plant evolution and general plant genetics her home. Angela obtained her B.S. at the Florida Institute of Technology in Conservation Biology and hopes to maintain this focus on conservation throughout her career.



Characterizing Chinmo: Structure-Function Analysis of a Stem Cell Sex-Maintenance Factor

Presenter: Leanna Rinehart Co-Author: M. Wawersik Advisor: Oliver Kerscher College of William & Mary,

Biology

Assignment of cells' sex is essential for a species to retain sexual dimorphism and the ability to reproduce sexually. In many organisms, sex-specific transcriptional (or cellular) programs must also be maintained throughout an organism's lifetime. If sex of stem cells is not continually reinforced, then entire organs could potentially switch sex. Chronologically inappropriate morphogenesis (Chinmo) is a putative transcription factor of the BTB-Zinc finger family found in Drosophila that regulates cell fate and behavior, and is essential for maintenance of male stem cell sex in the testis. Previous research indicates that Chinmo prevents feminization of stem cells in the adult male gonad and is, therefore, associated with male characteristics in fruit flies (Ma et al., 2014). Goals of this research are to investigate how Chinmo is regulated and how Chinmo controls cell fate and behavior in the fruit fly Drosophila melanogaster. We hypothesize that key domains and modifiers of Chinmo, including SUMO (Small Ubiquitin-Like Modifier), modulate Chinmo localization and function. In our preliminary analysis, we found that Chinmo contains several putative SUMO interacting motifs (SIMs) and sumoylation consensus sites that may play a role in regulating its function. Using two-hybrid assays we identified several Chinmo interacting proteins, and are investigating their functional relevance in the Drosophila testis using RNAi knockdown. Subsequent studies are aimed at identifying domains of Chinmo that may control its subcellular localization. This research sheds light on how stem cell sex is properly regulated throughout the lifetime of an organism.

Leanna Rinehart is a M.S. student in Biology at the College of William & Mary. She works in the labs of Dr. Kerscher and Dr. Wawersik. Leanna's research involves the study of sex maintenance in the stem cells of fruit flies.

The Antibacterial and Biofilm Disruption Activity of Novel Amphiphiles

Presenter: Elizabeth Anne Rogers

Advisor: Kyle Seifert

James Madison University,

Biology

Every year, approximately 2 million people in the United States acquire bacterial infections that are resistant to antibiotics, and 23,000 people die annually as a direct result of these infections. Organisms such as Pseudomonas aeruginosa and methicillinresistant Staphylococcus aureus (MRSA) put immunocompromised hospital patients at risk for secondary bloodstream infections and pneumonia. The risk of transmission between patients is further increased by the development of highly resistant bacterial biofilms, which protect bacteria against desiccation and chemical removal. Amphiphiles make up a diverse class of compounds that have welldocumented antimicrobial effects. The diversity of amphiphile structure, coupled with continued research of the effects of structural changes on antimicrobial activity, allows for a wide range of potential novel antimicrobial compounds with applications including more efficient surface disinfection. Several novel series of amphiphiles have been synthesized, and their antimicrobial activity tested on seven different bacteria, including P. aeruginosa, Escherichia coli, and S. aureus. This research has revealed relationships between structural characteristics such as hydrocarbon tail length and counter-ion, and antibacterial activity. The most effective compounds have also been shown to disrupt established P. aeruginosa biofilms as efficiently as tobramycin at similar concentrations. Continued research of novel antibacterial compounds is essential to combat the growing problem of antibiotic resistance. The development of new and more effective disinfecting agents could help reduce hospital-associated morbidity.

Elizabeth Rogers is a second-year M.S. student in the Biology Department at James Madison University. She is currently researching the antibacterial activity of novel amphiphiles and the effect of their molecular structure on bactericidal and biofilmdisruption activity.



Identifying Locations of and Mechanisms for Sea Turtle Mortality from Stranding Data Using Ocean Drift Models

Presenter: Bianca Silva Santos
Co-Authors: M. Friedrichs, J. Manning,
S. Barco
Advisor: David Kaplan
Virginia Institute of Marine Science,
Fisheries Science

The Chesapeake Bay is an important sea turtle habitat, vet each year, hundreds of turtles are found stranded on local shorelines. Sea turtle strandings can provide key information on turtle mortality, but knowledge of the drift and decay characteristics of sea turtle carcasses is needed to interpret stranding data. Turtle carcasses sink upon death, until decomposition causes the body to float and drift at the surface. We conducted field experiments to parameterize sea turtle carcass drift, namely the probable oceanic carcass drift time and the impacts of direct wind forcing on carcass drift. Turtle decay studies showed that carcass surface time was 2-15 days, dependent on water temperature. The importance of wind forcing for carcass drift was assessed by deploying various surface drifters, including artificial buoys and actual turtle carcasses, to estimate carcass leeway parameters. Turtle drift along-wind leeway varied with turtle size from 1-4% of wind speed, equating to a non-negligible change in carcass movement of 0.03-0.1 m/s. Together, these parameters were used to develop an oceanographic drift model predicting carcass trajectories after death to stranding location in the Chesapeake Bay. Results indicate that mortality events leading to strandings occur within 20 km of the coast, suggesting they are caused by coastal activities. Probable mortality hotspots were identified in waters of the lower bay, including around the bay mouth and entrance to the James River. This drift model will improve our ability to predict areas where mortality likely occurs during stranding events, serving as a basis for comparisons with potential anthropogenic causes of mortality.

Bianca S. Santos is a M.S. Candidate at the Virginia Institute of Marine Science, whose research focuses on sea turtle strandings in the Chesapeake Bay.

Changes in the Immune System During Spawning in *Oncorhynchus nerka* Anterior Kidney

Presenter: Meaghan Kathleen Smith Advisor: Patty Zwollo College of William & Mary, Biology

During the return journey to their spawning grounds, Sockeve 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 and B lineage cells, which develop in the anterior kidney, the bone marrow equivalent in teleosts. B cells provide highly-specific protection from pathogens. After activation by pathogen, they 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 have found that during the return journey, they retain their LLPCs, while B cell development is inhibited. This research plans to characterize changes in anterior kidney immune cell abundance during the journey and at various spawning sites. Flow cytometry will be used to analyze the abundance of developing, immature, and mature B cells, LLPCs, and myeloid lineage cells. I hypothesize that as fish approach their spawning grounds, there will be increased abundance of myeloid cells, a decreased abundance in B lineage cells, but no change in LLPCs. Additionally, I expect fish at the various spawning sites to have distinct differences in immune cell abundance. Understanding these changes to their immune system will help efforts to preserve wild salmon and aid in aquaculture.

Meaghan Smith is an M.S. Candidate in Biology at the College of William & Mary working under Dr. Patty Zwollo. She earned her B.S. in Biology from the College of William & Mary in 2016. Her research involves characterizing changes in the immune system of sockeye salmon during their spawning journey in Alaska.



Elevated Temperature and CO₂ Effects on Nitrogen and Carbon Uptake in a Coastal California Microbial Community

Presenter: Jenna L. Spackeen Co-Authors: R. Sipler, A. Tatters, K. Xu, D. Hutch Advisor: Deborah Bronk Virginia Institute of Marine Science, Physical Sciences

Average global temperatures and carbon dioxide (CO₂) levels are expected to increase in the coming decades. Implications for ocean ecosystems likely include shifts in microbial community structure and subsequent modifications to nutrient pathways. Studying how predicted future temperature and CO₂ conditions will impact the biogeochemistry of the ocean is important because of the ocean's role in regulating the global climate. We determined how elevated temperature and CO2 affect uptake rates of nitrate, urea, and dissolved inorganic carbon by two size classes (0.7 - 5.0; >5.0 um) of a microbial assemblage collected from coastal California. This microbial community was incubated for 10 days using a continuous culture system that supplied the microorganisms with either nitrate or urea as a nitrogen source. Biomass parameters, nutrient concentrations, and uptake rates were measured throughout the experiment. In all treatments, urea uptake rates were greater than nitrate, and larger microorganisms had higher uptake rates than smaller microorganisms. Urea and dissolved inorganic carbon uptake rates within both size fractions were higher at elevated temperature, and uptake rates of nitrate by smaller microorganisms increased with elevated CO₂. These findings suggest that the rate at which nutrients cycle in temperate coastal waters will increase as temperature and CO₂ levels rise, and that the affect will vary between nitrogen substrates and different microorganisms. This study also suggests that the form of nitrogen is as important as temperature and CO2 and should be considered in climate change studies investigating multiple interactive stressors.

Jenna Spackeen is a Ph.D. Candidate at the Virginia Institute of Marine Science. Her research is about phytoplankton, global change, and nutrient cycling. Her work has taken her to California, Antarctica, and the Arctic.

Systematic Inferences Of The Post-Cranial Skeleton Of *Batrachoidiformes*

Presenter: Diego Francisco Biston Vaz Co-Author: A. Summers Advisor: Eric Hilton Virginia Institute of Marine Science,

Fisheries Science

The toadfishes (Batrachoidiformes) are a monophyletic group of bottom-dwelling fishes. One specialization of the skeleton of this group is an enlarged anterior precaudal vertebrae, with the third and fourth neural spines articulating tightly with modified pterygiophores. These derived pterygiophores support the dorsal spines and are historically called as "Basalia". The first epineural, which is enlarged and heavily ossified, also interacts with the bones of this region, articulating with the neural arch of the first vertebra. Although this overall arrangement has been proposed as a synapomorphy of Batrachoidiformes, but this seems a bold statement given the poor taxon sampling for this character. Furthermore, the interrelationships among the species of Batrachoidiformes and the relationship of this order to other percomorph fishes are not entirely resolved. To assess morphological variations in this skeletal complex, 42 species representing the four subfamilies of Batrachoidiformes were examined using CT-scans and cleared and stained specimens. The aim was to identify characters that may be phylogenetic informative. We found that each sub-family has a distinct epineural arrangement and unique pterygiophore morphology. For example, in Halophryinae and Batrachoidinae, the pterygiophores that support the second and third spines articulate with the neural spine of the fourth vertebra. This condition of two pterygiophores articulating with a single neural spine is unique among Batrachoidiformes and most of other percomorph fishes. This condition, therefore, can be interpreted as synapomorphy grouping these two subfamilies.

Diego Vaz is a biologist with a M.S. Degree in Zoology. He is currently pursuing his Ph.D. at the Virginia Institute of Marine Science. His research interests are morphology and systematics of fishes.



Functional Analyses of Potential Insect Virus Virulence Factors

Presenter: Peng Zhang Co-Author: S. Erickson Advisor: Matthew Turnbull Clemson University.

Plant and Environmental Sciences

Polydnaviruses (PDVs), comprised by Ichnoviruses (IVs) and Bracoviruses (BVs), are unusual viruses, which have a mutualistic relationship with ichneumonid and braconid parasitoid wasps. PDV virions are injected together with wasp eggs during oviposition, and PDV gene expression is essential to successful parasitization. Infection with Campoletis sonorensis IV (CsIV) alters host caterpillar development and compromises immunity. CsIV encodes four insect gap junction gene (innexin) homologues termed vinnexins that form functional gap junctions. Studies demonstrate that Vinnexins alter host Innexin intercellular communication when expressed in Xenopus laevis oocytes, and expression of vnxG, but not other vinnexins, in transgenic Drosophila melanogaster embryos is lethal. However, the roles of Vinnexins during parasitization remains unknown. To study Vinnexin function in host, we generated recombinant baculoviruses (NPVs) encoding vinnexins. Vinnexin expressions have been verified in Sf9 cell line and Heliothis virescens caterpillars. Preliminary male adult Drosophila oral challenge works with Serratia found fly immunity was compromised when vnxG but not vnxQ2 was expressed in hemocytes. As gap junctions contribute to bioelectric processes, we tested membrane potential and found NPV-vnxG, but not NPV-vnxQ2, induces cell membrane depolarization. These results suggest that vnxG may play a role in disrupting host physiology by affecting bioelectric phenomena. Further encapsulation assays in the presence of NPV-vnxG will unravel the function comparison of vnxG and vnxQ2 on host immune system. Our assays will yield insight on different functions between Vinnexins, evolution of virus pathogenic gene families and host range determination.

Peng Zhang is a M.S. student in Entomology at Clemson University. He graduated from China Agricultural University with a degree in Plant Protection. He is interested in insect viruses and how they affect wasp parasitization, including the impact on host caterpillar physiology.



Development Of More Potent BRCA1 Inhibitors

Presenter: Nicolas A. Abrigo Advisor: Matthew Hartman

Virginia Commonwealth University,

Chemistry

Breast cancer associated protein 1 (BRCA1) is known to form a protein-protein complex through the C-terminal BRCT domain. Previously, we have used mRNA display, a powerful library technique capable of producing trillions of compounds, to find inhibitors to this protein-protein interaction. Currently, our objective is to develop a tighter binder to the BRCA1 BRCT domain through the use of next generation sequencing, mutations in the peptide sequence, analysis of the crystal structure, and developments already proven in the literature.

Nicolas Abrigo is a Ph.D. Candidate in Chemistry at Virginia Commonwealth University. His research focuses on developing peptide inhibitors to the breast cancer protein BRCA1.

Rhodamine Dyes Adsorbed onto TiO₂: Principle Study of Molecular Aggregate Formation

Presenter: James Cassidy

Co-Author: J. Tan

Advisor: Kristin Wustholz College of William & Mary,

Chemistry

Broadened absorbance bands, brought about by dye aggregation, have the potential to increase dye sensitized solar cell efficiency. Aggregation formation in a series of rhodamine dyes adsorbed onto TiO₂ anatase films were characterized via UV-vis diffuse reflectance and fluorescence spectroscopy. The absorbance spectra of rhodamine B (RB), rhodamine 101 (R101), and 5-carboxy-X-rhodamine (5-ROX) undergo a hypsochromic shift up to 50 nm when adsorbed onto TiO2 compared to acetonitrile solution, consistent with molecular aggregation and in some cases, photodegradation. Further increases in dye concentration have resulted in spectral broadening, predominately bathochromic shifts, in both absorbance and fluorescence spectra. The red -shifted emission is modestly fluorescent, consistent with the formation of head-to-tail J aggregates on TiO₂.

James Cassidy is an M.S. student in Chemistry at the College of William & Mary studying the aggregation of rhodamine dye molecules.



The Functional Effects of the Interaction Between Heparan Sulfate and Polynuclear Platinum Complexes

Presenter: Eric Ginsburg Advisor: Nicholas Farrell

Virginia Commonwealth University,

Chemistry

Cisplatin was the first member of the platinumcontaining anticancer class of drugs and has shown activity against a number of different types of cancers. However, acquired cellular resistance to cisplatin has been shown to be problematic. Polynuclear platinum complexes (PPCs) were developed as a way to circumvent cisplatin resistance through the formation of long range bifunctional DNA adducts that differed from cisplatin. Secondgeneration PPCs were shown to have increase physiological stability of the compounds by replacing the labile chlorine ligand for an ammine. The creation of a PtN4 coordination sphere allowed the compound to bind electrostatically to the phosphate backbone of DNA. This was referred to as a phosphate clamp, and an analogy to an arginine fork can be drawn. Following the analogy, an arginine fork is used for the cellular internalization of polycationic peptides through heparan sulfate proteoglycans (HSPG). PPCs have been shown to be internalized through HSPG by a TAMRA-R9 assay. HSPG regulate several biologically relevant processes, and the degradation of the covalently bound heparan sulfate (HS) through enzymatic cleavage which is the start of the angiogenic cascade which can cause the formation of metastasis. Interactions between TriplatinNC and HS were probed through mass spectrometry (MS), nuclear magnetic resonance (NMR) spectroscopy, and molecular modeling. Given the success of TriplatinNC in the initial studies. further research is needed to explore the PPC-HS interaction with other PPCs.

After receiving his B.S. from Christopher Newport University, Eric Ginsburg started graduate school at Virginia Commonwealth University. He is currently a third-year student in Dr. Nicholas Farrell's laboratory whose research focuses on expanding the frontiers of the understanding of the role and utility of metal complexes in biology and medicine. This topic has been dominated by the use of platinum complexes in the clinical treatment of cancer, but has been expanded to new targets.

Ribosomal Incorporation of Backbone-Modified Amino Acids via an Editing-Deficient Aminoacyl-tRNA Synthetase

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 illdefined 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 cellfree translation system we demonstrate how an editing deficient valine tRNA synthetase (ValRS T222P) can be used for the incorporation of 13 unnatural amino acids into peptides. This system has the potential to be applied to the ligand discovery tool of mRNA display for identification of potent peptide inhibitors of disease relevant protein-protein interactions.

