10th Annual

Graduate Research Symposium

March 25-26, 2011
The College of William & Mary
Sadler Center
Williamsburg, Virginia

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11:00 am - 12:00 pm	Poster Presentations with Q&A *Second Floor Lobby*
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1:15 pm - 2:15 pm	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
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5:30 pm - 7:30 pm	Evening Networking Reception *Chesapeake A*

Saturday, March 26, 2011 -- Sadler Center

8:00 am - 8:30 am	Registration *Second Floor Lobby*
8:30 am - 12:00 pm	Poster Displays *Second Floor Lobby*
8:30 am - 9:30 am	Concurrent Sessions *Tidewater A, Tidewater B, Colony Room, James Room, and York Room*
9:30 am - 10:30 am	Concurrent Sessions *Tidewater A, Tidewater B, James Room, and York Room*
11:00 am - 12:00 pm	Poster Presentations with Q&A *Second Floor Lobby*
12:00 pm - 1:30 pm	Luncheon & Awards Ceremony *Chesapeake A*

Dear Members of The College of William & Mary Community and Guests,

On behalf of the organizing committee, we would like to welcome you to the Tenth Annual Graduate Research Symposium. The Graduate Research Symposium began as a collaborative effort between the graduate programs to establish a forum through which work at the graduate level could be shared amongst graduate colleagues at William & Mary. The first Symposium, held in January 2002, featured presentations by graduate students from many of William & Mary's graduate programs including Arts & Sciences, the School of Education, and the School of Law. It was the first truly interdisciplinary gathering of William & Mary's diverse graduate student population. Through additional support from the American Studies Program, the Graduate Research Symposium was also host to the American Cultures Conference, which for a number of years provided a forum for students whose work concentrated on the American experience to share their work amongst their peers within the setting of the Symposium.

This year, as in years past, the Graduate Research Symposium will feature the work by current graduate students from William & Mary and fifteen visiting institutions. We hope that you will attend many of the more than 157 engaging presentations that will facilitate the interdisciplinary and inter-institutional exchange of ideas. This year our scholars come not only from Arts and Sciences at William & Mary, but also from American University, Old Dominion University, The George Washington University, Hampton University, the University of Maryland at Baltimore, George Mason University, Virginia Commonwealth University, West Virginia State University, Norfolk State University, Georgetown University, The University of North Carolina at Chapel Hill and Wilmington, Georgia State University, and Radford University. The diversity of our presenters not only reflects the geographical breadth of the symposium's reputation, but also the intellectual depth and breadth of the symposium.

In addition to the spectrum of research being presented over the duration of the Symposium, we are pleased to have members of the Graduate Studies Advisory Board hosting a networking session for the College's undergraduates engaged in Honors projects. The committee is pleased to have the increased support and interest of the undergraduates in graduate studies and research at the College and is delighted to host a future generation of graduate students and colleagues at this year's Symposium.

Finally, the committee would especially like to thank all of the participants and most especially the College's graduate faculty, staff, administration, and the Graduate Studies Advisory Board for their commitment to graduate students and research and helping to sustain the Graduate Research Symposium into its tenth year. We are also grateful to our graduate colleagues in the Graduate Student Association and the undergraduates for their ongoing support through the Student Assembly and in the classroom where we teach.

We hope that you will find that this year's program continues the tradition of cultivating an environment of interdisciplinary intellectual exchange amongst peers and peer institutions, and that you will join us in making the Tenth Annual Graduate Research Symposium a forum through which it can continue, in a phrase coined by Margaret L. Freeman, Humanities Chair of the Fifth and Sixth Symposiums, *"Preparing Scholars, Presenting Excellence".*

Alexandra Méav Ellinwood-Jerome
Chair, American Studies

Sarah Zimmet
Chair, Anthropology

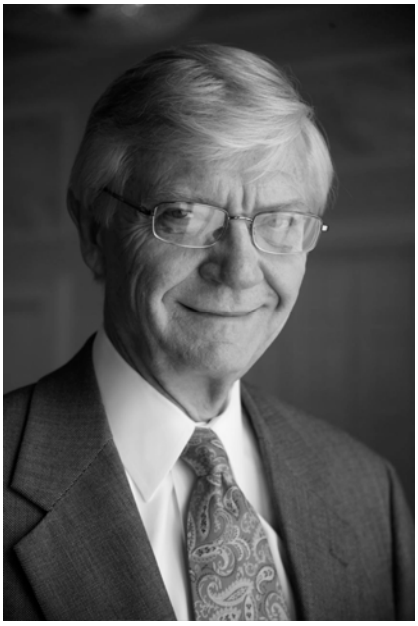
THE COLLEGE OF WILLIAM AND MARY
OFFICE OF THE PRESIDENT
P.O. BOX 8795
WILLIAMSBURG, VIRGINIA 23187-8795
757/221-1693; Fax 757/221-1259

Dear Students and Friends,

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

"Preparing Scholars, Presenting Excellence" – the Symposium's theme – reflects William & Mary's mission in graduate education. Our students contribute seriously to human understanding on their way to advanced degrees. Then they keep doing so as teachers and scholars. The Symposium provides an opportunity for our graduate students and their peers from other schools to present their work. It is also a time for the William & Mary community to enjoy the presentations.

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



Cordially,

W. Taylor Reveley, III
President

The Arts & Sciences Graduate Studies Advisory Board at the College of William & Mary is a proud sponsor of the 2011 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 and 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 the College of William and Mary and to the College's 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 2011 Graduate Research Symposium, initiating the Distinguished Thesis/ Dissertation Awards and the Awards for Excellence in Undergraduate Mentoring in Arts & Sciences, and providing recruitment fellowships to outstanding entering graduate students, the Graduate Studies Advisory Board is playing a vital role in advancing William and Mary's graduate programs in Arts & Sciences.

Members of the Graduate Studies Advisory Board, 2010-11

President: Cynthia Morton '77 BS Biology
Vice-President: Diane Alleva Cáceres '87 BA Economics, '89 MA Government
Past President: Larry McEnerney '76 BA English & History
Chair, Student Professional Development Committee: Robert Saunders '00 BS Physics
Chair, Development and Communications Committee: Bill Tropf '68 BS Physics
Chair, Nominations and Membership Committee: Patti Barry '63 BS Chemistry

Debbie Allison '77 BS Chemistry
John D. Burton '89 MA History, '96 PhD History
D. Nelson Daniel '90 BS Geology & Economics
Ann L. Koch '83 BA Religion
Peter Martin '71 MS Physics, '72 PhD Physics
George Miller '67 BS Physics, '69 MS Physics, '72 PhD Physics
Brian J. Morra '78 BA History
Bradley (Lee) Roberts '70 MS Physics, '74 PhD Physics
Edwin Watson II '68 BA History, '70 MA History
Gail W. Wertz '66 BS Biology

2011 Graduate Research Symposium

Program Chairs
Alexandra Méav Ellinwood-Jerome, *American Studies*
Sarah Zimmet, *Anthropology*

Graduate Student Committee
Sarah Byrd, *Anthropology*
Nicolette Gable, *American Studies*
Julia Kaziewicz, *American Studies*
Megan Kobiela, *Biology*
Jennifer Ogborne, *Anthropology*
Shaun Richards, *American Studies*

Office of Graduate Studies and Research
S. Laurie Sanderson, *Dean of Graduate Studies*
Aundrea Baker
Cortney Cain
Wanda Carter
Betty Ann Jones
Chasity Roberts

Distinguished Speakers
President W. Taylor Reveley, III
Provost Michael R. Halleran
Vice Provost Dennis Manos
Dean Carl Strikwerda, *Arts & Sciences*

Session Chairs
Dr. Seth Aubin, *Physics*
Dr. Timothy Barnard, *American Studies*
Dr. Deborah Bebout, *Chemistry*
Dr. Kathleen Bragdon, *Anthropology*
Dr. Chandos Brown, *American Studies*
Dr. Marley Brown, *Anthropology*
Dr. John Burton, *Graduate Studies Advisory Board*
Dr. Daniel Cristol, *Biology*
Dr. Susan Donaldson, *American Studies*
Dr. Mark Forsyth, *Biology*
Dr. Martin Gallivan, *Anthropology*
Dr. Oliver Kerscher, *Biology*
Dr. Rex Kincaid*, Computational Operations Research*
Dr. Qun Li, *Computer Science*
Dr. Weizhen Mao, *Computer Science*
Dr. Peter Martin, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Mr. Larry McEnerney, *Graduate Studies Advisory Board*
Dr. Charles McGovern, *American Studies*
Mr. Brian Morra, *Graduate Studies Advisory Board*
Prof. Curtis Moyer*, Anthropology*
Dr. Neil Norman, *Anthropology*
Dr. Charles Perdrisat, *Physics*
Prof. Jennifer Putzi, *English*
Dr. Elizabeth Radcliffe, *Philosophy*
Dr. John Riofrio, *Modern Languages*
Dr. Robert Saunders*, Graduate Studies Advisory Board*
Dr. Gregory Smith, *Applied Science*
Dr. Bill Tropf, *Graduate Studies Advisory Board*
Dr. Patricia Vahle, *Physics*
Dr. Larry Ventis*, Psychology*
Dr. Gang Zhou, *Computer Science*

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.