Emil Iqbal received his B.S. in Chemistry from the College of William & Mary and is now a Ph.D. Candidate in Chemistry at Virginia Commonwealth University. His research focuses on unnatural amino acid incorporation into peptides. These unnatural amino acids can confer proteolytic and conformational stability to peptides useful in therapeutic applications. This combined with mRNA display technology for ligand discovery is an extraordinary tool for identifying inhibitors of cancerous proteins.



A Novel Core Scaffold for Development of Fluorescent ERBB Inhibitors: Synthesis and Photophysical Characterization of a Benzofused Quinazoline

Presenter: Heajin Lee Advisor: James Wilson University of Miami, Chemistry

The EGFR/ERBB family of tyrosine kinase receptors is the crucial factor for intracellular communication modulating cell proliferation, metabolism, and numerous biological responses. The dysregulation of this signal pathway contributes to development of cancer malignancies including breast, head, and lungs tumors. This receptor family is a conventional chemotherapeutic target as well as a diagnostic modality. Common assays used to measure the activated ERBB level analyze tyrosine phosphorylated substrates or the receptors themselves. However, these lysate-based assay results cannot show the difference between a significant mechanistic value and actual clinical relevance. Fluorescent probes can overcome this current detection limit as they provide real-time readouts with minimum perturbation of living cells. My research has focused on developing fluorescent kinase probes for the ERBB2 receptor tyrosine kinase. Our recently reported fluorescent inhibitors are able to achieve dynamic imaging of ERBB2 in living cells, and are thus capable of identifying ERBB2(+) cells. Based on this foundation, the current stage of my research is focused on developing a longer wavelength, i.e. redder, fluorophores for ERBB2 by introducing stronger charge transfer character in the p system. Our long term goal is to simultaneously detect active and inactive receptor conformers in the same cell and at the same time by two-channel confocal imaging. This will be performed by co-staining prospective red probe with the blue probes reported. This may provide a crucial standard for the ERBB2 activation rates out of the ERBB2 in cells.

Heajin Lee is a Ph.D. Candidate in Organic Chemistry at the University of Miami. Her research interests include organic synthesis, fluorescence spectroscopy, bio-organic chemistry. Heajin's research focuses on developing novel fluorescent kinase probes for the ERBB2 receptor tyrosine kinase to elucidate dynamic information in cancer cells.

Gas-Phase Investigations of Reduced Metal Complexes via Sequentially Coupled Ion/Ion-Ion/Molecule Reactions

Presenter: Mariah Parker
Advisor: Scott Gronert

Virginia Commonwealth University,

Chemistry

Sequentially coupled ion/ion-ion/molecule reactions are used to examine the reactivity of metal complexes in unusually low oxidation states. Electron transfer dissociation (ETD) is exploited to cause a one-electron reduction of the metal center of iron, cobalt, nickel, copper, and zinc from the corresponding M(II) species with a fluoranthene radical anion. Mono- and bis-phenanthroline complexes, as well as bipyridine, terpyridine, and other nitrogenbased bidentate ligands, were examined for the ligand effect on the metal complex. Furthermore, the reactivity of the M(I) complexes were then probed in an ion/molecule reaction with neural allyl based compounds, such as allyl iodide. A modified linear ion trap mass spectrometer is used for all studies. The [M(I)Phen2]+1 species showed an oxidative addition of the halide to the complex for all five metal probed. The monophenanthroline complexes were more reactive and gave a variety of products: M(II) iodide complex, M(II) allyl complex, and adduct formation. The overall reactivity is in accord with computational studies and mirrors that of proposed intermediates in condensed-phase catalytic cycles.

Mariah Parker is a Ph.D. Candidate in the Chemistry Department at Virginia Commonwealth University. Her research looks into the gas-phase reactivity and allows insight into the mechanism of metal complexes in unusual oxidation states with alkyl halides in a modified LTQ mass spectrometer.



Improving the Synthesis of [2.2.2] diazabicyclic Alkaloids Using Radical Decarboxylation

Presenter: Jonathan C. Perkins Advisor: Jonathan Scheerer College of William & Mary, Chemistry

Fungal alkaloids of the bicyclo[2.2.2]diazaoctane family comprise a unique class of natural products with a number of desirable biological activities. Work in the Scheerer group has focused on forming the bicyclo[2.2.2]diazaoctane core through a well established aldol condensation-alkene isomerization-intramolecular Diels-Alder pathway. Previously, Jacob Robins and Kyu Kim altered the Diels-Alder portion of the pathway by changing to an intermolecular Diels-Alder reaction with nitro methylacrylate. This method eventually led to a 1:1 mixture of the syn and anti stereoisomers (C19, breavianamide numbering) of the desired methyl ester product. By changing the diene of the intermolecular Diels-Alder to either dimethylfumarate or maleic anhydride, we report that it is possible to stereoselectively synthesize either of the desired syn and anti isomers. This modification is made possible through the use of a radical decarboxylation method. Having separate methods to produce both the syn and anti isomers of the desired product will be useful in future syntheses as around two-thirds of the natural products in the [2.2.2]diazabicyclic alkaloid family have the anti configuration while the other third possess the syn configuration.

Jonathan Perkins is a second-year M.S. Candidate in Chemistry at the College of William & Mary. He is finishing up his thesis work on the synthesis of [2.2.2]diazabicyclic alkaloids in the research lab of Dr. Jonathan Scheerer.

Efficiency of Hydrogen Generation of Photocatalysts Functionalized with Fluorescein and Rhodamine-Based Chromophores

Presenter: Nicholas Race Advisor: William McNamara College of William & Mary, Chemistry

The development of systems that can efficiently utilize renewable energy, such as solar energy, are of great interest. 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. TiO2 semiconductors functionalized with photocatalysts are of interest for AP as low-cost photocathodes. In order to utilize visible light, a chromophore must also be attached to the semiconductor. These chromophores allow for a greater amount of visible light energy to be absorbed by the system, allowing for more efficient hydrogen generation. Our research examines the effect of immobilizing different chromophores, fluorescein and rhodamine-based dyes, on catalystsensitized TiO2. The functionalized TiO2 has been physically characterized using IR and UV-Vis spectroscopy. These functionalized TiO2 films have also been explored as materials for photocatalytic hydrogen generation.

Nick Race is a first-year M.S. student in Chemistry at the College of William & Mary conducting research in Dr. William McNamara's lab. Nick's research focuses on the development of low-cost photocathodes that can efficiently generate hydrogen gas, which can be used as a fuel source, through artificial photosynthesis. Prior to attending William & Mary, Nick received his B.S. from Towson University where he conducted research under Dr. John D. Sivey.



Neonatal Sepsis Prediction in the NICU Using Supervised Learning Techniques

Presenter: Nadia Aly
Co-Author: E. Dienstman
Advisor: Anh Ninh

College of William & Mary,

Computational Operations Research

In this study, we derive features from the R-R intervals (distance between R peaks) and apply novel machine learning algorithms to predict if an infant will be diagnosed with a sepsis infection within the next twelve hours. The dataset used in this study consisted of the R-R intervals recorded by monitoring electrodes in the NICU for approximately 3,000 infants. A Support Vector Machine (SVM) model, with a linear kernel, outperformed all other models with a 3.59% false alarm rate and an 85.17% classification accuracy. These encouraging results imply potential clinical applications for the NICU to implement this algorithm on real-time heart rate data to influence decisions on when to proceed with diagnostic procedures.

Nadia Aly is in her final year of the M.S. program in Computer Science with a specialization in Computational Operations Research at the College of William & Mary. She currently works at AidData as a Data Scientist, and specializes in machine learning and classification techniques. Her work uses data collected by Professor John Delos, William and Mary Physics Department, in collaboration with a team at the University of Virginia. Nadia's advisor is Professor Anh Ninh from the Mathematics Department.

An Adaptive BRDF Fitting Metric

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

We propose a novel adaptive BRDF fitting strategy based on a family of BRDF fitting metrics that are characterized by an additional free parameter. The fitting process is formulated as a double optimization that finds both the optimal fitting metric parameter and the BRDF parameters such that the fitted BRDF best mimics the appearance of the measured material under natural illumination. We demonstrate qualitatively and quantitatively improved fits for a variety of common analytical BRDF models. We analyze the obtained optimized fitting metric parameters, and show that the optimal fitting metric parameters, and thus the fitting metric, is largely invariant to natural lighting variations, and primarily depends on the material and analytical BRDF model.

James Bieron is a Ph.D. Candidate in Computer Science at the College of William & Mary.



Mixed-Weight Open Locating-Dominating Sets in Random Graphs

Presenter: Robin M. Givens Co-Authors: R. Kincaid, G. Yu Advisor: Weizhen Mao College of William & Mary, Computer Science

Previously we introduced mixed-weight open locating-dominating sets (mixed-weight OLD-sets), an extension of open locating-dominating sets. These sets represent locations in a network where sensors can be placed to detect and locate problems and have applications in wireless sensor networks, public utilities, and systems of microprocessors. Mixedweight OLD-sets allow locations to be given weights, representing sensors that have different strengths. We continue our study of mixed-weight OLD-sets by exploring these sets in random graphs and random geometric graphs. Random and random geometric graphs provide insight into how these sets work in randomly distributed wireless sensor networks, a common method for sensor dissemination. We estimate bounds on the size of mixed-weight OLD-sets in these graphs.

Robin Givens is a Ph.D. Candidate in Computer Science at the College of William & Mary. She is advised by Dr. Weizhen Mao, Dr. Gexin Yu, and Dr. Rex Kincaid. Robin received a B.S. in Mathematics and Computer Science at the University of Richmond in 2006 and an M.S. in Computer Science at William & Mary in 2014.

EdgeEngine: An Efficient and Customizable Framework for Edge Computing

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

Edge computing is a new computing paradigm extending cloud computing. By executing tasks at the edge of network, edge computing establishes an environment that enjoys better network conditions, including shorter network latency, higher network bandwidth and more stable network connectivity. All of these are critical for the emerging Internet of Things applications and big data analytics. Despite the aforementioned benefits, it is still difficult to employ edge computing in the real world. The main reason is that there is no mature middleware for edge computing in the literature, so developers have to implement their edge applications from scratch. This does not only require plenty of programming effort, but sometimes also leads to unoptimized or problematic implementation. To this end, we propose EdgeEngine, an edge computing middleware that aims at helping developers build robust and efficient edge applications with minimized programming effort. EdgeEngine fulfills all the troublesome, routine tasks for developers, effectively reducing the programming effort that they have to put into implementing their edge applications. This scheme, however, imposes another challenge, i.e., if the middleware treats all edge application equally, some edge applications that have a special nature may be handled inefficiently. Since only the developers know the nature of their edge applications, EdgeEngine provides a concise, Java-embedded programming interface, through which the developers can make suggestions on how to handle their edge applications, with little programming effort. Evaluation on our prototype demonstrates that EdgeEngine is efficient and easy-to-use in the real world.

Zijiang Hao is a Ph.D. Candidate in Computer Science at the College of William & Mary. His research interests include mobile-cloud computing, edge computing, geo-distributed storage systems, consensus algorithms, and machine learning.





You Are What You Tweet

Presenter: Cheng Li

Co-Authors: Z. Liu, F. Wong, V. Kanade

Advisor: Qun Li

College of William & Mary,

Computer Science

Social media websites e.g., Twitter, Facebook, have become one of the largest sources of news in the United States. Unlike the sites managed by "traditional" news such as CNN, Fox News, The New York Times, social media websites mine a user's historical activities in order to deliver personalized news. Because the historical activities reflect the individual user's interests, beliefs, and even political biases, personalized news is also biased. Deliveries of biased, perhaps even fake, news seem to cause significant impacts in this year's presidential election. In this paper, we develop an unsupervised learning algorithm to estimate a user's political biases based on historical activities using twitter datasets. Our algorithm uses a scale, instead of a categorical variable (conservative or liberal) to characterize the user's political leaning. Here, the scale is between [0, 1]. A user associated with 0, for example, means "extremely conservative". We face the following challenges: (1) groundtruth is unreliable and costly since we need to hire humans to label the data and the process is errorprone: (2) we need an effective strategy that aggregates weak signals from massive datasets, i.e., every tweet or interaction between users delivers only weak signals that are not useful on their own; and (3) we need a non-parametric solution that works for arbitrary distributions on users' biases, since simple assumptions on the distribution of users' political biases or on how users with different biases interact are prone to inaccuracy.

Cheng Li is a fourth-year Ph.D. Candidate in Computer Science at College of William & Mary. His research interests cover Software-defined Networking (SDN), network security, Internet of Things (IoT), Network Function Virtualization (NFV), fog computing and machine learning. His currently under submission work includes distributed SDN controllers, Openflow channel monitor with Bloom Filter and so on.

Exploring Main Memory Introspection of Docker System

Presenter: Lele Ma Advisor: Qun Li College of William & Mary, Computer Science

Docker is currently one of the most popular software containerization platforms. Since Docker is a relatively new system, few security-oriented runtime state monitoring solutions are available and there is no work trying to monitor the docker containers from outside of Docker system, which is vital critical when facing vulnerable kernel in the Docker host. This project tries to figure out an approach to monitor the runtime main memory states of the Docker system from outside of the Docker host based on Virtual Machine Introspection (VMI) technique. It will enable the runtime monitoring of Docker system without relying on the OS kernel security of the Docker host. In this project, we will use LibVMI to get a snapshot of the target VM's memory from a trusted VM. With the dumped memory snapshot, we then use the our customized Volatility framework to get semantic information of the Docker containers, including the Docker daemon process, container lists, the processes inside each containers, etc.. We might need to meet multiple challenges to materialize the work, including Go language support and docker semantics support in the volatility framework and memory filtering from the whole memory dump data. The project will design and implement the tools that has the ability to extract rich semantic information from the Docker memory dumps leveraging the VMI technique. Hopefully, the solution could be applied to the real industrial platforms to enhance Docker's security, for both personal and enterprise platforms.

Lele Ma is a Ph.D. Candidate in Computer Science at the College of William & Mary. He has a broad interest in computer system and its security, especially in virtualization system and binary analysis technique. He is currently exploring the security of Docker, a platform that provides software containerization and os-level virtualization.



Improving Automated Crash Discovery, Reporting, and Reproduction for Android Apps

Presenter: Kevin P. Moran Co-Authors: M. Linares-Vásquez, C. Bernal-Cárdenas, C. Vendome Advisor: Denys Poshyvanyk College of William & Mary, Computer Science

The quality of a mobile app is essential to its success in modern competitive marketplaces such as Google Play. Unfortunately, developers face unique challenges when detecting and reporting crashes in their applications due to their prevailing eventdriven nature and atypical input sources. Current automated testing solutions for Android are not practical due to required instrumentation or platform dependence, and generally cannot effectively exercise contextual features (e.g. network, sensors). Thus, to support developers in mobile software testing tasks, we introduce a novel, practical, and automated approach called CrashScope. Our tool explores Android apps using systematic input generation, per several strategies informed by static and dynamic analyses, with the intrinsic goal of triggering crashes. For each detected crash, CrashScope generates a thorough report containing screenshots, detailed reproduction steps, the exception stack trace, and a replayable script that automatically reproduces the crash on a target device(s). We evaluated CrashScope's effectiveness compared to five state-of-the-art Android testing tools across 61 apps. The results demonstrate that CrashScope performs about as well as current tools for detecting crashes yet provides more detailed fault information. Additionally, in a user study analyzing eight real-world crashes, we found that CrashScope's reports are easily readable and facilitate reliable fault reproduction by presenting more explicit information than human written reports. These results indicate that our tool is well positioned for developer adoption and has the potential to broadly improve the quality of mobile apps.

Kevin Moran is a Ph.D. Candidate in Computer Science at the College of 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.

Exploring and Exploiting the Interplay among Temperature, Power and GPU Errors

Presenter: Bin Nie Co-Author: J. Xue Advisor: Evgenia Smirni College of William & Mary, Computer Science

GPUs have become part of the mainstream computing facilities that increasingly require more computational power to simulate physical phenomena more quickly and accurately. However, GPU nodes also consume significantly more power than traditional CPU nodes, and high power consumption may increase the temperature and power/cooling cost, and lower reliability. This paper explores the interaction among power consumption, temperature characteristics, application related characteristics, and GPU soft errors. We provide insights and demonstrate how to exploit these insights toward predicting GPU errors via machine learning based methods.

Bin Nie is a third-year Ph.D. Candidate in Computer Science at the College of William & Mary under the supervision of Dr. Evgenia Smirni. Before joining William & Mary, she received her bachelor degree in Software Engineering from Xiamen University, and master degree in Computer Science from Fordham University. Her research interests include GPU Reliability in High-Performance Computing, Data Analysis and Machine Learning.



An Empirical Investigation into the Nature of Test Smells

Presenter: Michele Tufano

Co-Authors: F. Palomba, G. Bavota,

M. Di Penta

Advisor: Denys Poshyvanyk College of William & Mary,

Computer Science

Testing is a fundamental task when developing and delivering a software product. Writing good quality Test Cases ensures reliable testing process and maintainable test code. Test smells have been defined as poorly designed tests and, as reported by recent empirical studies, their presence may negatively affect comprehension and maintenance of test suites. Despite this, there are no available automated tools to support identification and repair of test smells. In this paper, we firstly investigate developers' perception of test smells in a study with 19 participants. The results show that developers generally do not recognize (potentially harmful) test smells, highlighting that automated tools for identifying such smells are much needed. However, to build effective tools, deeper insights into the test smells phenomenon are required. To this aim, we conducted a large-scale empirical investigation aimed at analyzing (i) when test smells occur in source code, (ii) what their survivability is, and (iii) whether their presence is associated with the presence of design problems in production code (code smells). The results indicate that test smells are usually introduced when the corresponding test code is committed in the repository for the first time, and they tend to remain in a system for a long time. Moreover, we found various unexpected relationships between test and code smells. Finally, we show how the results of this study can be used to build effective automated tools for test smell detection and refactor-

Michele Tufano is a Ph.D. Candidate in Computer Science at the College of William & Mary.

A Behavioral Biometrics Based Approach to Online Gender Classification

Presenter: Nicolas Jorge Van Balen

Co-Author: C. Ball Advisor: Haining Wang College of William & Mary,

Computer Science

Gender is one of the essential characteristics of personal identity but is often misused by online impostors for malicious purposes. However, men and women differ in their natural aiming movements of a handheld object in two-dimensional space due to anthropometric, biomechanical, and perceptualmotor control differences between the genders. Exploiting these natural gender differences, this paper proposes a naturalistic approach for gender classification based on mouse biometrics. Although some previous research has been done on gender classification using behavioral biometrics, most of them focuses on keystroke dynamics and, more importantly, none of them provides a comprehensive guideline for which metrics (features) of movements are actually relevant to gender classification. In this paper, we present a method for choosing metrics based on empirical evidence of natural difference in the genders. In particular, we develop a novel gender classification model and evaluate the model's accuracy based on the data collected from a group of 94 users. Temporal, spatial, and accuracy metrics are recorded from kinematic and spatial analyses of 256 mouse movements performed by each user. A mouse signature for each user is created using least-squares regression weights determined by the influence movement target parameters (size of the target, horizontal and vertical distances moved). The efficacy of our model is validated through the use of binary logistic regressions.

Nic Van Balen is a Ph.D. Candidate in Computer Science at the College of William & Mary with a focus on usable security and user authentication. His research includes graphical passwords, behavioral biometrics, and mobile security. He currently works as a Senior Security Engineer and the MITRE Corporation.



License Usage and Changes: A Large-Scale Study of Java Projects on GitHub

Presenter: Christopher Vendome

Co-Authors: M. Linares-Vásquez, G. Bavota,

M. Di Penta, D. German

Advisor: Denys Poshyvanyk

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Software licenses determine, from a legal point of view, under which conditions software can be integrated, used, and above all, redistributed. Licenses evolve over time to meet the needs of development communities and to cope with emerging legal issues and new development paradigms. Such evolution of licenses is likely to be accompanied by changes in the way how software uses such licenses, resulting in some licenses being adopted while others are abandoned. This paper reports a large empirical study aimed at quantitatively and qualitatively investigating when and why developers change software licenses. Specifically, we first identify licenses' changes in 1,731,828 commits, representing the entire history of 16,221 Java projects hosted on GitHub. Then, to understand the rationale of license changes, we perform a qualitative analysis-following a grounded theory approach-of commit notes and issue tracker discussions concerning licensing topics and, whenever possible, try to build traceability links between discussions and changes. Our results point out a lack of traceability of when and why licensing changes are made. This can be a major concern, because a change in the license of a system can negatively impact those that reuse it.

Christopher Vendome is a Ph.D. Candidate in Computer Science at the College of William & Mary. He is a member of the SEMERU Research Group and is advised by Dr. Denys Poshyvanyk. He received a B.S. in Computer Science from Emory University in 2012, and he received his M.S. in Computer Science from the College of William & Mary in 2014. His main research areas are software maintenance and evolution, mining software repositories, software provenance, and software licensing.

A Novel Core Scaffold for Development of Managing Thread-level Parallelism for Efficient and Fair Multi-Programming in GPUs

Presenter: Haonan Wang

Co-Authors: F. Luo, M. Ibrahim, O. Kayiran

Advisor: Adwait Jog College of William & Mary,

Computer Science

Managing the thread-level parallelism (TLP) of GPGPU applications by limiting it to a certain degree is shown to be very effective in improving overall performance. However, we find that these techniques can lead to sub-optimal system throughput and fairness in cases when two or more applications are co-scheduled on the same GPU. It is because they work in isolation attempting to improve performance of individual applications separately and not considering the overall system-wide metrics. Driven by this problem, we propose new TLP management techniques such that they also consider the shared resource demands of all the coscheduled application(s). They are based on our new observation that performance of a GPGPU application can be predicted accurately at different levels of its TLP by calculating its effective bandwidth from the GPU memory system that takes into account its two run-time metrics: attained DRAM bandwidth and combined cache miss rates. We further find that maximizing the overall effective bandwidth across all co-located applications and doing so in a balanced fashion can significantly improve the system throughput and fairness, respectively. In order to achieve these goals, we propose a series of mechanisms that can effectively and efficiently find the optimal TLP configuration of each application. These mechanisms improve the system throughput and fairness by 20% and 2x, over a baseline where each application executes with a TLP limit that provides the best performance when it executes alone.

Haonan Wang is a Ph.D. Candidate in Computer Science at the College of William & Mary. He works in the area of computer architecture under the guidance of Dr. Adwait Jog. His specific research interests lie in the area of GPU architecture, GPGPU computing, and approximate computation.



REDSPY: Exploring Value Locality in Software

Presenter: Shasha Wen Co-Author: M. Chabbi Advisor: Xu Liu

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Complex code bases with several layers of abstractions have abundant inefficiencies that affect the execution time. Value redundancy is a kind of inefficiency where the same values are repeatedly computed, stored, or retrieved over the course of execution. Not all redundancies can be easily detected or eliminated with compiler optimization passes due to the inherent limitations of the static analysis.

Microscopic observation of whole executions at instruction- and operand-level granularity breaks down abstractions and helps recognize redundancies that masquerade in complex programs. We have developed REDSPY—a fine-grained profiler to pinpoint and quantify redundant operations in program executions. Value redundancy may happen over time at same locations or in adjacent locations, and thus it has temporal and spatial locality. RED-SPY identifies both temporal and spatial value locality. Furthermore, REDSPY is capable of identifying values that are approximately the same, enabling optimization opportunities in HPC codes that often use floating point computations. REDSPY provides intuitive optimization guidance by apportioning redundancies to their provenance-source lines and execution calling contexts. REDSPY pinpointed dramatically high volume of redundancies in programs that were optimization targets for decades, such as SPEC CPU2006 suite, Rodinia benchmark, and NWChem—a production computational chemistry code. Guided by REDSPY, we were able to eliminate redundancies that resulted in significant speedups.

Shasha Wen is a Ph.D. Candidate in Computer Science at the College of William & Mary. She works in redundancy detection and performance profiling areas.

Machine Learning for Individualized Education

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

This project uses computer vision and machine learning techniques to analyze the students' inclassroom behavior in real time, e.g., our algorithm can determine that Alice was listening to the instructor in the first 10 minutes, then took a nap for 5 minutes, then gossiped with a classmate for 3 minutes, etc. Instructors can use this type of detailed analysis to improve the quality and delivery of their lectures. For example, in an optimization class, our algorithm recognized that some students looked confused when the instructor discussed convergence issues. By correlating this finding with the students' academic records, the instructor realized they had never been taught, about this important concept. Thus, the concept was introduced in the next lecture. We will present our progress on two specific problems: (1) determining whether students are paying attention by examining their facial expression, and (2) identifying students' social interactions in class, e.g., which students talk to one another and when they do so, and how they interact with the instructor. Information about social ties will help the instructor to design collaborative learning activities, i.e., determining how to organize the students to work on projects together.

Qiong Wu is a first-year Ph.D. student in Computer Science at the College of William & Mary. Previously, she has some research background in network (segment routing), VANET(The Vehicular Ad-Hoc Network) and machine learning.



Tale of Tails: Anomaly Avoidance in Data Centers

Presenter: Ji Xue Advisor: Evgenia Smirni College of William & Mary, Computer Science

It is a common practice that today's cloud data centers guard the performance by monitoring the resource usage, e.g., CPU and RAM, and issuing anomaly tickets whenever detecting usages exceeding predefined target values. Ensuring free of such usage anomaly can be extremely challenging, while catering to a large amount of virtual machines (VMs) showing bursty workloads on a limited amount of physical resource. Using resource usage data from production data centers that consist of more than 6K physical machines hosting more than 80K VMs, we identify statistic properties of anomaly instances (Als) on physical servers, highlighting their burst duration and potential root causes. To strike a tradeoff between a strong performance guarantee and resource provisions, we propose a tail-driven anomaly avoidance policy for boxes, Tail-Guard, which allows a small fraction of Als, e.g., 5% of usages can be above the target value, and still avoid severe performance degradation, typically caused by a burst of continuous Al. Specifically, TailGuard first introduces a novel usage tail prediction that explores the similarity patterns across a great number of boxes within a very recent history, and then redistributes the server load in an online fashion by proactive VM cloning and reactive load balancing. Evaluation results show that TailGuard can not only achieve an accuracy comparable with prediction methodology that relies on long history of usage data but also dramatically reduce the number of CPU Als by 60%, with a tenfold reduction of their duration, from more than 25 time windows to only 2.

Ji Xue is a fifth-year Ph.D. Candidate in Computer Science at the College of William & Mary. His research interest is to apply machine learning techniques to integrate with classic resource management policies, in order to maintain a reliable and dependable systems. He interned in Microsoft Research in 2014, IBM Research Lab in 2015, and Google in both 2015 and 2016.

PrivScreen: Defending against Shoulder Surfing via Near-eye Display Offloading

Presenter: Shanhe Yi Advisor: Qun Li College of William & Mary, Computer Science

We found ourselves equipped with more devices (mobile phones, tablets, laptops, etc.) that preferred with larger screen sizes. All those devices are susceptible to the shoulder surfing attacks, in which someone can just sit nearby and watch a form filled or PIN typed by the owner. Users may feel unconformable to check their private information such as banking accounts, medical reports, emails in public places, especially in crowded places. In this paper, we provide an easy-to-use solution to eliminate your anxiety about information leakage through shoulder surfing. Our solution leverages a smart glasses with a near-eye display. The near-eye display is secure in nature that the content of the display is only private to the wearer. Due to the small size of this display, we cannot offload the whole entire display of smartphone to that of a smart glasses. We solve this by automatically inferring secure information on the display and giving the user options to set their own rules. We also make use of users' focuses detected by front camera of phone and inertial sensors of smart glasses to accommodate seamless ondemand display offloading.

Shanhe Yi is a Ph.D. Candidate in Computer Science at the College of William & Mary working with Dr. Qun Li. His research interests include mobile computing, edge/cloud computing, and security and privacy.



In Search of The Real Clean Master: Can Popular Android Cleanup Apps Defend Against Data Residue Attacks?

Presenter: Tao Zhang Co-Author: F. Alemante Advisor: Chris Shenefiel College of William & Mary,

Computer Science

In "Life After App Uninstallation," presented at the Network and Distributed System Security Symposium 2016 (NDSS), Zhang et al. reveals several threats that make use of the fact that phone users frequently install and uninstall applications. They call these attacks 'data residue attacks'. Data residue attacks rely on the fact that Android's system clean up does not fully manage cached application data, leaving valuable information such as passwords to be used by a malicious application. It is well known that Android does a poor job of cleaning up junk data, which is thought to hurt performance. Since mobile system resources are more limited, users seek ways to improve performance. A popular method is using cleanup applications to remove junk files, free up RAM, and increase battery life. The majority of the cleanup apps also boast security features, such as securing private data and antivirus capabilities. However, we hypothesize that cleanup applications are generally unaware of all cached data and will fail to protect against data residue attacks. For this reason, we use a real-world test bed and emulators with two types of Zhang et al.'s prototype malicious apps to evaluate the ability of the ten most popular security and cleanup apps in the Android marketplace to defend against data residue attacks. Our experimental results show that there is a lot of space for the Android security community to enhance the security of applications' uninstallation operation.

Tao Zhang is a Ph.D. student in Computer Science at the College of William & Mary. He received his M.S. in Computer Science from Central Michigan University, and his B.S. in Computer Science and Technology at North China University of Technology, Beijing, China. His research interests include cyber security, visualization, deep learning, link mining, and distributed system.

PrivScreen: Defending against Shoulder Surfing via Near-eye Display Offloading

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

Computer Science

We found ourselves equipped with more devices (mobile phones, tablets, laptops, etc.) that preferred with larger screen sizes. All those devices are susceptible to the shoulder surfing attacks, in which someone can just sit nearby and watch a form filled or PIN typed by the owner. Users may feel unconformable to check their private information such as banking accounts, medical reports, emails in public places, especially in crowded places. In this paper, we provide an easy-to-use solution to eliminate your anxiety about information leakage through shoulder surfing. Our solution leverages a smart glasses with a near-eye display. The near-eye display is secure in nature that the content of the display is only private to the wearer. Due to the small size of this display, we cannot offload the whole entire display of smartphone to that of a smart glasses. We solve this by automatically inferring secure information on the display and giving the user options to set their own rules. We also make use of users' focuses detected by front camera of phone and inertial sensors of smart glasses to accommodate seamless ondemand display offloading.

Jianing Zhao is a Ph.D. Candidate in Computer Science at the College of William & Mary. His research areas include data mining, machine learning and simulation. His current research is in collaboration with AidData, estimating the World Bank project impact to the environment using causal inference.



"Native Citizens": Citizenship and Nationalism in Dessalines's Haiti

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

Between 1791 and 1804, the French colony of Saint -Domingue experienced a series of dramatic, tumultuous events, sparked by slave insurrection, and culminating in proclamation of independence for the new state of Haiti, by military general and new head -of-state Jean-Jacques Dessalines. It is unsurprising, given the political and legal upheaval of the period, and Dessalines' insistence on divesting Haiti from all French influence, that many historians have depicted the Haitian Revolution as a dramatic rupture; the end of an old state, and the beginning of a new one. However, despite Dessalines's stated desire to divest from French influence, he continued to use the language of citizenship in legal texts. speeches, and proclamations, despite its strong association with French republicanism. By examining legislative texts and proclamations from 1793 to 1806, I argue that Dessalines used the language of citizenship as a shorthand for duty, obedience, and unity, in order to ensure the security both of the nation, and of his own authority. In doing so, he continued a trend set by pre-independence administrators, who used citizenship rhetoric in their attempts to establish order after the proclamation of emancipation in 1793. Furthermore, I argue that his use of this rhetoric, in the context of his actions as head of state, raises fundamental questions about the ideological framework(s) of the revolution, and of Dessalines's personal ideology.

Frances is a Ph.D. Candidate in History at the College of William & Mary. She graduated with a first-class History degree from the University of Glasgow in 2015. Her current research interests are in Atlantic cultural history and include the Haitian Revolution, maritime history, and the development of cultural identities in the New World.

"In the Bosom of the Storied Blue Ridge Mountains:" Contesting the Future of American Culture in Shenandoah National Park, 1924-1936



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

In the early twentieth century, as the National Park Service gained traction, legislators in the east pushed to preserve large tracts of land in the "western" mind. Yet the forces that converged in the early twentieth century to produce the National Park movement and to envision what those parks should be were more complicated than Teddy Roosevelt and Woodrow Wilson's presidencies imply. Theoretically parks for "the people," National Park locations, resources, and regulations were often governed by the social and economic elite. In the case of eastern parks like Shenandoah, the federal government acquired land through eminent domain, often at the expense of rural and lower income communities. In this paper, I hope to explore the convergence of these varying factors to illuminate how competing definitions of culture shaped the founding of one of the United States' most visited public spaces. Efforts at Shenandoah, while drastic, illustrate how the creation of National Parks sought not only to preserve land, but also to craft and constitute a particular vision of American culture. Justified as places where the American public could go to enjoy health and continued prosperity, these places simultaneously offered lessons in what it should and should not mean to be an American. In their rejection of mountain culture in Shenandoah, the federal government defined America's past, present, and future as a place of supposed national growth, consumer culture, and economic advancement.