GRS Humanities and Social Sciences
Dr. Joshua Burk, *Psychology*
Dr. John Burton, *Graduate Studies Advisory Board*
Dr. Andrew Fisher, *History*
Ms. Ann Koch, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Dr. Neil Norman, *Anthropology*

GRS Natural and Computational Sciences
Ms. Debra Allison, *Graduate Studies Advisory Board*
Dr. Randy Chambers, *Biology*
Mr. Nelson Daniel, *Graduate Studies Advisory Board*
Dr. Weizhen Mao, *Computer Science*
Dr. David Phillips, *Mathematics*
Dr. Patricia Vahle, *Physics*

Mentoring Awards Humanities and Social Sciences
Dr. Cheryl Dickter, *Psychology*
Dr. Hiroshi Kitamura, *History*
Prof. Elaine McBeth, *Public Policy*
Dr. Neil Norman, *Anthropology*

Mentoring Awards Natural and Computational Sciences
Dr. Elizabeth Harbron, *Chemistry*
Dr. Matthias Leu, *Biology*
Dr. Weizhen Mao, *Computer Science*
Dr. David Phillips, *Mathematics*
Dr. Patricia Vahle, *Physics*

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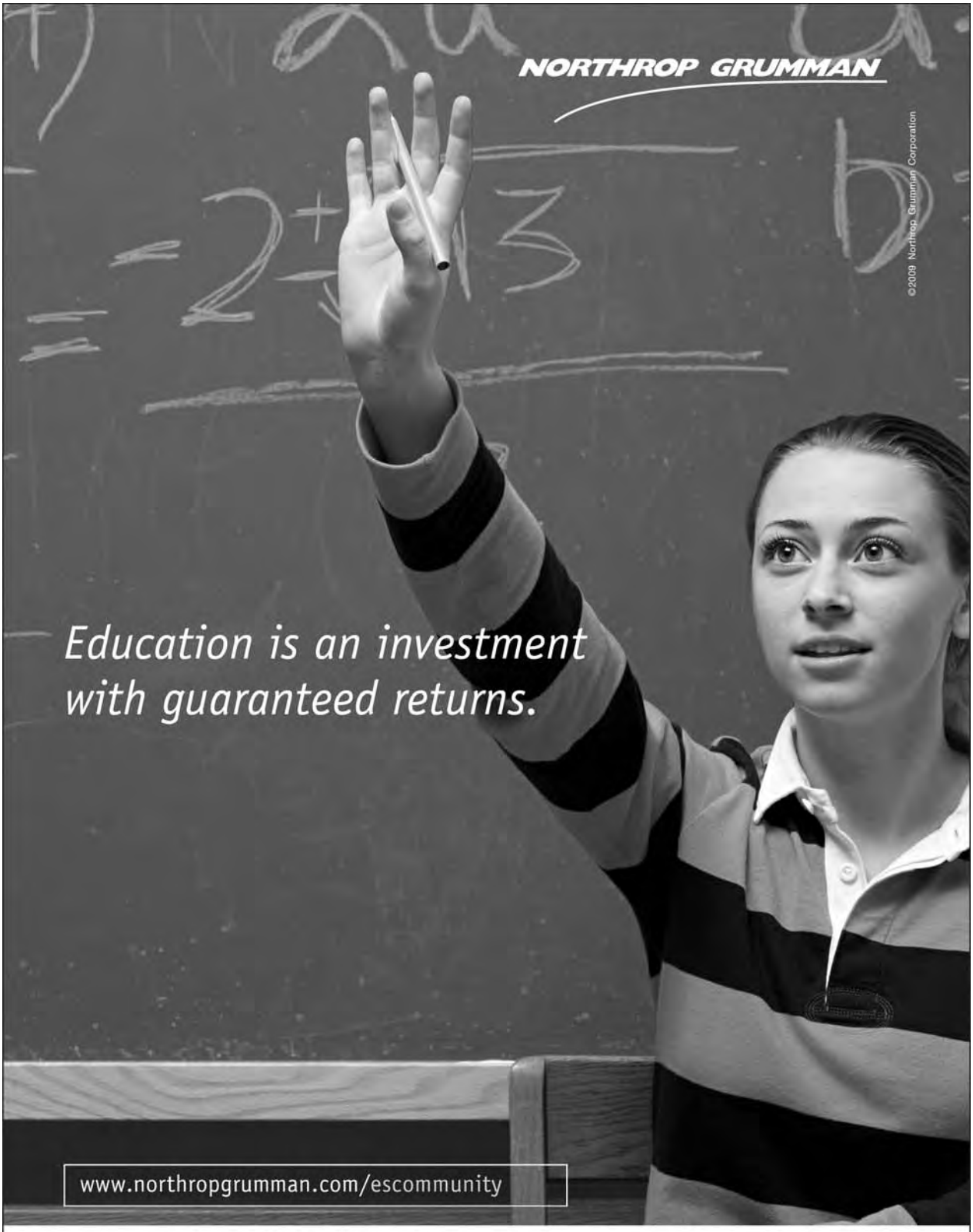
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The College of William & Mary
Award Recipients for Excellence in Scholarship

These awards acknowledge graduate students whose research presentation shows:

- Original investigation and the integration of knowledge, and
- Distinguished excellence in scholarship through potential contribution to the discipline and recognition by peers.

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

ERIK SIEDOW

The College of William and Mary, Anthropology. Advisor: Dr. Frederick Smith

An Archaeometric Examination of Barbadian Redware During the Early Colonial Era

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

WEI WEI

The College of William and Mary, Computer Science. Advisor: Dr. Qun Li

SybilDefender: Defend Against Sybil Attacks in Large Social Networks

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

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

JOHN FIORINI
History, Advisor: Dr. Leisa Meyer
Nathan F. Leopold and the Maturity Narrative

William & Mary Honorable Mentions

ELLEN CHAPMAN
Anthropology, Advisor: Dr. Michael Blakey
'To restore to them their lost Reason': Processes of Treatment and Confinement at Williamsburg's Public Hospital on the Brink of the Moral Treatment Revolution

STEPHANIE HASSELBACHER
Anthropology, Advisor: Dr. Kathleen Bragdon
"Shakespeare and All the Olden Talk": Linguistic Change and Authority at Coushatta, Louisiana

Visiting Scholar Award for Excellence in the Humanities and Social Sciences

STEPHEN SANTELLI
History, West Virginia University, Advisor: Dr. Joseph Hodge
The Chesterbelloc and Imperialism: Hilaire Belloc, G. K. Chesterton and the British Empire,1900-1920

Visiting Scholar Honorable Mention

MARK FLANAGAN
Anthropology, Georgia State University, Advisor: Dr. Kathryn Kozaitis
Contextual heavy alcohol use amongst homeless individuals, veterans with post-traumatic stress disorder and Notre Dame students

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

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

ZHENGRUI QIN
Computer Science, Advisor: Dr. Qun Li
A Prototype System for Cardiac Telemetry

William & Mary Honorable Mentions

TRAVIS S. HORROM
Physics, Advisor: Dr. Eugeniy Mikhailov
Polarization Self-Rotation in an Ultra-Cold Atomic Cloud

FENGYUAN XU
Computer Science, Advisor: Dr. Qun Li
IMDGuard: Securing Implantable Medical Devices with the External Wearable Guardian

Visiting Scholar Award for Excellence in the Natural & Computational Sciences

EVA KWONG
Biology, Virginia Commonwealth University, Advisor: Dr. Jeffrey Dupree
The clustering of voltage-gated sodium channel 1.6 at the peripheral node of Ranvier is altered in the absence of sulfatide

Visiting Scholar Honorable Mentions

RABIA HUSSAIN
Applied Science, Norfolk State University, Advisor: Dr. Natalia Noginova
Proton NMR and spin relaxation in viscous and multi-component systems with magnetic nanoparticles

SENTHILRAJA SINGARAVELU
Physics, Old Dominion University, Advisor: Dr. Michael Kelley
Laser Melt Smoothing of Niobium Superconducting Radio-Frequency Cavity Surfaces

The College of William & Mary
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

ADAM STACKHOUSE
American Studies Program, MA

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

ZACHARY ELMORE
Biology Department, MS

FENGYUAN XU
Computer Science Department, PhD

Recruiting / Mentoring Opportunity for Science Students

APL
The Johns Hopkins University
APPLIED PHYSICS LABORATORY

A William & Mary alumnus and member of the Arts & Sciences Graduate Studies Advisory Board, Dr. Bill Tropf is available at the evening networking reception, Saturday poster session, and awards luncheon to speak with interested students (all degree levels) regarding employment and internship opportunities with the Johns Hopkins University Applied Physics Laboratory (http://www.jhuapl.edu/).

The Applied Physics Laboratory (APL) is a not-for-profit center for engineering, research and development. APL recruits and hires the best and the brightest from top colleges to work on more than 400 programs that protect our homeland and advance the nation's vision in research and space science, at an annual funding level of about $680M. APL is primarily looking for science, engineering, mathematics, and computer science graduates with bachelors, masters, or doctoral degrees.

Local Sponsor

DAILY GRIND

Welcome to the Daily Grind. Your on campus coffeehouse, hangout, study bar, Chill-hut, "No worries mate" kind of place that caters to everyone and anyone who desires a Hangout, a Fort, a Treehouse of their very own to share, covet, selfishly keep to themselves. Come in, find a seat, put your stuff down, order a chai, a latte...mocha or a freshly baked scone, muffin, croissant, or grilled sandwich. Enjoy without guilt because all of our coffees and teas are organic and/or fair-trade certified. Open till 11pm during the week and 9pm on the weekends, the Grind is here for you.
Hope to see you soon.