Rebecca Capobianco is a first-year Ph.D. student in History at the College of William & Mary. She received her M.A. in U.S. and Public History from Villanova University in Philadelphia. Prior to returning to graduate school, Rebecca worked for the National Park Service in education and interpretation. Her research interests include the U.S. Civil War era, particularly contests over public commemorative space and national identity.



"So Little Appeal for Lids": Youth and the Movies in the Pre-Code Era

Presenter: Katherine Cartwright Advisor: Kathrin Levitan College of William & Mary, History

"Howdy and all other manners of salutation. Chuck Griffings speaking," wrote thirteen-year-old Charles Griffings in his 1931 diary. Throughout February of that year, Chuck began and ended his diary entries addressing the "Ladies and Gentleman" of an imaginary audience. Chuck, like other boys and girls his age, recorded his experiences seeing movies throughout his diary. Pairing a collection of diaries written by boys and girls in their teens from 1930 to 1934 with movie reviews from industry magazines, this paper seeks to recreate what moviegoing was like for youths in the Pre-Code Hollywood Era (before there was censorship) and ask the questions: Did the experience of boys and girls differ? What exactly did the youth watch? Ultimately, the diaries suggest that moviegoing was a rather uniform experience for boys and girls and that, regardless of the genre of movie, almost all of the movies challenged gender norms and showed drug and alcohol use. Most importantly, the paper argues that though moviegoing was indeed important for youth peer culture in the early twentieth century, it was not just that-it was also an activity pursued by youth and parents together and in tension with those advocating for censorship of the movies.

Kat Cartwright is a second-year Ph.D. student in History at the College of William & Mary. She is interested in the history of childhood and youth.

Inventing Saladin: The Preservation of Legend and Memory in the Western World

Presenter: Brian Christopher David Advisor: Timothy Fitzgerald James Madison University, History

"Is it possible to invent a person?" This question has plagued historians for millennia as legend and memory have always had a deep impact on recorded as well as oral and historical memory. Legends forge cultural and national identities, so what makes Saladin, the Islamic leader during the Third Crusade, so special in this regard? Simply put, the legends of Saladin were invented by his enemies, rather than his own people. This adoption of a national and religious enemy strikes one at once as strange, yet in the eyes of the authors, it was deeply important. For the European story-teller, trying to understand and justify how this Muslim General destroyed the Christian Kingdoms of Jerusalem, as well as defeated one of the greatest Christian monarchs, was the chief driving force behind the telling of the legends. Most importantly, the understanding of how the legends that evolve around Saladin were preserved for so long tell us much about the complexities of European culture across a broad timeperiod, and allows historians to discover who Saladin was and why he matters in history. This paper will specifically focus on the how the medieval legends could be so well preserved and thus effected modern histories, given there is almost a 600-year gap between the writing of the legends, and their presence in the histories of the late Nineteenth century.

Brian David is a second-year M.S. student at James Madison University. He did his undergraduate work at Wesley College in Dover, Delaware. His research focuses on the culture of the Mediterranean world, specifically on European and Islamic interaction and understanding.



"[T]he Diligent Man Becomes Necessary": Samuel Pepys and the Self-Conscious Creation of the Professional Bureaucrat

Presenter: Phillip Louis Emanuel Advisor: Nicholas Popper College of William & Mary, History

In the history of the modern English state Samuel Pepys (1633-1703) is often featured as essential to the development of the Royal Navy and to the professionalization of administration. Furthermore, thanks to his famous Diary, kept for ten years after the Restoration of the monarchy in 1660, Pepys is often used by historians and others as the voice of the age because he recorded so much about it. However, looking at the same period, and focusing particularly on the Second Dutch War (1664-67) and resulting Parliamentary inquiries into its conduct, we can see Pepys actively posturing to become the professional bureaucrat and pillar of the navy. Throughout the private Diary, Navy White Book and Brooke House Journal he demonstrated a desire to gain knowledge about his job and to use it to defeat rivals on the Navy Board (of which he was a member), in the dockyards, and in competing jurisdictions, such as Parliament. Pepys worked hard to become the necessary man and recorded the processes by which he performed knowledge, professionalism, diligence, and expertise. The wealth of information provided by Pepys and its frequent use by historians has tended to make us believe his depiction of himself as the ideal bureaucrat. However, looked at another way, Pepys's early years in administration show that this archetypal modern civil servant in fact invented himself and only in this way became the necessary man.

Phillip Emanuel is a Ph.D. student in History at the College of William & Mary. His current research interest is in books, maps, and libraries as they were used as sources of information and misinformation for people interacting with the Atlantic world and in how such people performed the knowledge which they thus acquired.

Objection: Jamaican Maroon Legal Posturing in 1796

Presenter: Connor Fenton Advisor: Guillaume Aubert College of William & Mary, History

On June 6, 1796, almost 600 Maroons, or free blacks, were deported from the island of Jamaica and sent to Nova Scotia. These Jamaican Maroons had lived independently from British rule from the time the English landed in 1655 until they signed a peace treaty with them in 1739. Fearing the terms of this treaty were not being upheld, the Trelawney Town Maroons rebelled in late summer of 1795. The British Governor declared martial law to end their rebellion and then, seeing no way for the Maroons to peaceably remain on the island, ordered their removal. The aim of my paper is to explore the Maroons' response to this cataclysmic event. Unwilling to accept their fate within the British Empire, the Maroons manipulated legal channels within the imperial framework to impact their own destiny. By closely examining the petitions sent by the Maroons to the British government before their deportation from Jamaica, it becomes evident that they understood the British legal system. This knowledge served as a useful guide to navigate the murky imperial legal channels that held their fate. Using the 1739 peace treaty as a frame, and the petitions as core evidence, it also becomes clear that the Maroons existed in a state of quasi-sovereignty, not quite British subjects, but not fully independent either. Most vitally, my project seeks to reinsert the Maroon voice into the historic record, and to understand their deportation not as inevitable, but as hotly contested by the Maroons themselves.

Connor Fenton is an M.A. Candidate in History at the College of William & Mary. He is studying Early Modern Britain.



"Defenceless Wives" and "Female Furies": Late Eighteenth-Century Periodicals' Depictions of Frontier Women

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

The frontier had a firm hold on late eighteenth century popular imagination, trailing most notably through newspapers and magazines of the era, which included, time after time, prominent accounts of the women who had made their homes on the outskirts of the "settled" colonies and early republic. My project examines the ways in which eighteenth century newspapers and magazines discussed frontier women's experiences. In the face of what they depicted as a perilous frontier, periodicals sought through their representations of women to maintain control over womanhood, in part through appropriation of women's stories. These appropriations, in turn, were frequently manipulated by periodicals in order to generate arguments in favor of political and military causes: anti-British sentiments, the Revolutionary War, and campaigns against Native Americans on the frontier. Quiet accidentally, as periodicals sought to simultaneously bind womanhood against the hazards of the frontier and to utilize women's perils for political gain, they also succeeded in writing frontier women into the late eighteenth century public arena, carving them a space within the political and cultural climate of the era. Pursuing a multicultural consideration of the frontier, my project compares the ways in which periodicals discussed white and Native American frontier women's experiences. Ultimately, I demonstrate the pervasiveness of the female frontier in eighteenth century popular culture.

Holly Gruntner is an M.A. student in History at the College of William & Mary. She studies early America with a focus on gender, the late eighteenth-century frontier, and the ways in which periodicals and literature of the era perpetuated ideas about women living in the 'back countries' of America. She is also interested in public history and how it intersects with academic history in order to communicate new scholarship, ideas, and debates to the public.

Out-Politicked: How Colonel Francis Marion's Ambush of Major Robert McLeroth Shifted the Southern Balance of Power

Presenter: Jacob Dean Harris Advisor: P. David Dillard James Madison University, History

Modern military historians' tendency is to think like Lord Charles Cornwallis. During the Southern Campaign of the American Revolution, Cornwallis focused on pitched battles and allowed an insurgency to make his southern occupation untenable. Conversely, Major General Nathanael Greene adopted a hybrid strategy that leveraged both conventional and guerilla tactics to engulf Cornwallis' offensive. Colonel Francis Marion was a partisan -- an officiallysanctioned officer who assisted Greene by leading local inhabitants in hit-and-run raids against enemy flank and rear areas. This paper will draw from Cornwallis and Greene's Papers, participant accounts, Patriot and British correspondence, and recent historiography to highlight the importance of Marion's misunderstood ambush of Major Robert McLeroth's 64th British Regiment at Halfway Swamp (December 12, 1780) to the success of Greene's strategy. Greene provided strategic direction and a professional Continental military nucleus, but relied crucially on guerilla assistance. Why are Marion's critical operations that enabled Greene's success conspicuously absent from major southern revolutionary historical narratives? One such trivialized action was Marion's ambush of McLeroth at Halfway Swamp. This paper will describe the Southern strategic situation, define Greene and Marion's cooperation, and describe the ambush and its effects in order to prove that Halfway Swamp, nested within Greene's well-defined strategy, actually triggered the critical mass necessary to shift the southern balance of power.

Jake Harris is an M.A. Candidate in U.S. History at James Madison University. His research interest is the evolution of southeastern unconventional warfare from the American Revolution to the Civil War. As an OIF/OEF veteran, he is familiar with insurgencies. His thesis research compares the effectiveness of the Patriot and Confederate high commands' strategic applications of Francis Marion and John Mosby's querilla operations.



"Please Sir, I Want Some More": Charleston's Oliver Twists

Presenter: Jamie Alistair Mansbridge Advisor: Adam Domby College of Charleston and The Citadel, History

This research into Charleston's nineteenth-century poor illuminates an otherwise neglected area of history: the poor white urban southerner. Distracted by the dramas of slavery, Reconstruction and Redemption, historians have largely ignored the history of the urban poor. Using the records of the Charleston Orphan House, which despite its name cared mostly for children whose parents were too poor to care for them, this paper argues that there was a culture in Charleston among the poor in which families and strangers would aid parents in their struggle to keep their children out of the Orphan House. Like other aspects of the nineteenth century welfare state, such as alms-houses and workhouses, the poor usually only turned to them when there was no other option open to them. Far from being lost to history, the Charleston Orphan House records reveal that it is possible to capture the life of some of the city's poorest in their struggle to survive. In doing so it becomes clear that far from wishing to bask in the largess of Charleston's welfare provisions, most working class families did everything they could to keep their children out of the Orphan House and the clutches of its Board of Commissioners.

Jamie Mansbridge is an M.A. student in History at the College of Charleston and The Citadel. His research is focused on the nineteenth-century white southern poor with an emphasis on Charleston around the Civil War. "Well What the Hell is He Then?"
Race, Sexuality, and Class in the Piney
Woods: The Brotherhood of Timber
Workers, 1910-1916

Presenter: David J. Marquis Advisor: Cindy Hahamovitch College of William & Mary, History

The Brotherhood of Timber Workers (BTW) was an interracial labor organization in the Jim Crow South that fought a brief, but historic struggle to organize the workforce of one of the South's largest industries. The BTW grew out of earlier populist, socialist, and labor organizing in the region and presented a major challenge to the power structure of the area. Southern timber companies banded together to create a virtual military occupation of the area and waged a bitter struggle against the BTW utilizing violence, Jim Crow, and collusion with the state. Over one hundred years have passed since the BTW was organized in the piney woods of western Louisiana and eastern Texas, and the racial politics of the union are still poorly understood. This article uses newly discovered documents and secondary source analysis to call into question whether segregation was uniformly employed by the union before affiliating with Industrial Workers of the World in 1912, demonstrating that the BTW's racial policies and actions changed over time to become more inclusive. Furthermore, this work will show that class, gender, and sexuality were components of the same hierarchical power structure that drove the engine of Jim Crow. The racial components of this campaign cannot be comprehended outside of an understanding of how gender and sexual relations of power or hierarchies operated in the subjugation of the workforce.

David Marquis is a Ph.D. Candidate in History at the College of William & Mary. He received his M.A. from the College of William & Mary in 2016. He is studying the timber industry and the development of industrial capitalism in the Jim Crow South.



Fear, Foreigners and Federalism: The Naturalization Act of 1790 and American Citizenship

Presenter: Cody Nager Advisor: Guillaume Aubert College of William & Mary,

History

The Naturalization Act of 1790's requirements of residency and "good character" reveal that the First Congress set the limits on the access of immigrants to citizenship while mostly considering European foreign outsiders, rather than African Americans or Native Americans. These residency and "good character" clauses were derived from a combination of concerns regarding foreigners that came to prominence during the Confederation Period. Among these concerns were perceived ability of foreigners to the gain control over land in the trans-Appalachian west and political influence in the newly founded and unstable political order established in the aftermath of the American Revolution. These newfound concerns regarding national stability were bolstered by long standing concerns over integration of foreigners on the basis of language or tendencies towards "monarchism," which were seen as contrary to republican values. When these concerns mixed with the British understandings of subjecthood and naturalization that formed the basis of the legal knowledge of the policy making elite in the First Congress, the confluence of these concerns and legal heritage informed a more conservative understanding of naturalization. Thus, the Naturalization Act of 1790 depicted a narrow definition of citizenship derived from prejudice against foreign outsiders. The conception of United States as an asylum for mankind came to ironic demise through the republican principles it sought to uphold.

Cody Nager is an M.A. student in History at the College of William & Mary with an interest in the history of the Early American Republic, especially in regards to immigration and policy. His current project focuses on the Jay Treaty and the Naturalization Act of 1795.

The Significance of French Refugees to Catholic Education in the Early American Republic

Presenter: Mitchell Edward Oxford Advisor: Joshua Piker College of William & Mary,

History

The French Revolution had a profound impact throughout the Atlantic world. Although as many as 25,000 refugees arrived in the United States in the 1790s, much of the scholarship on the importance of these refugees focuses on a few elite men whose brief time in the United States culminated in the political controversy between the French Republic and the United States known as the "Quasi War" (1798-1800). However, about two dozen Catholic priests were also among this group of refugees, and they played a crucial role in building Catholic education in the early United States. Many of these priests belonged to the Society of St. Sulpice, a French order devoted primarily to seminary education. The Sulpicians were recruited by the first American bishop, John Carroll of Baltimore, to establish the first American seminary in 1790. But this school, St. Mary's Seminary in Baltimore, was only the first of many colleges and seminaries founded by French Revolutionary refugees in the late eighteenth and early nineteenth century. Moreover, this initial group of French refugees immediately began to recruit new missionaries from across Europe to study, to serve as priests along the frontier, and to teach in the schools that they built. They also solicited funds, with varying degrees success, from numerous European institutions and individuals. The work done by these refugees and their recruits created the necessary institutions for the training of priests in the United States for work in American parishes, they were, therefore, pivotal in the creation of a distinctly American Catholicism.

Mitchell Oxford is a first-year Ph.D. student in History at the College of William & Mary. He received a B.A. from Florida State University and an M.A. from the University of South Carolina, both in History. Mitchell's research interests focus on the trans-Atlantic context in which religious belief and institutions developed in the early American republic. His recent work has explored the importance of French Catholic priests, women religious, and devout lay persons to the early development of the American-Catholic Church.

ARTS&SCIENCES

"A Devil of a Fright": Fear and Containment through Narrative and Language in the Seventeenth and Eighteenth-Century Mississippi Valley

Presenter: Makiki A. Reuvers Advisor: Daniel Richter University of Pennsylvania, History

In May of 1784, John Chesselden and James Arkins set out through the wilderness of the Illinois Country to visit an old friend of theirs. As they walked along the banks of the Mississippi and filled the silence with talk, the conversation turned toward a curious tale about Varnum's Wood, the shady grove through which they happened to be passing. An acquaintance who passed through that same wood mere months earlier had himself "such a devil of a fright" when none other than the Devil himself, manifested in the shape of a man without head or arms, appeared in the flesh. Chesselden, who later wrote of that particular day in Varnum's Wood, brushed off the tale as myth — that is until he and Arkins experienced a frightening encounter of their own. Set in the borderland space of the Mississippi valley, I argue that through narratives like Chesselden's we can better understand just how valley settlers in the 17th and 18th centuries perceived the isolated wilderness as a space of uninhibited freedom and simultaneous danger. At odds with Native Americans and an unfamiliar natural landscape. borderland settlers constructed fortifications that allowed them to turn inward in an effort to protect themselves. My research concludes that although buildings and fences protected settlers physically, it was through language and narrative, however, that they sought to secure psychological fortification against threats of the mind like otherness and cultural atrophy. Narratives like Chesselden's highlight the ways in which language was utilized by settlers to psychologically contain and neutralize the elements of the physical and cultural landscape that were, in reality, uncontainable.

Makiki Reuvers is a Ph.D. student in History at the University of Pennsylvania. Her primary research centers on race, religion, and culture within borderland spaces in Colonial & Early America. Her current research looks at spaces of interaction between Native Americans and Euro-American settlers on the southern Appalachian frontier in the late eighteenth century.

Masters of Light and Flight: The Spectacle of Invention in U.S. Popular Culture, 1876-1920



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

This paper concerns the popular fascination with inventors in U.S. popular culture in the decades surrounding the turn of the twentieth century. It asks why were Americans of this era so interested in the public lives and personas of inventors? In answering that question, it critically examines and analyzes the discourse, which is located in contemporary newspapers, popular magazines and works of fiction, surrounding their lives and inventions as well as the spectacle surrounding the public display of those inventions. Focusing mainly on celebrityinventors associated with electricity, such as Thomas Edison and Nicola Tesla, and innovators in the early days of aeronautics, such as Glenn Curtiss and the Wright brother, it will argue that the image of inventors presented to the public was doubleedged. On the one hand, inventors became popular symbols of control of labor and its products during an era when both the alienation of industrial and commercial labor as well as the changing nature and rising dangers of urban life were on the minds of many Americans. At the same time, popular coverage of inventors reminded the average person that industrial alienation was here to stay and that mastery was no longer available to the ordinary but now only to the exceptional. Finally, the discourse surrounding these celebrity-inventors facilitated a cultural transition from a nineteenth-century worldview in which value was placed upon individual mastery to a twentieth-century worldview in which value was placed upon the collective mastery of corporations and the state.

Jim Rick is a Ph.D. student in History at the College of William & Mary. His research interests center on the cultural and intellectual history of the nineteenth and early twentieth-century United States. Jim received his B.A. in History and Anthropology from Butler University in December 2015.



The Rough Road to Radicalism: A History of the Radical Civil Rights Social Movements of the 1930s and 1940s

Presenter: David Cameron Rothmund Advisor: Kerry Taylor 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 1960s. This article predominantly examines the Southern Negro Youth Congress (SNYC) and the leaders within the growing African American left. It will attempt to prove that federal interaction, fear of communism, and long-standing southern racial norms delayed the civil rights movement from occurring in the 1930s. Primary source material includes an array of works from SNYC party leaders and national conferences, ranging from speeches to personal letters to academic presentations. It will begin to create a web of social activists within the black social left and provide groundwork for an untold but socially, culturally, and politically important aspect of American history. With the exception of the works of Dr. Erik Gellman and Dr. Glenda Gilmore, the limitations of this paper include a lack of academic secondary sources and leadership testimonials due to FBI interference and obstruction. This paper will provide context on early twentieth century social movements and the way they have been preserved in the memories of American history.

David Rothmund is an M.A. student in History at the College of Charleston in South Carolina. His concentrations concern southern culture and its relationship to race within American history. He has previously presented papers at conferences across the U.S. on working women in post-World War II America, the dichotomy between race, gender, and law in antebellum America, and race and medicine on southern plantations.

Salem's Giles Corey in Fact and Fiction

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

Giles Corey is remembered today as the man who suffered the singular fate of being pressed to death during the Salem witchcraft trials of 1692. Corey was neither the first, nor the only, man killed during the trials, yet has captured the public imagination where others have not. Modern popular representations depict his refusal to stand before the court as a testament to his principled moral commitment, idealizing him as a hero ahead of his time. An examination of seventeenth-century court records and trial testimony, however, paints a different picture of his character. They reveal Corey engaging in illegal behavior, heckling his neighbors, alienating members of his own family, and generally inspiring dislike as he rose from humble origins to a position of relative wealth. How, then, did the glorified popular image of him originate, and why? Surveying the earliest works focused on Corey (both fiction and non-fiction) reveal him as a mythic construction of late nineteenth century. Authors recast his story to express an immediate sense of shame for the executions during the hysteria of 1692 and a general nostalgia for the agrarian past as a foil for the turmoil and corruption they saw in the present. Through the lens of nineteenth-century revisions, Corey entered American cultural memory as a symbolic caricature of preindustrial virtue and smalltown values. His outspoken stubbornness, independent individualism, and self-serving social climbing directly conflicted with the Puritan quest for a model community, but endeared him to later generations whose ideology valued those traits.

Kaila Knight Schwartz is a first-year Ph.D. student in History at the College of William & Mary. She holds a B.A. in History from Brandeis University and a dual M.A./M.L.S. in History and Archives Management from Simmons College. Her primary research focus is the history of personal naming patterns in early America.



Long Gone Buildings and Indifferent Improvements: The Fleeting Material Culture of Mid-Eighteenth-Century Shenandoah County

Presenter: Sarah Elaine Thomas Advisor: James Whittenburg College of William & Mary, History

From 1750 to 1780, most people living in Shenandoah County, Virginia constructed temporary buildings that have long disappeared from the county's built landscape. Buildings were impermanent, swiftly constructed, and in most cases, not maintained for longevity. Although a few buildings are still extant from this early period, these are the best of the best in terms of construction and maintenance, and most have been altered extensively over time. Since most of these impermanent structures have been gone for over two-hundred years, in the absence of extensive archaeological surveys, the Jonathan Clark Notebook of 1786 remains one of the only sources to understand the extent of the fleeting nature of mid eighteenth-century Shenandoah County material culture.

Sarah Thomas is a Ph.D. Candidate in History at the College of William & Mary. She is a material culture historian who specializes in the buildings and objects of early Virginia. She has received research fellowships from Winterthur, Colonial Williamsburg, the Decorative Arts Trust, the Society for American Period Furniture Makers, and the Early American Industries Association. She holds an M.A. in Architectural History and Historic Preservation from the University of Virginia and a B.A. and an M.A. from the College of William & Mary. She is currently writing her dissertation.

"A Second Offense of This Kind": Female Sexual Recidivism in Colonial New England

Presenter: Anna Leigh Todd Advisor: Kathleen Brown University of Pennsylvania, History

In 1747, Benjamin Franklin published the sensational and semi-fictional tale of Polly Baker, a Connecticut woman on trial for her fifth fornication charge. Before the magistrates, Baker bemoaned the double standard of sexual regulation and the cycle of poverty and criminality into which she was forced by her repeated unwed pregnancies. Franklin's vignette highlights the curious colonial phenomenon, often mentioned only passingly in current scholarship, of female sexual recidivists, classified here as women who bore more than one child out of wedlock. If the purpose of legal codes of sexual conduct was to deter certain undesired behaviors, sexual recidivists occupy an interesting space between the intent of the law and the reality of its implementation wherein alternative cultural norms and social circumstances could be allowed to intercede. This paper examines this small but visible category of female recidivists in New England for the period 1675-1775, describing their social characteristics, life trajectories, and perceptions. Employing court record abstracts for three New England counties, the majority of the research performed here utilizes the technique of record linkage, stringing together vital, probate, and other records to quantify the collective characteristics of these women and to piece together something of the reality of their lives. Ultimately, this study has found great and dramatic variety among female sexual recidivists, arguing both for a lack of broad social opprobrium existing alongside exacerbated vulnerabilities for women already on the margins.

Anna Leigh Todd is a first-year Ph.D. student in History at the University of Pennsylvania. Her research interests primarily concern gender and sexuality in early America.





Continental Army: Leadership School for the Early Republic

Presenter: David Lawrence Ward Advisor: Paul Mapp College of William & Mary, History

The orthodox understanding of the fate of the demobilized Continental Army soldiers holds that extended military service disadvantaged men in their subsequent civilian lives. Historians have long overlooked the effect of junior officers and sergeants hard-won wisdom and experience in the War for Independence. These former soldiers often migrated westward, and became law enforcement personnel, local politicians, and religious leaders in newly formed communities in the Old Northwest and Southwest. This important institution building and community service does not generally appear in pension applications, tax records, or wills, but it was vital to expansion in the early Republic. My work tracks the soldiers lives from their demobilization in 1783 to their pension applications in 1819 and 1832 by examining memoirs, letters, genealogical records, family histories, public records, obituaries, and newspapers to reveal the effect of military training on their postwar careers. The results of my research upend the current narrative, which concentrates on soldiers resentment at their treatment during the war and their poverty in later life. Instead, I argue, the benefits of service in the Continental Army were seen for many decades afterwards. By understanding these soldiers experiences during one of Americas longest wars and their contributions after the war ended to expansion in the early Republic, we gain insight into the effect of extended volunteer military service in the construction of an American empire, and the key role that military veterans have played in economic and geographic expansion, especially after long and bitter wars.

David Ward is a Ph.D. Candidate in History at the College of William & Mary. He is a retired U.S. Army Colonel with various command and staff positions in the United States and overseas during his 28 year career. His research focuses on Continental Army veterans who moved westward and used the skills acquired in their military training to establish communities in the new territories and states of the early Republic.

Reading the "Gothic" at Madame Rivardi's Seminary

Presenter: Emily Wells
Advisor: Carol Sheriff
College of William & Mary,
History

On June 15, 1811, Madame Rivardi's Seminary for Young Ladies moved to a mansion house on the corner of Twelfth and Chestnut streets in Philadelphia. Built in the gothic revival style, the mansion recalled the castles and cathedrals that dotted the fictional landscapes described by the poets and novelists of the Romantic era. The students delighted in their new surroundings, imagining themselves in the roles of their favorite gothic heroines. The headmistress, Marie Rivardi, was perfectly suited for her role as the "lady" of the house. A French émigré, Madame Rivardi had never completely forsaken her courtly manners and educated her students according to European standards. Using correspondence, schoolbooks, and other writings produced by students while attending Madame Rivardi's Seminary, I examine how reality and fiction collided within the newly constructed walls of the Gothic Mansion. Here, students learned to navigate the boundaries between the imaginary worlds portrayed in Romantic fiction, and the often-disappointing realities of the present. As a European intrusion onto the American landscape, the Mansion also served as a site of conflict between the aesthetics and values of the old world and those of the new. Through this case study, I examine how young women incorporated fiction into their daily lives and traversed the boundaries between the fictionalized "gothic" past and the quickly-changing present.

Emily Wells is a Ph.D. student in History at the College of William & Mary. She graduated from Mount Holyoke College with a B.A. in History. As a graduate student, she studies the history of early America with a focus on women, material culture, and education. Emily has pursued her academic interests through internships with institutions including Colonial Williamsburg, Historic Deerfield, Old Sturbridge Village, the American Antiquarian Society, and the Mount Holyoke College Archives and Special Collections.



Rapid, Inexpensive Optical Characterization of Nanosheet Materials

Presenter: William W. Dickinson Co-Authors: H. Kumar, D. Adamson Advisor: Hannes Schniepp College of William & Mary,

Physics

Nanosheet materials, including graphene and graphene oxide (GO), are a subject of interest for many researchers due to their exceptional properties (strength, conductivity, etc.). Correspondingly, a variety of methods have been used to characterize them, such as fluorescence microscopy, scanning electron microscopy (SEM), atomic force microscopy (AFM), and Raman spectroscopy. However, each of these methods provides information that is in some way limited, and all require substantial investment into specialized equipment. We describe here a method using optical microscopy and free software (ImageJ and Gwyddion) that rapidly and inexpensively provides full characterization of these materials regarding both flake area and thickness. Further, we demonstrate the power of this technique by characterizing a sample of GO that we separated into four fractions using a recently described emulsion-based method. Our optical characterization technique gives new insight into the mechanism underlying this fractionation method. Our technique will expedite the development of processing methods for these important materials, impacting systems such as flexible electronics, sensors, nanocomposites, and many others.

William Dickinson is a Ph.D. Candidate in Physics at the College of William & Mary. He works in the Nanomaterials & Imaging Lab of Dr. Hannes Schniepp. His research focuses on measuring interfacial forces at the nano scale using atomic force microscopy (AFM). This has included investigations of oil/mineral interactions, 2D materials, and polymer brush layers.

Ultracold Potassium for Atom Chip-Based Experiments

Presenter: Shuangli Du

Co-Authors: A. Rotunno, A. Pyle, C. Fancher

Advisor: Seth Aubin College of William & Mary,

Physics

We report on the progress of an atom chip-based laser cooling and trapping apparatus for potassium. Potassium has many useful properties for ultracold experiments. First, potassium has several low-field magnetic Feshbach resonance for controlling the atom-atom interactions. Second, potassium has a relatively small hyperfine splitting, which benefits experiments on the AC Zeeman effect. Third, the isotopes of potassium can be both bosons (K39 and K41) and fermion (K40), which can be used for both bosonic and fermionic interferometry. At present, we are commissioning the apparatus with the most abundant isotope, K39, thus ensuring large trapped samples. To upgrade the apparatus, we added a second laser amplifier to increase the 767 nm cooling and trapping laser power to 400 mW, which has resulted in a substantially larger magneto-optical trap (MOT). Also, by improving the temperature and humidity control of the cooling and trapping lasers, the optical frequency tuning range has been broadened to over 100 MHz. We use an optical molasses stage to further cool the MOT atoms before loading them into a magnetic trap. These improvements have resulted in a magnetic trap with 4*10^7 potassium atoms, an order of magnitude increase, at roughly 60 microkelvin. Once in the magnetic trap, we transport the atoms magnetically to a second chamber, where they are loaded into a micromagnetic trap on our atom chip. At present, we are optimizing the efficiency of the transfer to the atom chip trap. The next step is to trap a potassium isotope of choice and ultracold rubidium on the chip simultaneously. The rubidium will allow us to sympathetically cool K39 or K41 to BEC or K40 to DFG.

Shuangli Du is a third-year Ph.D. Candidate in Physics at the College of William & Mary. He graduated from Renmin University, China, with a B.S. in Physics.



Auxiliary-Field Quantum Monte Carlo Study of Transition-Metal Decorated Linear Carbon Chains

Presenter: Brandon Kyle Eskridge Advisor: Henry Krakauer College of William & Mary, Physics

Carbon allotropes have been studied extensively both experimentally and theoretically over the past few decades due to their promising potential for use in advanced technological applications and due to their interesting physical properties from a pure science perspective. Two-dimensional (2-D) carbon allotropes such as graphene have been experimentally realized for some time; however, methods for producing one-dimensional (1-D) carbon linear chains with long lengths (~6000 atoms or more) have only recently been developed. The physical properties of carbon allotropes can be altered by decorating them with various individual atoms. Commonly, transition metal adatams have been studied on the surface of 2-D carbon allotropes for use in spintronic devices. Convincing studies of 1-D carbon allotropes with transition metal adatoms and with transition metal atoms inserted into the carbon chain structure have not yet been performed using near exact quantum many body methods. Motivated by the recent successful fabrication of long linear carbon chains, we employ the high accuracy of the auxiliary-field quantum Monte Carlo (AFQMC) method in order to study the energetics and magnetic states of linear carbon chains decorated with transition metal atoms.

Brandon Eskridge is a Ph.D. Candidate in Physics at the College of William & Mary. He is a computational physicist working in the group of Dr. Henry Krakauer on theoretical condensed matter physics.

Tailorable Dispersion in a Ring-Laser Cavity

Presenter: Demetrious Thomas Kutzke Co-Authors: O. Wolfe, I. Novikova Advisor: Eugeniy Mikhailov College of William & Mary, Physics

Planning on taking a Captain Nemo style journey? If your research or travels take you into uncharted territory, off-the-grid, far from the reaches of GPS or your smartphone's map application, then you could benefit from a ring-laser gyroscope (RLG). Where traditional gyroscopes fail due to mechanical effects like friction, RLGs never experience a drift in location accuracy. This means you can know your location, exactly, without reference to any external navigation device. No GPS, no maps apps, no compass. What's the catch? They already exist. But we seek to improve accuracy so that any minor deviation from your desired path can be detected and corrected before you end up in the Arctic when you intended Key West. To improve accuracy, we demonstrate the ability to tune the sensitivity factor or pulling factor (PF), i.e. the ratio of the laser frequency shift to the empty cavity frequency shift, of our laser by more than an order of magnitude by varying experimental parameters such as laser detunings, pump laser power, and atomic density. This represents significant progress toward achieving the highly sought-after "fast-light," regime, where one could seemingly violate causality and special relativity, achieving light which exceeds c in speed. At the same time, fast-light has been suggested to improve rotation sensitivity in RLGs by factors as high as a million times greater than current technology.