Daily Grind is located right behind the Sadler Center, next to the Terrace.
757-221-2918

SYMPOSIUM COFFEE BREAK

Friday, March 25
2:30-3:00pm
Sadler Center Lobby

Please join Graduate Studies Advisory Board members for coffee, dessert and an informal networking opportunity with Board members as well as current Arts & Sciences undergraduate and graduate students.

Friday Morning, March 25 Program Schedule

8:00 AM - 8:30 AM REGISTRATION (Second Floor Lobby)

8:30 AM - 9:30 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Prof. Sharon Zuber*	**Session Chair:** *Dr. Rex Kincaid*	**Session Chair:** *Dr. John Riofrio*	**Session Chair:** *Prof. Elaine McBeth*	**Session Chair:** *Dr. Charles Perdrisat*
Kimberly Mann American Studies *College of William & Mary*	**Rui Zhang** Computational Operations Research *College of William & Mary*	**Sarah Zimmet** Anthropology *College of William & Mary*	**Katherine Cook** Political Science *James Madison University*	**David Johnston** Physics *College of William & Mary*
Anna Rapp English *College of William & Mary*	**Samy El-Tawab** Computer Science *Old Dominion University*	**Derek Miller** Anthropology *College of William & Mary*	**Steven Hanson** Public Policy *College of William & Mary*	**Anusha Liyanage** Physics *Hampton University*
Jack Cohen History *College of William & Mary*	**Nancy Carter** Computer Science *College of William & Mary*	**Erik Siedow** Anthropology *College of William & Mary*	**Sagar Rijal** International Studies *Old Dominion University*	**Mehdi Meziane** Physics *College of William & Mary*
				Joshua Magee Physics *College of William & Mary*

9:45 AM - 10:45 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Charles McGovern*	**Session Chair:** *Dr. Gang Zhou*	**Session Chair:** *Prof. Curtis Moyer*	**Session Chair:** *Dr. Deborah Bebout*	**Session Chair:** *Dr. Seth Aubin*
Ben Anderson American Studies *College of William & Mary*	**Wei Wei** Computer Science *College of William & Mary*	**Tiffany Little** Anthropology *College of William & Mary*	**Sonia Antony** Chemistry *Old Dominion University*	**Chen Chen** Physics *College of William & Mary*
Kimberly Burnett American Studies *UNC-Chapel Hill*	**Yifan Zhang** Computer Science *College of William & Mary*	**Kelley Walter** Anthropology *College of William & Mary*	**Tara Hagedorn** Chemistry *College of William & Mary*	**Herbert Brown** Physics *Hampton University*
Kevin Kosanovich American Studies *College of William & Mary*	**Zi Chu** Computer Science *College of William & Mary*	**Maxwell Werner** Anthropology *College of William & Mary*	**Peter Mercredi** Biochemistry *Univ of Maryland-Baltimore*	**Megan Ivory** Physics *College of William & Mary*
Jeffreen Hayes American Studies *College of William & Mary*	**James Deverick** Computer Science *College of William & Mary*			**Craig Hanley** Physics *Hampton University*

11:00 AM - 12:00 PM POSTER PRESENTATIONS (Second Floor Lobby)

1) Dessa Lightfoot (Anthropology) *College of William & Mary*	**5) Morgan Niccoli** (Biology) *College of William & Mary*	**9) Madeline Nestor** (Chemistry) *College of William & Mary*	**13) Matt Simons** (Physics) *College of William & Mary*	**17) Julie Kittel** (Psychology) *College of William & Mary*
2) Liang Zhao (Applied Science) *College of William & Mary*	**6) Stephanie Wolf** (Biology) *James Madison University*	**10) Kathryn Peth** (Chemistry) *College of William & Mary*	**14) Siyuan Yang** (Physics) *College of William & Mary*	**18) Viktoria Tidikis** (Psychology) *Old Dominion University*
3) Jenna Carlson (Biology) *College of William & Mary*	**7) Lenora Harper** (Chemistry) *Old Dominion University*	**11) Zhenyu Wu** (Computer Science) *College of William & Mary*	**15) Austin Ziltz** (Physics) *College of William & Mary*	**19) Lisa Ulmer** (Psychology) *VCU*
4) Kari Messina (Biology) *College of William & Mary*	**8) Patricia Lutz** (Chemistry) *Old Dominion University*	**12) Travis Horrom** (Physics) *College of William & Mary*	**16) Johanna Folk** (Psychology) *College of William & Mary*	**20) Hannah Vargason** (Public Policy) *College of William & Mary*

12:00 PM - 1:15 PM LUNCH & WELCOMING REMARKS (Chesapeake A)

Dr. Dennis M. Manos, *Vice Provost for Research & Graduate Professional Studies, College of William & Mary*
Dr. S. Laurie Sanderson, *Dean of Graduate Studies and Research, Arts & Sciences, College of William & Mary*

Friday Afternoon, March 25 Program Schedule

1:15 PM - 2:15 PM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Prof. Jennifer Putzi*	**Session Chair:** *Dr. Gregory Smith*	**Session Chair:** *Dr. Neil Norman*	**Session Chair:** *Dr. Timothy Barnard*	**Session Chair:** *Dr. Patricia Vahle*
Anne Frommelt English *Old Dominion University*	**Shadrack Antwi** Applied Science *College of William & Mary*	**Ellen Chapman** Anthropology *College of William & Mary*	**Monica Blackwell** Education *James Madison University*	**Zachary Brown** Physics *College of William & Mary*
Sarah Glosson American Studies *College of William & Mary*	**Yan Hao** Applied Science *College of William & Mary*	**Aileen Watchko** Anthropology *George Mason University*	**Adam Hirsh** Psychology *College of William & Mary*	**Joshua Devan** Physics *College of William & Mary*
Emma Wolfe English *Old Dominion University*	**Mei Jin** Statistics *George Washington Univ.*	**Amanda Johnson** Anthropology *College of William & Mary*	**Saori Takahashi** Sociology *American University*	**Alena Gavrilenko** Physics *College of William & Mary*
			Chiquita King Education *James Madison University*	**Ekaterina Mastropas** Physics *College of William & Mary*

2:30 - 3:00PM UNDERGRADUATE AND GRADUATE STUDENT COFFEE BREAK (Second Floor Lobby)
JOIN GRADUATE STUDIES ADVISORY BOARD MEMBERS FOR AN INFORMAL NETWORKING OPPORTUNITY

3:15 PM - 4:15 PM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Susan Donaldson*	**Session Chair:** *Dr. Chandos Brown*	**Session Chair:** *Dr. Martin Gallivan*	**Session Chair:** *Dr. Bill Tropf*	**Session Chair:** *Dr. Dan Cristol*
Renee Kingan American Studies *College of William & Mary*	**Stephen Santelli** History *West Virginia University*	**Ashley Atkins** Anthropology *College of William & Mary*	**Yichun Fan** Applied Science *College of William & Mary*	**Amanda Bessler** Biology *College of William & Mary*
Julia Kaziewicz American Studies *College of William & Mary*	**Matthew Thomas** History *College of William & Mary*	**Jessica Herlich** Anthropology *College of William & Mary*	**Kaida Yang** Applied Science *College of William & Mary*	**Sarah Lemelin** Biology *College of William & Mary*
Elizabeth Neidenbach American Studies *College of William & Mary*	**Leslie Waters** History *UCLA*	**Alexandra Martin** Anthropology *College of William & Mary*	**Lei Wang** Physics *College of William & Mary*	**Catherine Lewis** Biology *College of William & Mary*
John Fiorini History *College of William & Mary*	**M. Connors Santelli** History *George Mason University*			

4:30 PM - 5:30 PM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Qun Li*	**Session Chair:** *Dr. John Burton*	**Session Chair:** *Dr. Marley Brown*	**Session Chair:** *Dr. Peter Martin*	**Session Chair:** *Dr. Mark Forsyth*
Bob Morrissett Computer Science *VCU*	**Lucie Kyrova** History *College of William & Mary*	**Stephanie Bergman** Anthropology *College of William & Mary*	**Yunhan Long** Applied Science *College of William & Mary*	**Stephen Cole** Biology *College of William & Mary*
Larry Williams, Jr. Engineering *VCU*	**Jennifer Huff** History *James Madison University*	**Adam Richardson** Anthropology *College of William & Mary*	**Rabia Hussain** Applied Science *Norfolk State University*	**V. Quinlivan-Repasi** Biology *College of William & Mary*
Lei Lu Computer Science *College of William & Mary*	**Heather DiAngelis** History *College of William & Mary*	**Megan Victor** Anthropology *College of William & Mary*	**Corey Miller** Applied Science *College of William & Mary*	**Kevin Leslie** Biology *College of William & Mary*

5:30 PM - 7:30 PM EVENING NETWORKING RECEPTION (Chesapeake A)
JOIN GRADUATE STUDENTS, FACULTY AND GRADUATE STUDIES ADVISORY BOARD MEMBERS
Hors D'oeuvres and Refreshments will be served.