Demetri Kutzke is a second-year Ph.D. student in Physics at the College of William & Mary. His research focuses on Quantum Optics, broadly, with his current project focusing on improving rotation sensitivity in ring-laser gyroscopes. He completed his undergraduate degree in Physics and Mathematics at Marquette University in Milwaukee, Wisconsin.



Thickness and Substrate Dependence of the Optical Conductivity of Niobium Dioxide Films

Presenter: David Lahneman Advisor: Mumtaz Qazilbash College of William & Mary,

Physics

Niobium dioxide (NbO₂) undergoes a temperature induced insulator-to-metal transition accompanied by a crystallographic transition at ~1080K. Films of different thickness (100 nm and 200 nm) were grown directly on sapphire substrates and on gold coated sapphire substrates. Using Fourier transform infrared spectroscopy and spectroscopic ellipsometry we investigate the room temperature insulating state of NbO2 thin films in the spectral range from ~100 cm-1 to 50000 cm-1. We observe that at ~25000 cm-1 there is a shift in the optical interband transition for different films. We discuss the origin of this shift and the implications for the electronic structure. We compare the infrared-active phonons in NbO2 films with those published in the literature on single crystals. The phonons shed light on the strain in the films.

David Lahneman is a Ph.D. Candidate in Physics at the College of William & Mary studying experimental condensed matter physics. His primary research interests are strongly correlated materials and furthering the capabilities of broadband infrared nanospectroscopy.

Modeling Near-Field Infrared Microscopy Data

Presenter: Patrick McArdle Co-Author: D. Lahneman Advisor: Mumtaz Qazilbash College of 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 to 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. We have begun numerical modeling of this tip-sample system with the program FEKO, an electromagnetic radiation simulation software tool. Using FEKO, we aim to more accurately model near-field infrared data obtained in recent and ongoing experiments.

Patrick McArdle is a second-year Ph.D. student in Physics Department at the College of William & Mary. He completed his B.S. in Physics at the University of Florida and is currently working with Dr. Qazilbash's group, studying nano-ftir.



Parameterizing Main Detector Light Response for the Parity-Violating Qweak Experiment

Presenter: Victoria Owen Advisor: David Armstrong College of William & Mary,

Physics

Qweak is a parity-violating, electron scattering experiment of 1 GeV electrons incident on a liquid Hydrogen target to obtain a high precision measurement of the weak charge of the proton. The scattered electrons are bent through a magnet system before interacting with the quartz-bar main detectors. The main detectors, distributed geometrically into eight octants, use the properties of total internal reflection to propagate light to photomultiplier tubes. Understanding the effect on the amount of light from the location, energy, and angle of particles incident on the main detectors is key to effectively modeling these detectors and subsequently understanding the physics results of the experiment. Results from Monte Carlo simulations of the detector's optical response are parameterized using simple analytic functions in this work.

Victoria Owen is Ph.D. Candidate in Physics at the College of William & Mary studying Experimental Nuclear Physics. She is working as part of the Qweak collaboration at Jefferson Lab under the guidance of Dr. David Armstrong. Her analysis currently includes parameterizing light in the main detectors and verifying electron scattering step-size in lead.

Reduction of Four-Wave Mixing Using Raman Absorption in Rub

Presenter: Nikunjkumar Prajapati Co-Author: G. Romanov Advisor: Irina Novikova College of William & Mary,

Physics

Information technology has been progressing at astounding speeds, but there are limitations to this progress. The smaller electronic components become, the more complex the systems become. Quantum effects like electrons jumping from one wire to another and between components arise. To get around problems like these, new technologies must be developed. One approach removes the usage of transistors in memory. It uses light inside a medium as the means of storage by taking advantage of an effect known as Electromagnetically Induced Transparency (EIT). The effect occurs when two lasers fields, strong control and weak probe, are tuned to frequencies which correspond to the energy difference of energy levels in the atoms. The effect allows for the slowing of light and its transparency. Perfect for memory application, but the introduction of the strong light causes the generation of a stokes field and amplification of the probe field. This is known as four-wave mixing. The main problem is the probe amplification producing additional noise for the signal being sent in. This reduces the viability of EIT based memory. A possible fix to this problem is the absorption of the stokes field as it is produced to stop effect of four-wave mixing by using an additional laser field at a frequency matching the separation stokes field and a higher, non-interacting, energy level. Preliminary results showed a suppression of the stokes gain and probe gain of 85%. Further increases in stability and optimization of the laser frequencies and powers should lead to better results.

Nikunj Prajapati is a second-year Ph.D. student in Physics at the College of William & Mary. He completed his undergraduate degree in Physics with Honors at Stockton University in Galloway, New Jersey.



Discrete Momentum Sideband Generation with Ultracold Atoms Scattered off an Oscillating Barrier

Presenter: Andrew J. Pyle

Co-Authors: C. Fancher, J. Delos, K. Das

Advisor: Seth Aubin College of William & Mary,

Physics

We present progress on an experiment to study 1D quantum mechanical scattering by an amplitudemodulated barrier. The oscillating barrier imparts or subtracts kinetic energy in discrete amounts from the scattered atoms. In this manner, the energy spectrum of the scattered atoms resembles a comb with a tooth spacing of $\hbar\omega$ where ω is the oscillation frequency of the barrier. Numerical simulations of the scattering process confirm this basic scattering picture. We present an atom chip-based experimental system to study the scattering dynamics with Bose-Einstein condensates (BEC) of 87Rb. The proposed experiment operates by releasing a BEC from a magnetic chip trap and directing it horizontally towards a tightly focused laser beam that serves as an oscillating barrier. A magnetic field gradient is used to control the vertical motion of the BEC. Detection is carried out with a time of flight technique to resolve discrete atomic packet sidebands. This method can be used to study momentum sideband generation with a BEC in the presence of no or weak interactions. Dark-ground imaging can be used to detect small atom number BECs. This experiment represents a first step toward implementing a quantum pump for ultracold atoms based on two such barriers modulated out of phase with one another. Quantum pumping was originally proposed in the context of electron transport in nanowires, but has proven difficult to implement. The ultracold atom approach represents a possible route around the current experimental bottleneck.

A.J. Pyle is a sixth-year Ph.D. Candidate in Physics at the College of William & Mary. He graduated from Kutztown University of Pennsylvania with a B.S. in Physics and Chemistry.

Precision Microwave Source for AC Zeeman Experiments with Ultracold Atoms

Presenter: Andrew Peter Rotunno Co-Authors: A. Pyle, C. Fancher, S. Du

Advisor: Seth Aubin College of William & Mary,

Physics

Ultracold atom experiments involving the AC Zeeman force require powerful, narrowband, and rapidly tunable microwave or radiofrequency fields. We present on the research and development of such a source, based on a direct digital synthesis (DDS) as master oscillator for use with ultracold rubidium and potassium isotopes. Our source can directly synthesize 1-400 MHz, with the ability to perform phasecontinuous sweep over hundreds of MHz in less than 100 microseconds. The sweeping source can be frequency multiplied for use near 6.8 GHz (the hyperfine splitting of rubidium-87), and amplified up to 20 W with current equipment. Vector network analysis from the existing chip will suggest ways to maximize microwave currents, and atom chip wire layouts for generating AC Zeeman traps will be investigated through electromagnetic simulation, as well as possible impedance matching approaches. We are developing high-speed microwave amplitude control and pulse-shaping hardware for an atomic clock and spin-dependent atom interferometry. The precision microwave source enables experiments on AC Zeeman potentials and traps, spinspecific forces, and state-dependent interferometry, with possible applications to precision microscopy inertial force sensing, and quantum computing.

Andrew Rotunno is a Ph.D. Candidate in Physics at the College of William & Mary in Experimental Physicist working with ultracold rubidium and potassium atoms in Seth Aubin's lab. He graduated with a B.S. in Physics from Fordham University in the Bronx, New York.



Statistical Physics of the Symmetric Group

Presenter: Mobolaji Williams

Co-Authors: C. Fancher, J. Delos, K. Das

Advisor: Eugene Shakhnovich

Harvard University,

Physics

Ordered chains (such as chains of nucleotides or amino acids) are ubiquitous in biological cells, and these chains perform specific functions contingent on the sequence of their components. Using the existence and general properties of such sequences as a theoretical motivation, we study the statistical physics of systems whose state space is defined by the possible permutations of an ordered list, i.e., the symmetric group, and whose energy is a function of how certain permutations deviate from some chosen correct ordering. Such a non-factorizable state space is quite different from the state spaces typically considered in statistical physics systems and consequently has novel behavior in systems with interacting and even non-interacting Hamiltonians. Various parameter choices of a mean-field model reveal the system to contain five different physical regimes defined by two transition temperatures, a triple point, and a quadruple point. Finally, we conclude by discussing how the general analysis can be extended to state spaces with more complex combinatorial properties and to other standard questions of statistical mechanics models.

Mobolaji Williams is a graduate student in Physics at Harvard University. He has a B.A. from the Massachusetts Institute of Technology (MIT). His undergraduate thesis, completed under Jesse Thaler, concerned multiple supersymmetry breaking in potential models of dark matter. At Harvard, he is studying theoretical problems in the statistical physics of protein design.

An Infrared View of Superconductivity in the Iron-Based Materials

Presenter: Zhen Xing

Co-Authors: S. Saha, J. Paglione Advisor: Mumtaz Qazilbash College of William & Mary,

Physics

Appropriate chemical doping in the 122 iron arsenides (AFe2As2) usually leads to suppression of the antiferromagnetic order. However, bulk superconductivity does not always occur upon suppression of the antiferromagnetism. In this work we study why some iron-based materials are superconducting while others are not. We have performed cryogenic optical spectroscopy measurements on single crystals of superconducting BaFe_{1.9}Pt_{0.1}As₂ non-superconducting, rare-earth-doped CaFe₂As₂. The ab-plane dielectric functions have been obtained and compared to one another to gain insight into the conditions necessary for superconductivity in these materials. We also compare the dielectric functions of a number of superconducting and non-superconducting iron-based materials from the published literature. We shall discuss our findings in light of the electrodynamics formulation of the BCS theory of superconductivity.

Zhen Xing is a sixth-year Ph.D. Candidate in Physics at the College of William & Mary who has worked for the past five years in Dr. Mumtaz iron-based Qazilbash's lab focusing on superconductors. As а experimentalist condensed matter physics, his works include cryogenic infrared spectroscopy and ellipsometry measurements. He is trying to reveal the nature of superconductivity of iron-based materials.



16th Annual Gra	duate Reseai	rch S1	ımvosium
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\mathcal{NOTES}



Personality Similarity Between Writers and Readers: Predicting Reader Inspiration in a Cross-Classified Multilevel Framework

Presenter: Will Belzak

Co-Authors: L. Wadsworth, Y. Sim

Advisor: Todd Thrash College of William & Mary,

Psychology

Writer-reader personality similarity may facilitate reader inspiration and other positive responses to a text. This hypothesis has not been tested, perhaps due to the methodological and analytic challenges involved. In the current study, 195 student writers each wrote one poem about the human condition, and 220 student readers read each poem and rated how inspired they were in response. In this design, writers and readers are fully crossed, making available 36,020 cells of data. Use of cross-classified multilevel modeling is necessary to account for nonindependent observations in the resulting Writer x Reader data matrix. Overall similarity of each reader with each writer will be operationalized in terms of profile similarity across the Big 5 traits. Because profile similarity is known to be confounded with normativity (i.e., the extent to which individuals have typical profiles), we will decompose profile similarity into distinctive similarity and normative similarity. This approach will allow us to test whether a writer's personality is distinct from the average writer personality in a similar way that a reader's personality is distinct from the average reader personality, thus avoiding interpretational problems caused by normativity. In addition to testing overall similarity across the Big 5 traits, we will also examine similarity in individual traits using polynomial regression in conjunction with response surface analysis. Results are forthcoming.

Will Belzak is a second-year M.A. Candidate in Psychology at the College of William & Mary. His work focuses on statistical modeling techniques in psychological research.

Reducing Neural Attentional Bias Toward Homosexual Couples via Entitativity

Presenter: JoEllen Blass Co-Authors: C. Forestell, N. Gupta Advisor: Cheryl Dickter College of William & Mary,

Psychology

Recent research has suggested that early neural preferential attention toward social outgroup versus ingroup members may lead to differences in person perception. Other research has suggested that perceiving homosexuals as entitative is associated with heterosexuals' antigay bias. Entitativity is defined as the degree to which people are perceived as similar to one another and share common goals. The goal of the current study was to investigate whether manipulating entitativity would affect the neural attentional processing of sexual minorities, as measured with event-related potentials (ERPs). Heterosexual participants (N=45) read statements suggesting that homosexual couples were either high or low in entitativity. Participants then completed an oddball task in which they viewed a total of 222 images that were mostly heterosexual couples (174 pictures) interspersed with 48 (oddball) matched pictures of homosexual couples. Analyses of ERPs were timelocked to the presentation of the pictures of the homosexual couples. Results revealed that participants in the low entitativity condition had a smaller P2 amplitude to pictures of homosexuals than did participants in the high entitativity condition. These findings suggest that providing people with information that reduces their perception that sexual outgroup members are entitative reduces neural attention to homosexual images. Because outgroup -ingroup differences in neural attention have been linked to processes involved in stereotype activation, this work suggests that portraying homosexuals as less entitative may reduce implicit bias toward these individuals.

JoEllen Blass is a second-year M.A. Candidate in Psychology at the College of William & Mary. She received her B.A. in Psychology from Bloomsburg University. Her research focuses on prejudice toward sexual minorities with an emphasis on mechanisms through which prejudice reduction may occur.



The Interaction of Relational Mobility and Social Attractiveness: Impact on Depression, Self-Esteem and Life Satisfaction

Presenter: Megan Jessie Buys Advisor: Joanna Schug College of William & Mary, Psychology

The community in which a person with a disability is embedded can have a serious impact on their ability to have a functioning social life. As humans are social creatures, social exclusion (the lack of a community that supports them in their endeavor to complete leisure activities) can lead to increased rates of depression, along with lower self esteem and overall lower satisfaction with life. In this study, we will examine whether the culture within which a person who has some form of disability may relate to social inclusion and exclusion. In particular we will examine relational mobility, or the number of new relational opportunities available in a given social environment. We predict that higher relational mobility, common in the United States, will lead to more exclusion of individuals with disabilities, while lower mobility may lead to more inclusion and stable social networks. In the first study, we have collected data from Japan, and will collect complementary data from the US to examine relational mobility as a function of culture and disability status. In the second study, we will examine if cultural factors such as relational mobility and cultural tightness and looseness may change outcomes associated with the autism spectrum among University students in Japan and the United States.

Meg Buys is a second-year M.A. Candidate in Psychology at the College of William & Mary. She graduated with a degree in Psychology and History from Ohio Wesleyan University. Her current research involves social attractiveness and its relationship to depression, satisfaction with life and self esteem. She is originally from Pretoria, South Africa.

Adolescents' Implicit and Explicit Attitudes towards Emotion Expression

Presenter: Margaret Eileen Cameron Advisor: Janice Zeman College of William & Mary, Psychology

Expressing emotions in constructive ways are important for social relationships. Particularly in adolescence, youth may be more likely to show or mask emotions to be included in a group. No prior studies have examined adolescents' implicit attitudes on the acceptability of expressing emotions. The current study assessed the concordance between adolescents' implicit and explicit attitudes toward expressing emotions. Participants were 140 youth (52.1% girls, 75.6% Caucasian) between 13-17 years old (Mage=14.7 years). Youth responded to the Emotion Expression Scale for Children (EESC) that measured explicit attitudes toward emotion expression on two dimensions (expression reluctance and poor awareness). Adolescents also completed a computer task, an Implicit Associations Test (IAT), measuring implicit attitudes toward expressing emotions. Individuals either associate posexpressing itive attributes with emotions (compatible associations) or positive attributes with hiding emotions (incompatible associations). Regression analyses indicated that adolescents' IAT scores predicted reluctance to express emotion, but did not predict poor emotional awareness. Gender marginally moderated the relation between implicit attitudes and expressive reluctance, such that boys who reported lower implicit attitudes for expressing emotions tended to have higher levels of expressive reluctance. There was no significant relation for girls. Studying implicit attitudes toward emotion expression can lead to a better understanding of why some people inhibit rather than express emotions, and provides a valid way of avoiding self-report bias inherent in self-report measures.

Margaret Cameron is a first-year M.A. Candidate in Psychology at the College of William & Mary. She is advised by Dr. Janice Zeman. Margaret is interested in clinical, developmental, and cross-cultural psychology. She hopes to study the development of eating disorders in children in order to find appropriate intervention techniques to help prevent the onset of eating disorders.



Evaluation of an ERP-Based, Brief Neurometric Battery-Derived Profile of Alzheimer's Disease

Presenter: Wendel Matthew Friedl Advisor: Paul Kieffaber College of William & Mary, Psychology

This work seeks to support the utility of using eventrelated potentials (ERPs) derived from brief recording sessions of electroencephalographic activity (EEG) to compile a neurometric profile indicative of the cognitive dysfunction observed in patients with Alzheimer's disease. A test measure that is both brief and non-invasive, such as is presented here, could provide an ideal assessment measure for use with clinical populations in whom collecting data over a more extended period is difficult or impossible. Statistically significant differences between the neurometric profiles of healthy older and younger adults have been revealed using the brief neurometric battery (BNB) test procedure utilized in the current work. Seeking to establish the accuracy of the brief neurometric battery in classifying pathological as well as healthy functioning, participants in the current study are a clinical population consisting of 41 older (age 59-90) adult patients of Eastern State Hospital. Test sessions incorporate both auditory and visual stimuli presented concurrently, creating a 20-min battery designed to elicit 8 discrete ERP components (Frequency & Gap MMN, P50, P3, vMMN, C1, N2pc, and ERN). Findings may support the development of a time- and cost-effective diagnostic aid in the form of a neurometric profile suggestive of Alzheimer's disease.

Matt Friedl is a first-year M.A. student in Psychology at the College of William & Mary.

Can Merely Swishing a Glucose Solution Influence Decision-Making on the Iowa Gambling Task?

Presenter: William Hayes

Co-Authors: S. Vanhille, M. DeGraba,

A. Reimold, B. Palmer *Advisor:* William Overman

University of North Carolina-Wilmington,

Psychology

Previous research suggests that merely swishing a sugar solution without ingestion can decrease cognitive interference on the Stroop task, enhance selfcontrol, and even improve athletic performance. In addition, the extant literature supports a direct effect of sugar ingestion on judgment, preferences, and decision-making. However, the underlying mechanisms are not yet well-understood, and it is unclear whether this phenomenon extends to all cognitive domains. The current study investigates whether swishing a glucose solution can influence decisionmaking when choice outcomes are ambiguous. College-aged participants were randomly assigned to a glucose group or a placebo group in a double-blind design. Participants completed a computerized version of the Iowa Gambling Task (IGT), which assesses decision-making under conditions of uncertainty, and the color Stroop task, which tests executive functioning. Because glucose is thought to enhance executive functions, we expect participants in the glucose group to make more advantageous decisions on the IGT than those in the placebo group. In addition, we hope to replicate previous research demonstrating that swishing glucose, but not artificial sweetener, reduces reaction times on incongruent Stroop trials. If glucose can be shown to influence performance on the IGT, it would add another cognitive domain to the line of research on nutrition and human cognition. This would also suggest that higher level executive functions play a role in advantageous IGT performance.

William Hayes is a graduate student at UNC-Wilmington in the Department of Psychology and the Department of Mathematics and Statistics. Hayes studies human decision-making and issues related to the Iowa Gambling Task as a researcher in Dr. William Overman's lab.



Modeling Cooperative Decision-Making Using Bayesian Cognition and Evolutionary Dynamics

Presenter: Amrita Lamba Co-Author: W. Cunningham Advisor: Joanna Schug College of William & Mary,

Psychology

The decision to cooperate (i.e. contribute to a public good) versus behaving selfishly has been an extensive topic of research in evolutionary psychology. Formal game-theoretical models suggest that dualprocess models of cognition can be employed to explain these decisions; during heuristic/automatic cognition, individuals are more likely to cooperate, whereas during controlled/deliberative cognition, individuals are more likely to defect. Furthermore, research shows that network and payoff structure influence cooperative trajectories over time. However, such models do not account for the wide range of behaviors observed in the real world; Specifically, what functions well as an automatic strategy varies by social context, and what functions well as a deliberative strategy will likely to shift depending on current contingencies. In my research, I propose a dynamic integrated evolutionary model of cognition, which accounts for natural selection and cultural transmission. Specifically, my model proposes that evolutionary pressures shaped cognitive functioning, such that the degree of uncertainty of past and future interactions modulates whether individuals use heuristic versus controlled processing. Furthermore, evolutionary pressures bias attentional processes towards the decisions of others, thus we should expect individual decisions to reflect the level of cooperative behavior of others embedded within their local network rather than reflecting fixed innate biases towards cooperation. To test these hypotheses I am using an integrated model of Bayesian cognition, evolutionary game theory, and network theory.

Amrita Lamba is a second-year M.A. Candidate in the Psychology at the College of William & Mary. Her research uses simulation-based models to study the evolution of cooperation in modern human social networks. She is also interested in Bayesian models of decision-making and affect.





Effects of N-Desmethylclozapine on Attentional Performance Following Loss of Basal Forebrain Corticopetal Cholinergic Inputs

Presenter: Eden Blake-Lea Maness Advisor: Joshua Burk College of William & Mary, Psychology

Corticopetal cholinergic neurons play a vital role in attentional processing, and dysregulation of this system contributes to central nervous system disorders whose main attributes include an inability to focus for an extended period of time, such as Alzheimer's disease (AD). The cholinergic muscarinic-1 (M1) receptor is known to be necessary for normal attentional processing. The goal of the present experiment is to evaluate whether NDMC, which acts on allosteric M1 receptor sites, can reverse attentional deficits following loss of cortical cholinergic inputs. After training in an attention-demanding task requiring differentiation between signal trials (500, 100, and 25ms illumination of a central panel light) and non-signal trials (no light illumination), Sprague Dawley rats received intrabasalis infusions of either saline or the cholinergic neurotoxin 192 IgG-saporin. The effects of intracerebroventricular infusions of NDMC were tested after post-surgical performance stabilized. In general, NDMC impaired attentional performance, particularly for lesioned animals. These findings suggest that NDMC may reduce the binding of acetylcholine by way of orthosteric competition or that the actions of NDMC at other receptor sites disrupts any beneficial effects of NDMC at the M1 receptor.

Eden Maness is a second-year M.A. Candidate in Experimental Psychology at the College of William & Mary. In Dr. Burk's neuropsychopharmacology lab, she examines the effects of various pharmacological compounds on sustained attentional processing in an attempt to explore potential therapeutic targets for a variety of psychological disorders.

The Impact of Fertility Cues on Intrasexual Competition and Threat Perception

Presenter: Grant Michael Ostrander Advisor: Melanie Shoup-Knox James Madison University, Psychology

Humans are capable of detecting subtle fertility indicators that change across women's menstrual cycle. One such indicator is the voice, which may change over the course of the menstrual cycle and provide fertility cues to listeners. Such cues provide an obvious advantage to men selecting mates, however research suggests that women can also detect these cues, as evidenced by heightened sympathetic nervous system activity when listening to fertile female voices. Women may monitor the fertility of others to more effectively adjust their own mating strategies. The proposed study will further investigate this intrasexual competition via vocal cues by monitoring women's skin conductance, cortisol, and testosterone responses to hearing high- and lowfertility female voices. We will also examine these responses as a function of the fertility status of the listener by conducting identical trials to women both when they are at high- and low-fertility. We expect to find a heightened galvanic skin response specific to hearing female voices that were recorded at highfertility as an index of sympathetic nervous system activity. We expect to find raised salivary cortisol and testosterone levels after presentation of the voices, as indices of a stress response and a response indicative of anticipation of competition. Additionally, it is suspected that all three of these reactions will be heightened when the listeners are fertile themselves.

Grant Ostrander is a graduate student in the Experimental Concentration of the Psychological Sciences program at James Madison University, working under the supervision of Dr. Melanie Shoup-Knox. His current focus is behavioral neuroscience and neuroendocrinology, particularly with respect to theories underlying evolutionary psychology and human mating strategies. Alternative interests lie in investigating dietary influences on brain function, neural plasticity, and adult hippocampal neurogenesis.



A Latent Factor Analysis of Distress Tolerance and its Relation to Borderline Personality Disorder

Presenter: Molly Penrod Advisor: Christopher Conway College of William & Mary, Psychology

Research on distress tolerance, defined as the capacity to endure emotionally or physically uncomfortable states, has grown rapidly over the last decade. Studies strongly suggest that distress tolerance is a risk factor for the development of diverse forms of psychopathology. Distress tolerance is associated with borderline personality disorder (PD); the tendency to find aversive emotional states unacceptable and avoid them is one of the core characteristics of borderline pathology and the most effective cognitive behavioral treatments for borderline personality disorder focus on increasing the capacity or willingness to withstand emotional distress. Research has also found that borderline PD symptoms are linked to several constructs that closely resemble distress tolerance, namely experiential avoidance, acceptance, anxiety sensitivity, and emotion regulation. Despite the close theoretical link between these constructs and distress tolerance, prior research has not examined these factors simultaneously. Thus, the boundaries between constructs are still unclear, as are their associations with borderline PD. The proposed study has two aims. First, we will examine the latent structure of distress tolerance and related constructs to determine whether they are in fact separate constructs or minor variations on a single underlying construct. Second, we will examine the magnitude of association between the distress tolerance construct(s) and a latent variable reflecting borderline pathology. We expect that our results will advance our understanding of the nature of distress tolerance and inform theories of the origins of borderline pathology.

Molly Penrod is a first-year M.A. student in Psychology at the College of William & Mary. She is broadly interested in the diagnosis and classification of psychological disorders.

The Effects of Observer Race on the Categorization of Racially Ambiguous Targets

Presenter: Matthew Steven Preda Advisor: Chervl Dickter

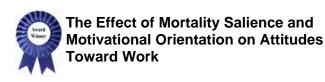
College of William & Mary,

Psychology

Face perception proceeds quickly and automatically in interpersonal encounters, and includes the determination of racial group membership. Individuals of multiracial descent are often categorized, according to the principle of hypodescent, as members of the socially subordinate (i.e. non-White) racial group. Additionally, research shows that categorizations are often consistent with the principle of in-group overexclusion, such that ambiguous targets are less often considered members of an observer's own racial group. Both hypodescent and overexclusion lead White observers to categorize Black-White biracial faces as Black, but the processes lead Black observers to make divergent categorizations. Little research has directly examined the effect of observer race on such racial categorizations, so it is unclear whether White and Black individuals behave similarly. The proposed study employs samples of Black and White Americans, recruited through an online platform, who will complete a computerized dual racial categorization task. Presented with target face morphs in two runs, they will indicate whether or not targets are members of a given racial group: first Black, then White. Patterns of responses will be analyzed to determine the relative influence of hypodescent and overexclusion on categorizations made by Black and White observers. If hypodescent is more influential, Black and White participants will exhibit similar patterns of categorization. If overexclusion is more influential, Black and White participants' categorizations will diverge. Other factors, such as essentialism and racial identity, will also be analyzed as moderators of observer race effects.

Matt Preda is a first-year M.A. student in Psychology at the College of 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.





Presenter: Yoon Young Sim Co-Author: S. Solomon Advisor: Todd Thrash College of William & Mary,

Psychology

Past research has demonstrated that a subtle reminder of death increased Israelis students' desire to work. The present study was designed to determine: 1) if this effect would be replicated as consistent in a sample of American employees in the real work setting; and, 2) if death reminders would also increase work motivation as a function of intrinsic and extrinsic motivational orientation. The researchers recruited 98 currently working participants via Amazon Mechanical Turk and introduced them to General Causality Orientations Scale, either Mortality Salience or Pain Salience condition, Desire to Work Scale and Work Extrinsic and Intrinsic Motivation Scale. Results indicated that: 1) in contrast with the Israeli sample, death reminders decreased the desire to work; and, 2) in accord with our hypothesis, intrinsically motivated participants reported higher intrinsic work motivation in response to death reminders. Explanations for these findings and suggestions for future research are discussed.

Yoon Young Sim is a first-year M.A. student in the Psychology at the College of William & Mary. Originally from Korea, she earned her BA in Psychology from Skidmore College with an honors minor in Business. Merging her cultural and educational backgrounds, she has broad research interests as how internal, individual attributes, such as intrinsic motivation and self-control affect working output, such as job performance, and productivity in diverse cultures.

Predicting Criminal Justice System Involvement: Parental Incarceration, Impulsivity, Planning, and Criminogenic Cognitions



Presenter: Morgan Jane Thompson

Advisor: Danielle Dallaire College of William & Mary,

Psychology

The human brain is malleable to adverse events occurring in childhood and adolescence partly due to the brain not reaching maturity until 25. With the prefrontal cortex maturing after the brain's socioemotional system, adolescents and young adults are driven by emotion and impulse leaving them vulnerable to engaging in health-risk behaviors. From an adverse childhood experiences framework, health-risk behaviors result from untreated social, emotional and cognitive impairment, and disrupted neurodevelopment. In particular, parental incarceration has been associated with a greater likelihood of experiencing other adversities and socioeconomic challenges, placing these children at an even greater risk of adopting health-risk behaviors. It is important to understand how parental incarceration interacts with normal development patterns seen in the brain to affect outcomes during early adulthood. The present study assesses whether parental incarceration, impulsivity and planning predicts offspring incarceration. Participants include college students, individuals from the local community, and individuals currently involved with the criminal justice system (CJS) who are 18-22 years old. Data analysis for the present study is ongoing; however, we anticipate the relationship between parental incarceration and offspring involvement with CJS to be mediated by impulsivity and planning. This study will inform programs to reduce health-risk behaviors in children with adverse backgrounds and assist in reducing young adults' involvement with CJS.

Morgan Thompson is a second-year M.A. Candidate in Psychology at the College of William & Mary. Her research interests focus on the impact adverse childhood experiences have on neural and cognitive development, and the resulting psychopathology.



The Effect of Intuition on Performance and Understanding of the Iowa Gambling Task

Presenter: Sean Vanhille

Co-Authors: W. Hayes, B. Palmer

Advisor: William Overman

University of North Carolina-Wilmington,

Psychology

Researchers developed the Iowa Gambling Task (IGT) to assess real-life decision-making. Since its inception, many researchers utilized the task to explore decision-making in diverse populations resulting in hundreds of articles. The designers of the task developed the Somatic Marker Hypothesis (SMH) to describe the preconscious bias that precedes conscious learning that typically occurs in the task. The construct of intuition can be described as an implicit, nonconscious learning process. To measure participants' intuitive capabilities, selection of the Types of Intuition Scale (TIntS) occurred which includes four subscales of intuition referred to as inferential, affective, holistic big-picture and holistic abstract. Task administration included use of both a laptop and tablet version of the IGT as well as an involved and noninvolved condition. Multilevel modeling will be employed to determine how each of the intuitive subscales may relate to both performance on and understanding of the IGT. Task administrative method and involvement will also be explored in the model. Based on prior research findings, participants scoring high in affective intuition may select more advantageous cards than those who score lower. Additionally, higher intuitive scores may improve performance and task understanding in the noninvolved condition. Significant results may provide support for the SMH and further understanding of the type of learning that occurs in the IGT.

Sean Vanhille is pursuing his M.A. in Psychology at the University of North Carolina-Wilmington as well as a Post-Baccalaureate Certificate in Applied Statistics. He plans to pursue a career in Clinical Neuropsychology.

Integrating Motivation and Imagination: Factor Structure and Nomological Net

Presenter: Lena Marie Wadsworth

Advisor: Todd Thrash College of William & Mary,

Psychology

The increasing interest in imagination calls for attention to fundamental questions. What is the structure of the imagination construct, and does it overlap with motivation constructs? In the present study, we developed the Imagination and Motivation Questionnaire and tested its factor structure and nomological net. This 30-item questionnaire consists of 5 pairs of 3-item subscales. Five subscales assess relatively automatic ("system 1") processes: being inspired "by," spontaneous ideation, nonverbal imagery, illumination, and being inspired "to." Five subscales assess relatively controlled ("system 2") processes: pre-ideation effort, controlled ideation, verbal modality, logic, and post-ideation effort. 274 participants completed the IMQ and measures of other constructs. A 10-factor CFA yielded good fit. The system 1 total scale converged with openness, nostalgia, experiential processing, mysticism, and chills, whereas the system 2 total scale converged with conscientiousness, self-control, rational processing, and free will beliefs. Implications for the integration of imagination and motivation theories are discussed.