Saturday Morning, March 26 Program Schedule

8:00 AM - 8:30 AM REGISTRATION (Second Floor Lobby)

8:30 AM - 9:30 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Colony Room
Session Chair: *Dr. John Burton*	**Session Chair:** *Dr. Oliver Kerscher*	**Session Chair:** *Dr. Robert Saunders*	**Session Chair:** *Dr. Elizabeth Radcliffe*	**Session Chair:** *Dr. Larry Ventis*
Jenna Simpson American Studies *College of William & Mary*	**Elizabeth MacMurray** Biology *College of William & Mary*	**Wei Zheng** Applied Science *College of William & Mary*	**Daniel Ramsey** Public Policy *George Washington Univ.*	**Chauncy Brinton** Psychology *James Madison University*
Sarah Stanford-McIntyre American Studies *College of William & Mary*	**Matt Heidman** Biology *College of William & Mary*	**Eric Jensen** Physics *College of William & Mary*	**Aaron Ray** Public Policy *Georgetown University*	**Ivo Gyurovski** Psychology *College of William & Mary*
Helis Sikk American Studies *College of William & Mary*	**Jason Westerbeck** Biology *College of William & Mary*	**Kelly Kluttz** Physics *College of William & Mary*	**Junko Shimazoe** Sociology *UNC-Chapel Hill*	**Mark Flanagan** Anthropology *Georgia State University*
	Kelly Subramanian Biology *College of William & Mary*		**Andrea Schirokauer** Public Policy *Georgetown University*	**Chris Martin** Psychology *College of William & Mary*

9:45 AM - 10:45 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room
Session Chair: *Mr. Larry McEnerney*	**Session Chair:** *Dr. Weizhen Mao*	**Session Chair:** *Mr. Brian Morra*	**Session Chair:** *Dr. Kathleen Bragdon*
Jasmine Williams Education *James Madison University*	**Fengyuan Xu** Computer Science *College of William & Mary*	**Minzhen Cai** Applied Science *College of William & Mary*	**Stephanie Hasselbacher** Anthropology *College of William & Mary*
Brian Wall Law *College of William & Mary*	**Zhengrui Qin** Computer Science *College of William & Mary*	**Eric Dieckman** Applied Science *College of William & Mary*	**Jaclyn Kuizon** Anthropology *College of William & Mary*
Mariaelena DiBenigno American Studies *UNC-Wilmington*	**Samiur Arif** Computer Science *Old Dominion University*	**William Roach** Applied Science *College of William & Mary*	**Jeff Johnson** History *Georgia State University*
S. Strosnider-Hollis History *James Madison University*	**Matthew Keally** Computer Science *College of William & Mary*	**Chen Xu** Applied Science *College of William & Mary*	

11:00 AM - 12:00 PM POSTER PRESENTATIONS (Second Floor Lobby)

1) Ryan Carpenter (Applied Science) *College of William & Mary*	**6) Aaron Clark** (Education) *James Madison University*	**11) Sucheta Jawalker** (Physics) *College of William & Mary*	**16) Angel Medina** (Psychology) *Radford University*
2) Zachary Elmore (Biology) *College of William & Mary*	**7) Nina Uqdah** (Education) *James Madison University*	**12) S. Singaravelu** (Physics) *Old Dominion University*	**17) Wesley Sanders** (Psychology) *College of William & Mary*
3) Daniel Ramos (Biology) *College of William & Mary*	**8) Jessica Wade** (Education) *James Madison University*	**13) Philip Frum** (Psychology) *Radford University*	**18) James Streett** (Psychology) *Radford University*
4) Tanya David (Chemistry) *Norfolk State University*	**9) Sean Freeman** (Neurobiology) *VCU*	**14) Maria Markhelyuk** (Psychology) *College of William & Mary*	**19) Katherine Ballard** (Public Policy) *College of William & Mary*
5) Justine Arrington (Chemistry) *College of William & Mary*	**10) Eva Kwong** (Neurobiology) *VCU*	**15)Victoria Marshall** (Psychology) *College of William & Mary*	**20) Tania Fitzgerald** (Social Work) *UNC–Chapel Hill*

12:00 PM - 1:30 PM LUNCHEON & AWARDS CEREMONY (Chesapeake A)

Dr. S. Laurie Sanderson, *Dean of Graduate Studies and Research, Arts & Sciences, College of William & Mary*
Dr. Carl J. Strikwerda, *Dean of Arts & Sciences, College of William & Mary*
Dr. Michael R. Halleran, *Provost of the College of William & Mary*
President W. Taylor Reveley, III, *President of the College of William & Mary*

Notes

ARTS & SCIENCES

Miles Runs the Zoot Suit Down: Coolness, Jazz, Race, and the Politics of High Fashion during the Civil Rights Movement

Presenter: Ben P. Anderson
Advisor: Arthur Knight
College of William & Mary,
American Studies

As one of the most recognized icons of "cool" to emerge in postwar America, African American jazz trumpeter Miles Davis is often compared with other "cool" white men from the same time period including James Dean and Marlon Brando. While such comparisons are justified to a certain degree, they tend to disregard how racialized postwar manifestations of "coolness" were and thus obscure the ways in which Davis' varied expressions of it can be understood as part of African American tradition. Using Davis' suits as a primary example, this paper will suggest that by wearing them in the 1950s and 1960s, Davis was not only arguing for more individual expressive agency as a black jazz artist but was participating in a much longer history of African Americans dressing up as a means of resistance as well. Set against the backdrop of the civil rights movement, which also involved well-dressed activists and politicized the “cool” individual, I hope to show how the combined act of Davis wearing suits while calmly rejecting prevalent (white) cultural assumptions regarding the onstage behavior of black performers can be interpreted more accurately as a variation on the theme of passive resistance than simply one of individual exceptionalism.

Beyond the Blues: Gospel Music as Critical Theory

Presenter: Kimberly Burnett
Advisor: Trudier Harris
University of North Carolina at Chapel Hill,
English and Comparative Literature

Critics of black women’s literature often credit the blues tradition with offering a conceptual image of black female agency and the performance of gender. However, gospel music plays a perhaps equally significant role in the literary imagination of black women writers. This presentation will explore the relationship that black women’s writing shares with the black gospel music tradition. In particular, I examine how black female texts and the critical analysis of black women’s writing all inscribe an awareness of gospel music in ways that expand the critical gaze and introduce new challenges in the process. Some of the questions addressed in this presentation include: How is gospel music invoked in black women’s writing? How does gospel music become productively invoked in critical literary theory? What are some of the challenges of categorizing gospel music as a cultural referent? How does an awareness of gospel music expose literary critics to new questions concerning the text? As a map for re-reading black women’s writing, gospel music may well prove itself an important critical tool.

The Specter of Historicity in "True" Colonial Williamsburg Ghost Story

Presenter: Mariaelena DiBenigno
Advisor: Tiffany Gilbert
University of North Carolina at Wilmington, English

In the Author's Note to *The Ghosts of Williamsburg: Volume II*, L.B. Taylor states that as soon as he thought he "had used up all the material in [his ghost story] files" with his first Williamsburg ghost story anthology, "people began calling and writing letters to [him] telling of their ethereal experiences." This unexpected onslaught of spectral sources provides interesting insight into the Colonial Williamsburg persona, mainly in how frequently the "true" ghost story preserves specific colonial moments. Taylor's anthology is not framed within a fictive context; rather, these ghosts survive in "personal interviews [and] in old family histories and diaries." They exist in a pseudo-literal-not-literary way as evidence of both colonial historicity and cultural spookiness. I argue that the Colonial Williamsburg ghost immerses itself within both familial and folkloric heritage in a different manner than other colonial coastal environs. I am also interested in the ways in which Colonial Williamsburg relies on the "true" ghost story as a mode of colonial interpretation. Many Colonial Williamsburg ghost talks and tours provide visitors with their only exposure to quasi-historical texts enveloped within the "true" ghost story theme. I propose to examine how reliable these retold and revised stories are, and if there is a responsibility to report historically accurate information. I plan to explore how the "true" ghost story in Colonial Williamsburg depicts and disseminates important historical and cultural moments via the production, projection, and eventual consumption of scary stories.

Jane Austen in America: Fans and the Performance of Fandom

Presenter: Sarah G. Glosson
Advisor: Charles McGovern
College of William & Mary, American Studies

Most Americans in the general public are fans or enthusiasts of at least one kind of text. Broadly construed these "texts" might include sports teams, television shows, authors, characters, music artists, genres, celebrities, or films. It is crucial to better understand the prevalent phenomenon of fandom in America as cultural convention of popular consumption commonplace yet often derided in American society. My study applies the theoretical toolbox of performance studies to fandom in order to elucidate an aspect of our own individual cultural lives that often goes unexamined. Activities related to fandom range from casually "following" and consuming a popular text, to engaging in elaborate social rituals including sharing fan fiction, attending a convention, dressing in costume or regalia, or enacting an aspect of the text. I suggest that these communal rituals are performances. As a case study, I consider the long-lived American fandom of Jane Austen. Since she was first published in America, Austen has had fans here, and since 1979, the Jane Austen Society of North America has institutionalized this fandom into a highly organized and lively group of enthusiasts that celebrates the life, times, and novels of Jane Austen with literary teas, historic house tours, lectures, and dances. I suggest that like the ritual aspects of performance, fandom provides a liminal space, apart from the quotidian, that allows fans continually to forge new meaningful experiences by reviving and reliving their beloved text.