Lena Wadsworth is a first-year M.A. Candidate in Experimental Psychology at the College of William & Mary. She is interested in the psychology of motivation and specifically, motive congruence and inspiration.





Intergenerational Smoking Behaviors Among Asian Immigrants: Do Region of Ancestry and Gender Matter?

Presenter: Mandar V. Bodas Co-Author: T. Hamilton Advisor: Tiffany Green

Virginia Commonwealth University,

Health Behavior and Policy

We examine the relationships between generational status and self-reported smoking among U.S.- and foreign-born Asian adults using national data. We also investigate how these relationships differ by gender and ancestry. Using data from the Tobacco Use Supplement of the Current Population Survey (1995-2011 waves), we conducted logit regressions to investigate differences in the likelihood of selfreported current smoking among first-, second -and third/higher-generation Asian immigrants (N=47,713). Among first-generation immigrants, migrating after age 13 was associated with a lower probability of smoking relative to the third/higher generation; this pattern was most pronounced among women. Second-generation immigrants with two foreign-born parents were also less likely to be current smokers. However, second-generation immigrant women with only one foreign-born parent were more likely to smoke; there were no significant differences among men. Finally, we documented considerable variation in these relationships across ancestral subgroups. The relationships between generational status and current smoking vary widely by gender and ancestry among Asians. Policymakers should be mindful of these complex factors when designing smoking cessation interventions for this growing population.

Mandar Bodas is a Ph.D. student in the Healthcare Policy Research program at the Department of Health Behavior and Policy of Virginia Commonwealth University. His research focuses on maternal and child health, immigrant health, Medicaid and health disparities. He is currently evaluating the effect of national-level policy initiatives on maternal health indicators in India. He is also interested in early life obesity among children from disadvantaged families.

Uncovering Corruption in the Public Service: Review of the role played by the Office of the Auditor General of Zambia, Africa

Presenter: Sombo Muzata Chunda

Advisor: Richard Huff

Virginia Commonwealth University,

Public Policy

According to the World Bank, sixty percent of Zambians live below the poverty line. The country is the second largest producer of copper in Africa and the worlds' single largest producer of emeralds. This is the paradox that not only Zambia but other resource rich African countries face- rich vet so poor. Corruption is a serious problem and a deterrent to development. Zambia like many other countries has put in place various efforts to fight corruption. Good progress has been made through development and implementation of various policies and establishment of institutions. Despite these measures in place, the levels of public finances mismanagement have been increasing over the years. According to the 2015 Auditor General's report, a total of K881, 986, 087 (about \$90, \$168, \$100) was mismanaged compared to K549, 937, 706 (about \$56, \$221, \$800) in 2014. This paper seeks to examine the contribution that the Office of the Auditor General of Zambia has made to highlight the internal financial mismanagement during the period 2011 to 2015. It further, discusses the challenges that the Office has faced in carrying out their work. It gives recommendations on what should be done to reverse the current trend of increasing mismanagement of financial resources. The problem of financial mismanagement is complex therefore, recommendations made in this paper will need accompanying measures and legal framework to be effective.

Sombo Chunda was the Country Manager for the Swedish Development Organization Diakonia in Zambia. She is a Chartered Accountant and Fellow of the Association of Chartered Certified Accountants (FCCA), holds a Master of Business Administration (M.B.A.) from Heriot Watt University and is a Certified Anti-Money Laundering Specialist. A 2016 Mandela Washington Fellow, Sombo is passionate about the fight against corruption which she sees as a major cause of poverty in Zambia.





Can Gender-Sensitive Local Development Projects Improve the Subjective Well-Being of the Participating Communities?

Presenter: Suparna Dutta Advisor: Nancy Stutts

Virginia Commonwealth University,

Public Policy

Rural women from traditional societies lack assets, skills, education, income, and are bound by societal norms not to participate in community development activities and decision-making. This is reflective of women's status at home where household decisionmaking and finances are controlled by male members. Because of women's invisibility, their needs are not addressed by policymakers, resulting in their marginalization and disenfranchisement. This study investigates if there is a correlation between women's participation in local-level energy, and water, sanitation, and hygiene (WASH) projects and subjective well-being of participating communities. Subjective well-being (SWB) refers to how people experience the quality of their lives. SWB includes both emotional reactions and cognitive evaluation. The qualitative research design of this study is based on systematic review and meta-analysis of 20 case studies drawn from South Asia, Latin America, and Africa. This analysis indicates that inclusive grassroots development projects are likely to increase project efficiency, demonstrate potentials for transforming societies, and enhance subjective well -being of participating communities through women's empowerment, increased livelihood opportunities and household incomes, community capacity building, enhanced gender-sensitivity among men, improved integrity within communities and other factors.

Suparna Dutta is a Ph.D. student in the L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University in Richmond, Virginia. She earned an M.S. in Sustainability Management from Columbia University, New York, and an M.B.A. in India. Her research focuses on diversity and inclusion.

Dispensaries of Democracy: How Four States Experience the New Frontier of Legal Marijuana



Presenter: Howard Estes Advisor: John McGlennon College of William & Mary,

Public Policy

Last year, 42% of American adults reported using marijuana recreationally. Over the past 15 years, marijuana use has grown significantly as medical marijuana remedies and liberalized notions of drug use become more prevalent. Many state governments have begun to consider the total legalization of recreational marijuana. In the past five years, voters from Washington, Colorado, Oregon, and Alaska passed marijuana legalization ballot initiatives. When transitioning marijuana from an illegal product to a legal market, states often make different policy choices that result in different outcomes. Analyzing tax revenues from the sale of marijuana demonstrates that some states with legal marijuana are more successful in collecting revenue. Marijuana proponents often argue that, by alleviating prohibition, states will no longer require as costly of a police force or incarceration system. However, states may not actualize budget reductions. Many criminologists argue that violent crime is attached to the black market for marijuana, and by legalizing, violent crime levels would fall. However, violent crime and legal marijuana seems to have no relationship in the states that have legalized so far. American Federalism gives states a lot of power to make their own policy decisions. Consequently, states with legalized recreational marijuana often differ in their approaches. Analyzing the effects of policy with a differences-of-differences framework allows researchers to gain greater understanding of the issue, but also allows states to learn from each other and, ultimately, make the right policy decisions for their constituents.

Howard "Skip" Estes is a first-year M.P.P. student at the College of William & Mary. Skip takes great interest in tax and regulatory policy, as well as state and local politics. He is the President of College Libertarians at William & Mary.



Decision Making in the Public Sector and the Crutch of Expectation

Presenter: Ibrahim Habib Keita
Advisor: Richard Huff
Virginia Commonwealth University,

Public Policy

A review of the study of human decision-making exposes a myriad of vulnerabilities regarding this act, particularly the influence of expectation. The antiquity of Public Administration intimates a personal dogmatism sustaining the public administrator's occasionally untenable expectations prior to folly. Responses expressing incredulity and amazement of the failure often ensue, in spite of clear signs indicating unfavorable results. Literature on the subject has lightly addressed the wicked nature of expectation and the error of human overdependence upon it, thus, its sway over decisions relating to governance remains unchecked. Assuming this is the case, how can public sector employees mitigate this limiting effect? Utilizing survey and interview data in a longitudinal, fixed panel sample design, the present study aims to examine the extent that individual expectations of decision-makers impact the decisions forming public programs and consequent outcomes. Additionally, a theoretical framework for resisting the deceptive aspect of expectation will be proposed. It is predicted that findings will illustrate and support the notion that decision-makers lean upon their personal expectations as a crutch, which ultimately leads to unwise decisions and ineffective governance. Implications include informing critical decision-makers across all levels of government of the effect of personal expectations pertaining to policy analysis, as well as enhancing the decision-making process to ensure effective governance and administration.

Ibrahim Habib Keita is a second-year graduate student from Sierra Leone, West Africa, pursuing a Master of Public Administration degree at Virginia Commonwealth University. He was recently named as a member of the 2016-17 cohort of the Douglas L. Wilder Fellowship, working in the Statistical Analysis & Forecast Unit of the Virginia Department of Corrections in Richmond. He also holds a B.S. in Marketing from VCU.

Compulsory Voting Laws: A Necessary Evil to Solve Voting Woes?

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

I will be conducting a comparative analysis of voting laws in the U.S. and countries with compulsory voting laws, including Argentina and Australia. I will investigate if compulsory voting laws lead to a better representation of the population, particularly of marginalized populations, and the relative cost of voting for citizens under voluntary and compulsory voting systems. The central question I am hoping to address is: what are the potential implications of implementing aspects of a compulsory voting system in the U.S., either with or without the Electoral College remaining in place? In addition to an analysis of different countries' laws and policies. I will be examining statistics of voter turnout and demographics in the U.S. and countries with compulsory voting with hypothesis testing and regression analysis. I predict that people who are minorities or lower class will be less represented in countries with voluntary voting systems and that countries that mandate voting will not only have a significantly higher voter turnout, but also one that is more representative of the population. This will lead to questioning if the lack of representation is due to indifference or accessibility issues. If the latter, as a country we will need to discuss how or if we can guarantee the right to vote without infringing upon the right to not vote.

Laura Mallison is an M.P.P. student at the College of William & Mary. She dual-majored in Legal Studies and Hispanic Studies at Scripps College in Claremont, California. She is currently studying international development policy and working as a graduate assistant at the research lab AidData.



Social Media as the New Early Warning **System in Emergency Management**

Presenter: Kelsey Robarts Advisor: Elaine McBeth College of William & Marv. Public Policy

Early warning systems in emergency management are transforming rapidly with technology. Traditionally, early warning systems have been limited by the complexity and cost of their upkeep, by the dissemination of information, and by the unpredictability of most types of disasters. Government-run early warning systems are often still limited to radio/TV broadcasts, sirens, and word-of-mouth. However, the recent of ubiquity of smartphones and computers have changed the way civilians communicate about disasters. Social media posts are now the first instance of warning for many disasters, and geocaching, keywords, and hashtags allow emergency managers to locate and map affected regions before the physical first response has occurred. GIS maps based on posts' geocache information, as well as categorical information on disasters in inaccessible areas, are uniquely valuable data that can be gained from civilian social media. As tracking of disaster-related keywords on social media platforms becomes more and more routine, it is useful to examine the evolution and forms of social media use during disasters. I will explore the relevant history of social media as an early warning system, and show its efficacy as a new, decentralized alternative to traditional warning systems. Particularly, I will analyze cases in which social media information was used to gather data on otherwise unknown or unreachable disaster zones, proving the usefulness of an open-source warning system in our increasinglyconnected global community.

Kelsey Robarts is an M.P.P. Candidate at the College of William & Mary. Her research interests include emergency management and homeland security, policy analysis, and Chinese/Asian studies.

Title IX's Endeavors to Create an **Equitable Environment for NCAA** Student Athletes

Presenter: Patricia Anne Trotta Advisor: Richard Huff Virginia Commonwealth University,

Public Policy

Title IX of the Education Amendments of 1972 was originally implemented by the United States Department of Education to mitigate discrimination on the basis of gender in public schools, colleges, and universities. This essence of Title IX evolved after major amendments in 1979, 1996, and 2011; each change contributed to mitigating inequity in public schools, colleges, and universities. This policy analysis of the Title IX Educational Amendments of 1972, 1979, 1996, and 2011 examined the effects of the policies on the student-athlete population. Title IX had positive implications for student-athletes as it has provided more opportunities for women to participate in collegiate sports. However, it was found for student-athletes, Title IX does not assure an equitable environment in colleges and universities because athletic departments need to comply with one out of three guidelines outlined by the 1979 and 1996 Title IX amendments. It was examined whether male student athletes were responsible for sexual violence at a higher rate than nonstudent athletes, as often portrayed by media outlets. It was found utilizing the 2008-2012 National College Health Assessment and the 2012 NCAA Social Environments Study, male student-athletes were not responsible for sexual violence at a higher rate than non-student athletes. Instead, a higher percentage of male student athletes were survivors of sexual violence than male non student-athletes. Aggression can be characterized as the mediator between male student athletes and the increased perpetration of sexual violence.

Patricia Trotta is an M.P.P. student at Virginia Commonwealth University. She received a B.A. in History from Virginia Commonwealth University. Her research is on government reform, NCAA policy, and human-centered policy design.



16th Annual Graduate Research Symposium



The Impact of Dental Insurance on Emergency Department Visits

Presenter: Lauryn Walker Advisor: Peter Cunningham Virginia Commonwealth University, Health Behavior and Policy

Historically, dental insurance is purchased separately from general medical coverage despite evidence that poor oral health is associated with numerous medical conditions, such as heart disease, pneumonia, and diabetes. These conditions are also major drivers of emergency department (ED) use. This study aims to identify linkages between dental insurance and ED use by examining allcause ED visits by dental insurance status to capture visits potentially influenced by oral health. Analysis is based on data from the 2014 Medical Expenditures Panel Survey Household Component (MEPS-HC). The sample includes persons over the age of 18 holding private medical insurance. Weighted multivariable logit regression was used to estimate the proportional change in likelihood of having an ED visit by dental coverage status. A secondary logit model assessed differential impact of dental coverage by income level. Persons holding dental insurance were less likely to have an ED visit than those without coverage (-0.161, p=0.01). On average, gaining dental coverage reduced a person's likelihood of requiring an ED visit by 2.3 percent (p=0.00). No practically significant differential effect of dental coverage by income level was found (-0.000, p=0.04). For privately insured persons, having dental coverage is associated with lower ED utilization, regardless of income level. Policies aimed at reducing ED utilization, especially for those with chronic conditions known to be associated with oral health, such as heart disease and diabetes, may consider dental coverage as a means of reducing ED use.

Lauryn Walker is a Ph.D. student in Healthcare Policy and Research at Virginia Commonwealth University and works as a registered nurse in critical care. She received her nursing degree and a Master of Public Health degree from Johns Hopkins University. Her research interests include health reimbursement systems, integrated care models, quality measurement, and Medicaid services.



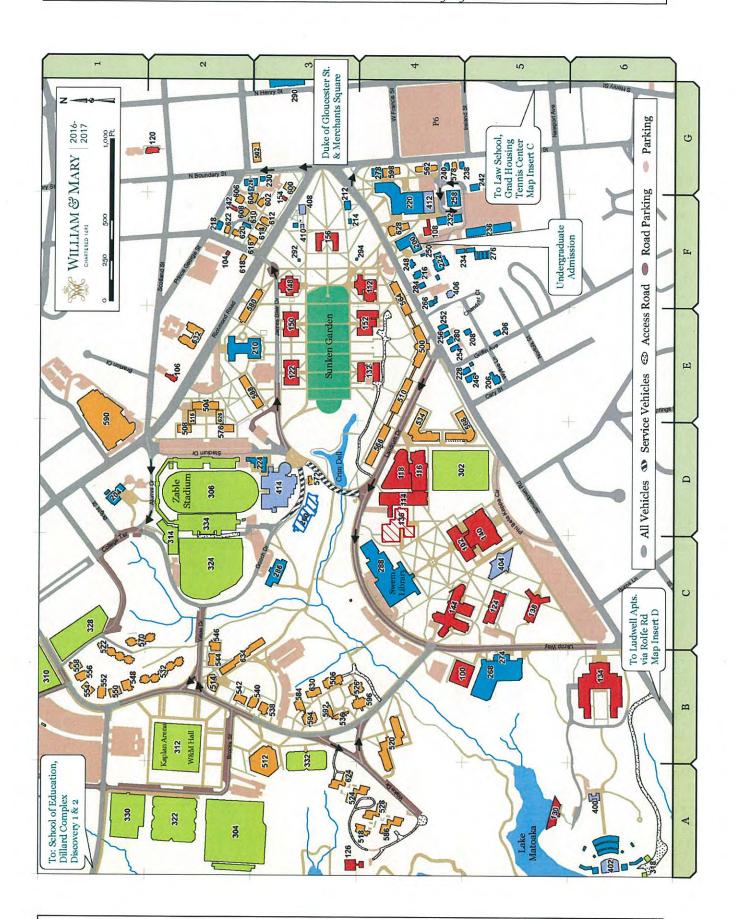
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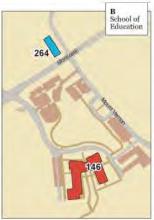
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