Killin' Them Softly: *Chappelle's Show*

Presenter: Jeffreen M. Hayes
Advisor: Grey Gundaker
College of William & Mary,
American Studies

Chappelle's Show, the sketch comedy show created by comedian Dave Chappelle, debuted in 2003 and received critical acclaim and disdain for its direct attack on racism. The acknowledgement of Chappelle's contributions to race relations is laudable; however, many scholars have overlooked the linguistic traditions he employs to interrogate race. This paper explores some of the ways that African American linguistic and speech events are significant mechanisms in *Chappelle's Show*. In this paper, I argue that Chappelle especially utilizes two traditional forms, signifyin' and loud-talking, to combat racism by demonstrating the heterogeneity of African Americans, not just in our culture but also in Hollywood. Chappelle's title for the television show, *Chappelle's Show* demonstrates the use of signifyin'. Loud-talking, although evident in the first season, takes center stage in the season two sketch "Wayne Brady's Show." An interdisciplinary approach supports my argument, which incorporates African American linguistic scholarship, specifically drawing from Claudia Mitchell-Kernan's and Geneva Smitherman's research, as well as art historical methods. Dave Chappelle, while a comic, is also an artist and intellectual using comedy to breakdown racial boundaries firmly entrenched in the American psyche. I hope to prove show his brilliance in the use of African American oral traditions to confront racial stereotypes. By practicing signifyin' and loud-talking, Chappelle challenged the audience's ideas about race by killin' them softly.

There's Nothing Personal about "The Family of Man": Edward Steichen, Richard Avedon, James Baldwin and the Politics of Photo-text

Presenter: Julia Kaziewicz
Advisor: Susan Donaldson
College of William & Mary,
American Studies

While a cultural oligarchy worked to institutionalize American modernism in the early years of the Cold War, important artists and writers opposed this standardization and created works that refused to participate in the pro-American cultural machine. This paper explores how *Nothing Personal* (1964), a book of photography and meditations created by Richard Avedon and James Baldwin, is an exemplary rebellious work of creative expression that lies outside the box of textbook American modernism. This radical opposition to homogenized modernism is particularly striking when read against the Museum of Modern Art's famous exhibition, "The Family of Man" (1955). Curated by Edward Steichen, the message of the show, and its creator, is that of a like-minded and universal humanity. Conversely, Avedon and Baldwin tear apart the notion of sameness and equality in the post-war world. Where "The Family of Man" acts as a suture for the wounds of World War II, *Nothing Personal* tears off the bandages to reveal a broken and misunderstood America. Reading these texts against one another illustrates the competing modernisms of the cultural and political elite and that of mid-century avant-garde artists. Exposing this opposition provides a better understanding of how modernism really worked in Cold War America.

"The Changes are Difficult": Politics and Postmodernism in Amiri Baraka's Poetry

Presenter: Renee M. Kingan
Advisor: Christy Burns
College of William & Mary,
American Studies

Pursuant to his belief that "All people want to be revolutionary; there's always a need to struggle to try to transform your worldview, to remold your worldview, so that you actually perceive reality as do the great masses, the working class," Amiri Baraka has famously transformed himself throughout the course of his publishing career. Initially collaborating with the white postmodern avant-garde of the 1950s, then finding his voice in the politically charged Black Arts movement, Baraka has become an artist-activist whose writing works to illuminate different facets of what it means to be a black American struggling against the hegemonic forces of an imperialistic white capitalist society. While much of Baraka's work and ideology conform to discrete, self-proclaimed periodization, his poetry has always been rooted in a postmodern aesthetic. This paper provides a framework for reading Baraka's work that analyzes the way in which he employs postmodern themes in highly political verse, defying a common conception that postmodern writers are too disaffected to use their writing as a catalyst for pragmatic political change.

Cultural Architecture: The Bronx River Houses, Hip-Hop and Material Presentations of Race

Presenter: Kevin Kosanovich
Advisor: Charles McGovern
College of William & Mary,
American Studies

Hip-hop studies increasingly investigate cultural production without critical examination of the material environment of hip-hop's emergence. This has resulted in works assuming a material history based on demographics of poor and largely nonwhite locales. Epistemological, this approach problematically isolates hip-hop's history from a critical investigation of hip-hop's material spaces and places. My research attempts to solve this problem by framing hip-hop in terms of the material history of the Bronx River Houses. Focusing on the Bronx River Houses provides a geographical and material place to frame competing visions of space shaped by public policy, political discourse, and cultural practice. The Bronx River Houses are the home of the first 'park jams' organized by Afrika Bambaataa as he began articulating the Zulu Nation and his vision of hip-hop culture. The history of the Bronx River Houses provides a material record of the contest between top-down, public policy and everyday experience turning space into place along contested racial, political, and economic lines. Examining hip-hop's material history elucidates hip-hop's connection to late 20th century racial and spatial discourse. Hip-hop's cultural and material practices present the spatial history of the 1960s and 1970s South Bronx and late 20th century urban African America, providing a cultural and material record of neoliberal America. Hip-hop's historical moment documents the era when the nation shifted from a responsive to a repressive state, when the limits of political inclusion were baldly and forcefully commodified, privatized and spatialized.

Robot Complex: Passing for Human in Westworld and The Stepford Wives

Presenter: Kimberly L. Mann
Advisor: Leisa Meyer
College of William & Mary,
American Studies

Depictions of robots in American popular culture in the late-20th century often engage with passing narratives - they imitate humans so well that people are unable to tell that they are machines. In this paper, I consider two science fiction films from the 1970s - Michael Crichton's *Westworld* (1973) and Bryan Forbes's *The Stepford Wives* (1975). By adhering to certain gendered expectations, machines in these films are able to covertly blend in with human populations. In both of these films, however, machines ultimately fail in their passing. By looking at the motivations behind the creation of these machines in the films, and the moments of exposure as machines, I will show how these films reflect broader anxieties over white, heteronormative middle class identity in the 1970s and the ways in which fears over technological advances are steeped in representations of gendered and racial difference.

"Mes dernières volontés": Testaments to the Life of Marie Couvent, an Ex-Slave in New Orleans

Presenter: Elizabeth C. Neidenbach
Advisor: Kimberley Phillips
College of William & Mary,
American Studies

In her last will and testament, recorded on November 12, 1832, Marie Justine Cirnaire, Veuve Couvent claimed a lasting legacy as a patron of African American education in New Orleans when she declared that a school be established on her property. It is little known, however, that Couvent, in fact, made two wills, the first dated twenty years earlier. Through a close reading of Couvent's testaments, this article will explore the life of a woman who was born in Africa, enslaved in Saint-Domingue, and died a free and wealthy slave owner in New Orleans. As catalogs of material accumulation, acts of autobiography, and maps of social networks these wills suggest the ways Couvent and other former slaves created identities as free people through property ownership and personal relationships. The differences between Couvent's two wills are significant, revealing traces of her experiences from a slave in Saint Domingue to a free woman in Louisiana. These discrepancies also reflect broader transformations in New Orleans. Placing the wills in their historical context not only allows me to fill the gaps in her life story, but reveals a complicated picture of how free people of color sustained their community as the center of slavery shifted into the Deep South.

Can he not try to be a Communist a little longer? Readings of Race in the 1970s German Democratic Republic

Presenter: Anna Rapp
Advisor: Maria Diedrich
College of William & Mary,
English

During the Cold War, the German Democratic Republic's (GDR) governmental censorship offices controlled what foreign literary texts were translated and published; this had enormous consequences for GDR readers, particularly for the reception of African-American writers. Politically sanctioned translations of African-American texts were widely read as epitomes of Lenin's two-nation-thesis, which splits each nation into a progressive, socialist nation; and a reactionary, imperialist nation. Consequently, the African-American struggle against racism in the United States was considered class struggle and aligned with socialist ideology in the GDR. Using the publication of Richard Wright's works in the GDR during the 1970s as an example, my analysis shows how the politically inspired restrictions on publishing foreign literature resulted in the establishment of an academic discourse which limited the meanings of African-American writing. As Richard Wright had renounced communism in his famous essay "I Tried to Be a Communist" decades before his works were translated into German, it is particularly striking how the Eastern German reception of his writings merged the fight against racism with class struggle. At the same time, the files kept by the GDR governmental department of censorship reveal how the reception of Wright's work through a communist lens was also a strategy employed by Eastern German scholars to include American writing in the literary landscape and thus broaden the canon of politically acceptable literature.

Laramie Death Trip: Matthew Shepard and Objects of Pain

Presenter: Helis Sikk
Advisor: Leisa Meyer
College of William & Mary,
American Studies

This presentation unpacks media representations of death, violence, and pain using the example of the highly publicized murder of Matthew Shepard. Inspired by Michael Lesy's cult classic *Wisconsin Death Trip*, this presentation not only analyzes media representations of the macabre but also demonstrates how images and the visual imagery employed in written text are used to tell a complicated graphic story; how the media have chosen to represent death and violence; and what outcomes the repetition of these images of death have on remembering and memorializing tragic events.

"America's Hometown" - Living History Sites Where Local and National History Meet

Presenter: Jenna Simpson
Advisor: Arthur Knight
College of William & Mary,
American Studies

Celebrating local history has long been a way to show regional pride and express a sense of personal identity and membership in a community. But what happens when events in an area's local history also happen to be events that played an important role in the creation of our American nation? As a site becomes more widely known for its connection with an event of national significance how do local historical institutions deal with the change, and what is the ultimate effect on the stories told there? Plymouth, Massachusetts and Williamsburg, Virginia offer two valuable case studies in the intersection of local and national history. Through a long tradition of pageantry, performance, and self-promotion, both have successfully integrated their local histories into a national story. This presentation will consider the importance of living history and reenactment in making that integration successful – how, through performance and audience participation, "outsiders" are made to feel that the "insiders'" history is their own. This will also explore how the nationalization of a local history can alienate the local audience and alter both the intent and the content of the stories that are told.

The Atlantic Rural Exposition 1946-1961: Nostalgia, Transgression, and Capitalism at the Virginia State Fair

Presenter: Sarah S. Stanford-McIntyre
Advisor: Arthur Knight
College of William & Mary,
American Studies

For this presentation I will examine the evolution of the State Fair of Virginia from 1946 to the mid 1960s, analyzing it as the product of many changes in American and Virginian society, such as the spread of consumerism, the influx of wealth after World War II, the emergence of the Cold War, and the effects of racial integration on the South. I will demonstrate that the mid-century state fair represents a place of contradiction, both physical and ideological, with one foot pointing toward the future and the other toward the past. I will prove that this contradictory nature evolved to reflect the increasing influence of urban values and culture on the state fair even as veneration of an idealized agrarian past intensified. In my talk I will separate this sense of paradox into three broad trends central to the state fair tradition: the pastoral versus the industrial, moral conservatism versus social transgression, and communal participation versus anonymous consumption. To understand these contradictions I will engage the anthropology of the festival, the role of cultural memory, the importance of tradition, and the role of nostalgia in society. I will analyze the role that mass consumer culture has played at the state fair and in twentieth century rural society, using the fair to illustrate broader changes in American culture. My analysis will demonstrate that the state fair is a "constructed tradition" that reflects the symbiotic relationship between tradition, transgression, and consumption in twentieth century America.

Addiction as a Positive Feminist Discourse in Oedipa's Search for Meaning in *The Crying of Lot 49*

Presenter: Emma K. Wolfe
Advisor: Kevin Moberly
Old Dominion University,
English

From the beginning of the novel *The Crying of Lot 49* by Thomas Pynchon, Oedipa Maas' life is thrown into chaos when she leaves her meaningless life in order to become the executer of her ex-boyfriend Pierce Inverity's will. In her investigation of the Trystero and its connection to Inverity's estate, she finds meaning in her life. However, I believe that rather than finding true meaning, she has found a replacement for meaning; her quest is constructed as being an addiction rather than being meaningful. The inconclusive nature of her quest seems to reflect her addiction with discovering new information about the Trystero, and her unwillingness to end her search implies that she is attempting to justify this addiction with herself. Moreover, her juxtaposition with characters that do have experience with drugs seems to draw out her addiction, and makes her similar, rather than superior to them. Unlike modern discourses that claim that addiction is a disease, I believe that Oedipa's addiction is more a social construct as suggested in Jacques Derrida's *The Rhetoric of Drugs*; thus Oedipa is able to choose whether to become addicted to her search. Since her addiction gives her more purpose in life than when she defined her life by Inverity, Maas, and Metzger, I believe Pynchon is implying the feminist idea that Oedipa is better off living the life of a solitary addict than living her life in a subservient female role.

Negotiating Community Persistence, Survival and Place: Archaeological Investigations on the Pamunkey Indian Reservation

Presenter: Ashley L. Atkins
Advisor: Martin Gallivan
College of William & Mary,
Anthropology

Despite rising interests in the historical archaeology of Native Americans, the diverse experiences of Native communities in Tidewater Virginia have received scant attention from historical archaeologists. Broader conversations discussing change and continuity, survival and persistence, and Native materiality have not been addressed in the historical archaeology of the Chesapeake. Archaeological sites on the Pamunkey Indian Reservation hold the potential to contribute to these larger conversations. In particular, test excavations at the Raymond Bush Site (44KW29) yield promising evidence on the complexity of Native experiences during the historic period. Features and artifacts excavated at 44KW29 date to the mid eighteenth through early nineteenth centuries, and illustrate that that the Pamunkey produced pottery and metal objects and used materials from Native and European traditions. Close examination of 44KW29 provides the opportunity to uncover the Pamunkey peoples' efforts to negotiate community persistence, survival, and a sense of place within the colonial context.

The Embeddedness of Property: An Anthropological Approach to Post-Emancipation Property Relations

Presenter: Stephanie Bergman
Advisor: Frederick Smith
College of William & Mary,
Anthropology

Anthropology can benefit from the concept of property relations to understand people's attitudes towards objects and the ways in which they are used to create meaning. I draw from the anthropological tradition that approaches property as a "bundle of rights" and property relationships as social relationships. In this paper I broadly examine property relations through the analysis of court reforms and individual legal testimonies, and ask how social relations were transformed after Emancipation in Barbados, WI. How did people that were once considered chattels conceive of property? At the micro level it is possible to learn through property relations how the former enslaved built their social identities through holding and using a variety of 'things' in their environment. At the macro level, it is possible to address issues of political power and control over the distribution of 'things' in society. These levels can be connected in analysis using a political economy approach, and highlights how property relations underwent a dramatic transformation after slavery that increasingly moved scarce rights and resources from the community to restrictive notions of 'possessive individualism'.

'To restore to them their lost Reason': Processes of Treatment and Confinement at Williamsburg's Public Hospital on the Brink of the Moral Treatment Revolution

Presenter: Ellen L. Chapman
Advisor: Michael Blakey
College of William & Mary,
Anthropology

The Public Hospital of Virginia, established in southeast Williamsburg in 1773, was the first hospital in the American colonies dedicated entirely to the treatment and cure of mental illness. While initially a pioneering institution, the move of the Virginia capital to Richmond after the War of Independence greatly diminished the population and resources present at Williamsburg. This paper explores treatment strategies, the impact of gender on the perception of mental patients, punishment and resistance in an asylum setting, and the impacts of institutionalization through an examination of the Lunatic Hospital Book, a partial account of patient care, for the period 1799-1801. Primary documents written by several hospital physicians are used to elucidate the medical theories employed at the Public Hospital as well as the expectations and attitudes of caregivers at the hospital towards the committed. This examination has revealed that treatment of mental illness at the Public Hospital was somewhat less invasive than that common in other American and European institutions, possibly due to a combination of physician discretion in choosing their preferred theory of mental health treatment and the Public Hospital's peripheral location in contemporary medicine. The paper will also use the anthropological theory of Goffman, Douglas, and Foucault to explore how hospital structure and the process of institutionalization undermined efforts to cure patients through the mortifying process of integration into the hospital and the polluting influence of a diagnosis of insanity.

Contextual heavy alcohol use amongst homeless individuals, veterans with post-traumatic stress disorder and Notre Dame students

Presenter: Mark W. Flanagan
Advisor: Kathryn Kozaitis
Georgia State University, Anthropology

This project aims to compare social and individual aspects of heavy drinking as presented in three unique populations: the Notre Dame male student body, a local homeless population, and a local population of PTSD veterans. Although drinking differences and stigmas are typically recognized by quantity of alcohol consumed (light social drinkers versus heavier imbibers), heavy, and often more dangerous, drinking habits are generally lumped together as "problematic". Data was gathered on social aspects of drinking using a combination of surveys, participant observation, and life histories. Data was gathered on perceived conscious or individual experiences using informant-rendered intoxication graphs. While Notre Dame students differed significantly from homeless and PTSD drinkers in almost all 7 identified areas of social context, PTSD and homeless drinkers showed discrepancy from each other in the areas of sociality, violence, law, and poly-drug use. All groups showed differences in perceived altered-consciousness. These findings could have potential usefulness in defining alcohol typologies or creating novel and more effective ways of treating alcoholism/addiction.
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"Shakespeare and All the Olden Talk": Language Change and Linguistic Authority at Coushatta, Louisiana

Presenter: Stephanie Hasselbacher
Advisor: Kathleen Bragdon
College of William & Mary, Anthropology

Based on five months of interviews and participant observation on the Coushatta Reservation outside Elton, Louisiana, this research addresses the tension that arises between synchronic language as a marker of identity and diachronic language as a matter of historical anthropological interest. Specifically, this paper describes the Coushatta Heritage Department's use of legacy language materials collected by linguists in the early twentieth century for their tribe's linguistic revitalization efforts. Each historical source comes with a different theoretical stance and method befitting their creators' time period and discipline, having serious effects on their content and utility for future projects. What do the differences between these linguistic snapshots mean to a community that is critically engaged with their language in a very self-conscious way? What is considered sadly "lost" and fit to be reincorporated into contemporary spoken Coushatta, and what are the permissible leavings-behind of natural language change? In a community that values precedent as well as orality, the linguistic authority of historical documents compared to the fluency of living speakers is ambiguous. I address how members of a speech community perceive language change and linguistic authority, and the ways in which knowledge about language change is produced and accessed.

Middle Woodland Shellfishing: Gender, Tradition, and Social Practice

Presenter: Jessica M. Herlich
Advisor: Martin Gallivan
College of William & Mary,
Anthropology

The late Middle Woodland period in the Middle Atlantic has been characterized by a hunter-gatherer lifestyle with an emphasis on the utilization of estuarine resources and settlement in estuarine locations. This paper is influenced by discussions within the archaeological community pertaining to the division between the prehistoric and the historic, and it explores the possibilities for studying social constructs prior to European contact. Potential interpretations of gender relations, tradition, and social practice in a Middle Woodland context derived from documentary and ethnographic accounts of shellfishing and shellfish processing will be addressed in conjunction with archaeological evidence.

A Glimpse into the Lives of Boston's 'Butterflies': An Analysis of Personal Hygiene and Presentation of Self in Victorian Era Brothels

Presenter: Amanda B. Johnson
Advisor: Frederick Smith
College of William & Mary,
Anthropology

Historical narratives concerning nineteenth-century prostitution in New England often portrayed lower-end parlor houses and brothels as unkempt places with prostitutes who lacked basic hygiene. Recent archaeological analysis of artifacts recovered from a privy associated with a nineteenth-century brothel in Boston, Massachusetts, however, are beginning to shed new light on the inner workings of brothel and the hygienic practices of women in residence. The archaeological assemblage from the site will be compared with archaeological materials from other Victorian-era brothel sites excavated in the United States in order to provide a broader understanding of personal hygiene and presentation of self in nineteenth-century houses of prostitution. Archaeologists have successfully used artifacts of personification, such as toothbrushes and cosmetic items, to investigate levels of personal hygiene at low-end Victorian parlor houses. The evidence suggests that lower-end prostitutes were much more concerned with their health and hygiene that can be gleaned from historical narratives of the late nineteenth century.

Santa Fé Indian Market: Agency and Restrictions

Presenter: Jaclyn Kuizon
Advisor: Danielle Moretti-Langholtz
College of William & Mary,
Anthropology

SWAIA's Indian Market located in Santa Fe, New Mexico is the largest fair of its kind, showcasing a vary large selection of arts, crafts, and textiles produced by artists identifying as American Indian or Alaska Natives. The Indian Market employs a juried process for the selection of its vendors and is sponsored by the Indian Arts and Crafts Board in the U.S. Department of the Interior for the economic development of the tribes and families of those selected vendors. It is within these specifications that problems lie and questions begin to arise. This study is a literature review and a look at the Indian Market through the perspectives of some young college-age contemporary artists who currently live in Santa Fe; it is also a section of my Master's Thesis. However, this paper specifically looks to the Indian Market as a facilitator of contemporary indigenous artists' incorporation into the [Capitalistic] global market economy. It also highlights new trends among contemporary artists, who (often times out of necessity) are creating art less for traditional purposes and more to gain prestige as an "artist" in the Westernized understanding of the term, which puts an emphasis on the individual. This trend is met with the additional complicating matter of the urgent obligation felt to cater to the large tourist influx. The work displayed at this Indian Market not only reflects these issues but also speaks to the dynamics involved in the negotiation of a post-colonial experience.

Between Page and Bone: Recipe Reconstruction from Zooarchaeological Assemblages

Presenter: Dessa E. Lightfoot
Advisor: Frederick Smith
College of William & Mary,
Anthropology

Butchery analysis holds a great deal of promise for bridging the gap between the wealth of documentary sources addressing American colonial foodways, and the faunal remains found on archaeological sites. Zooarchaeological analyses often focus on animal bones as the primary artifact, but faunal remains from archaeological sites are usually only the byproduct of meals, discarded after the meat had been stripped from them. A detailed butchery analysis is one way of thinking of bones as the vehicle for the meat, making it possible to link the meat removed from those bones with methods for preparing that meat. By making connections between which muscle groups are included in specific cuts of meat being produced historically, and recipes from popular printed cookery books and women's own handwritten manuscript receipt books from 18th century colonial America, it may be possible to determine how the resulting meat was being cooked, and what, if any, recipes were being used. The conclusions drawn from this work has far-reaching affects, as it sheds light on how and what people sat down to eat day to day and how the documentary and the zooarchaeological record do and do not reflect people's real experiences. The purpose of this research is to explore how zooarchaeology can be used to inform and work alongside with documentary research to create a stronger interpretation of past foodways.

Sweet, Sour and Salty: Preservation Methods in Nineteenth-Century Plantation Recipes

Presenter: Tiffany O. Little
Advisor: Mary Voigt
College of William & Mary,
Anthropology

Food is an expression of culture that can be subtle or obvious. Food becomes iconic: it can express identity, ethnicity and status. Food is shared culture, and while it often provides a medium for socialization, individuals and households have their own personal foodways which are affected by a multitude of factors. During the late eighteenth and the early nineteenth century cookbooks became fashionable, and the focus of this research is on two cookbooks compiled by women in the Tucker family. The Tuckers were wealthy plantation owners, and highly educated, with the resources to provide a complex and varied set of foodways. The various methods of preserving foods mentioned in the documents show how the Tucker women manipulated a limited set of basic ingredients to not only reduce the perishability of the ingredients, but also to add flavors and to transform a simple ingredient into a complex vehicle for social interaction. The simple is made complex and with the increasing complexity involved in preparation and of wealth and status expressed by adding spices and sweetening. How the ingredients are used, and personal tastes are expressed also affect which recipes were included and variations on a single dish are also represented. These represent active decisions made by the female members of the household, a group which often is subsumed in the documentary records along with the details of preparation in archaeological context.

"He used to revisit the graves of his fathers": New English Commentary on Native American Commemoration

Presenter: Alexandra G. Martin
Advisor: Kathleen Bragdon
College of William & Mary,
Anthropology

Mortuary rituals and human burials hold significance and interest for many cultures. In this presentation, I explore the perspectives on Native American burial methods and grounds as presented in Anglo-American historical documents. Surveying primary sources including historic maps, poems, religious texts and addresses, dedication ceremonies of cemeteries and monuments, and early ethnographic or archaeological texts, I propose that Anglo-American settlers of New England strategically sought to distance and anchor indigenous groups and individuals in the past by concentrating on their deaths and interments. While Anglo-Americans attempted to assert their new hold on the land, however, Native Americans continued burial practices that had, since before European contact, established mortuary contexts in which Native worldview could be expressed. Burials, by nature, are acts of commemoration that represent continual Native presence on the colonial landscape.

The Hebrew Nation of Barbados: A Diasporic Community in the Colonial Caribbean

Presenter: Derek R. Miller
Advisor: Frederick Smith
College of William & Mary,
Anthropology

In the early 17th century a number of Jews settled in Bridgetown, Barbados. These first settlers established multiple religious institutions including a Synagogue, a Mikveh, and a cemetery. These institutions helped to establish a Jewish community in Barbados. Yet, how do we define a Jewish community? The scale of a community, and its shape, is determined by the way we define the term community. In the case of the Jews of Barbados, they not only erected prominent landmarks in Bridgetown to establish a local community but also took active steps to maintain themselves as part of a larger Jewish Diasporic community. Thus, structuring our archaeological questions within a framework of a diasporic community will help nuance our interpretations to better understand how the Jews of Barbados not only created a local community on Barbados but also remained active within a larger dispersed Jewish community.

Turncoats, Thievery, and Town Cohesion: York County's Response to British Seizure of Property and Pride during the American Revolution, 1781

Presenter: Adam D. Richardson
Advisor: Marley Brown
College of William & Mary,
Anthropology

In August of 1781, British forces under General Cornwallis campaigned into Virginia and seized Yorktown. This and the events that followed are well-known within American Revolutionary history and inextricably tied to ideas of American legacy and independence. The story told less often, however, is one of the impacts the British occupation had on the lives of the townspeople of York County during this occupation. This study, conducted at the York County archives, presents a new people-oriented view of the occupation of Yorktown. In 1783, a special court was held to hear claims of individuals who sought compensation for property seized in the invasion of 1781. Studies of those original claims and documents reveal that not only were land and food seized by the British, but enslaved individuals, wealth and sentimental items, weapons, and clothing as well. The results, historically relevant in their own right, also reveal vital information about the socio-political climate of post-Revolution America. Studied from an anthropological perspective, this special court is argued to be a method of resistance and identity-construction post hoc to British occupation and seizing of property. Situated in a position of flux between military participants and those unaffected as well as between colony and new nation, the records reveal a search for identity and cohesion among people who felt wronged and insulted during the British invasion. Considering this insight, the impact of British occupation and seizure of property in York County can add an often-overlooked perspective on an important American series of events.
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An Archaeometric Examination of Barbadian Redware During the Early Colonial Era

Presenter: Erik Siedow
Co-Authors: M. Kelley, O. Trofimova
Advisor: Frederick Smith
College of William & Mary, Anthropology

In the seventeenth and eighteenth centuries, pottery manufacture emerged in the British Caribbean island of Barbados. Many of the potters were enslaved Africans and poorer classes of whites, and the industry was concentrated primarily in the eastern parishes of the island. The pottery produced consisted of glazed and unglazed red earthenware comprising a variety of utilitarian forms. Archaeologically, it has been nearly impossible to distinguish locally made Barbadian red earthenware from imported forms. Analysis of Barbadian redwares using scanning electron microscopy identified holoplanktonic protozoa fossils known as radiolarian in Barbadian-made red earthenware, which were deposited in the soil over the eastern shore between the Miocene and Pliocene Epochs. The radiolarian fossils are proving to be an important diagnostic marker of at least some Barbadian red earthenwares, and the evidence has implications for understanding broader trends in the political, economic, and social arenas of Barbados in the early colonial era.

Rogue Taverns: A Comparison of Smuttynose Island, Isles of Shoals, and Port Royal, Jamaica

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

In order to gain better understanding of the changing economic, political, and social aspects of Atlantic trade, both illicit and legitimate within New England from the seventeenth to the late eighteenth century, this study turns to an examination of tavern assemblages at Smuttynose Island, a fishing village off the coast of Maine. The larger characteristics of the maritime community that made, purchased, used, and discarded these artifacts will be explored in an attempt to trace where the wealth of the island's inhabitants was being placed. Documentary evidence suggests that these Isles of Shoals fishermen were developing their own sense of identity during the seventeenth and eighteenth centuries and that they saw themselves as distinctive from the mainland colonial settlements and the British mother-country. This fishing community was on the ideological peripheries of the American mainland, just as they were physically ten miles off of its coast. Additionally, this evidence reveals that the fishermen harbored pirates and actively took part in smuggling and privateering. This paper seeks to uncover these historically-documented trading patterns (including an illicit economy) demonstrated by the material goods recovered from Smuttynose, and compared with those on the American mainland and in the Caribbean.

A Pragmatist Approach to Public Archaeology

Presenter: Kelley M. Walter
Advisor: Martin Gallivan
College of William & Mary,
Anthropology

Archaeologists are increasingly aware of the need to engage the public if the discipline is to remain relevant outside the world of academia. This is visible in the dramatic increase in methods that incorporate collaboration with descendant communities and the general public. This task is not easy, as the diverse field of public archaeology offers many methods but little guidance on which approach is best suited for a particular project given the pluralistic nature of many communities. I suggest that a pragmatist archaeology is suitable for uniting these different methods under a theoretical position that allows for different ways of creating knowledge, and takes into account how a project's aims can serve all those who are involved or affected. Importantly, pragmatism ensures that archaeologists still have a say in research and can handle problematic cases that arise when different interests intersect. In this presentation I will apply pragmatist theory to the research conducted at Port Tobacco, a town where public archaeology efforts have largely failed, in an attempt to demonstrate how archaeology can be made more relevant for researchers and public alike. The interests of the public are not always incompatible with those of researchers, and when they are pragmatism forces us to ask how the archaeological process can be made to be the most relevant.

The Unbranded Doctor: An Anthropological Perspective

Presenter: Aileen Y. Watchko
Advisor: Andrew Bickford
George Mason University,
Anthropology

In the last few years, there has been considerable attention given to the issue of physician/ pharmaceutical relationships. However, there has been little focus on this subject by anthropologists. This study looked at physicians who have decided to become "unbranded" and reject the current, standard relationship between medical practitioners and the pharmaceutical industry. The author conducted participant observation and qualitative semi-structured interviews for one week at a medical practice in Madras, Oregon. The five physicians were distrustful of the drug reps. Prior to the change, the physicians at the clinic found the gifts given by the drug reps to be excessive. Even those physicians most opposed to the change realized that in the end, drug reps were salesmen. They also believed that the free samples left by the drug reps were, in general, not helpful. The practice did not see an overall downturn in patient satisfaction, ease of business, or an availability of affordable medication after the transition to a "pharm-free" environment. The results of this study suggest that while there are some challenges to becoming "unbranded," physicians who make the change create a safer, more productive environment for their patients and themselves. Furthermore, the loss of free samples does not, in general, negatively affect patients or the practice. However, unbranded doctors may not be able to completely free themselves from the influences of the pharmaceutical industry, thus the results suggest that no doctor is completely unbranded and no medical setting is completely pharm-free.

Structuration, Legislative Change, and the Power of the Press in Colonial Liberia: A Case Study in Documentary Anthropology

Presenter: Maxwell Werner
Advisor: Martin Gallivan
College of William & Mary,
Anthropology

I will discuss the relationship between legislative change and media in colonial Liberia (1820-1847), a period during which the colony was governed by the American Colonization Society (ACS). ACS legislation, printed as Constitutions and Plans of Government in the African Repository & Colonial Journal, preserved American discrimination in the colony falsely designed for African-American sovereignty. I will consider the documentary record - pre/post-independence legislation, media, personal accounts - to understand the importance of the media to legislative development in colonial Liberia. My presentation will begin with a discussion by Anthony Giddens's structuration theory (which will frame the rest of my presentation) and end with a discussion of the limitations of this theoretical perspective for anthropologists.

Pots Without Clay: Coarse Earthenwares, Markets, and Internal Trade Networks Among Bermudian Slaves in the 17th-19th Centuries

Presenter: Sarah Zimmet
Advisor: Marley Brown
College of William & Mary,
Anthropology

Afro-Caribbean wares and Colonowares, both a type of handmade, locally produced coarse earthenware pottery, are found on a variety of archaeological sites on the island of Bermuda dating between the mid 18th and early 19th centuries. The island, however, does not have a source of raw clay for local production. Handmade coarse earthenwares were therefore imported, most likely by and for enslaved Africans. The presence of this pottery on Bermuda is especially interesting because it raises questions about procurement practices and pottery use among enslaved Africans. My research examines handmade coarse earthenwares from six Bermudian sites spanning the east and west ends of the island. By the late 17th century, Bermuda's charter company dissolved and the economy shifted focus from agriculture to maritime trade. During this period, enslaved Africans as sailors on Bermudian vessels had access to markets throughout the Caribbean and eastern seaboard which gave them the opportunity and independence to buy or trade for goods. Recent studies have shown that enslaved Africans were active in purchasing desired items. Markets catering to enslaved communities were established on many British islands throughout the Caribbean and influenced the types of coarse earthenwares that were in style over time. The presence of coarse earthenwares on Bermuda is suggestive not only of the expansive networks enslaved Africans participated in abroad but also informal networks for trade goods on the island.

Stochastic dynamics in a social network with payoff-dependent adaptation

Presenter: Shadrack A. Antwi
Advisor: Leah Shaw
College of William & Mary,
Applied Science

It has been shown theoretically and empirically that human behavior can affect the dynamics of an infection that is transmitted through interpersonal contacts. Motivated by HIV and other STI's, we use a Monte Carlo simulation to implement stochastic social dynamics in a network with formation and breaking of links representing changes in interpersonal contacts. Each node has an intrinsic benefit its neighbors derive from connecting to it. However, links represent an inherent risk (e.g., increased chances of contracting an infection). Thus for a given benefit value, nodes with a higher number of connections, or "degree," are less desirable partners. A node's desirability is its payoff value computed from its benefit and degree. Seeking greater benefit via more links is assumed to be tempered by two factors: the risk from high degree neighbors, and one's own reduction in desirability due to high degree. It is found that the degree distribution evolves to a single attractor. We characterize the resulting network structure and dynamics.

Interfacial Adhesion and Stress Transfer Between Graphene Oxide and Polymers

Presenter: Minzhen Cai
Advisor: Hannes Schniepp
College of William & Mary,
Applied Science

Polymer nanocomposite materials, which embed nanoparticles into polymers, have advanced properties and great potential to be multi-functional, high-performance materials. Graphene, the single atomic layer of carbon, possesses outstanding mechanical properties making it a promising reinforcing filler for ultra-strong structural nanocomposites. Of all the factors affecting the mechanical performance, the interfaces between nano-size fillers and matrix are vital, but, still difficult to measure. We present two novel methods to directly measure the interfacial adhesion between individual single-layer graphene oxide (GO) sheets and polymers using Atomic Force Microscopy (AFM). We have applied these methods for a broad range of polymers and for graphene sheets with different degrees of surface functionalization. We find that the sheet–polymer adhesion vary greatly for the different systems. Subsequently, we applied AFM to visualize individual GO sheets embedded in polymer in relaxed state and under strain, respectively. By scanning the very same set of sheets in these two states, we are able to measure the strain of graphene oxide sheets. We found that sheets in GO/PVA nanocomposite can be strained up to 7% through adhesion before they slip. This is the highest reported strain in GO to date. The GO strain is also much higher than what was found for adhesively coupled graphene. Our results suggest that it is possible to make nanocomposites utilizing graphene sheets' outstanding mechanical properties. Hence, we envision a new generation of graphene-based nanocomposites with exceptional strength and toughness.

Modeling the effects of calsequestrin's role in regulation of local calcium release and depletion in cardiac myocytes

Presenter: Ryan Carpenter
Co-Author: Sandor Gyorke
Advisor: Gregory Smith
College of William & Mary,
Applied Science

Cardiac calsequestrin (CASQ2), a Ca buffer localized to the junctional SR (jSR) of cardiac myocytes, is known to bind to the RyR-triadin-junctin complex, participate in the luminal regulation of RyRs, and modulate Ca spark activity. To investigate the possible functional roles of CASQ2 during Ca sparks, we constructed ODE simulations of Ca release site models composed of 100 RyRs. Several different topologies of the RyR were chosen for study to include several plausible roles of CASQ2. These different topologies allow for different pathways of luminal regulation, whether by direct binding of jSR Ca to the RyR, or through CASQ2 binding to the RyR, as well as different pathways of Ca dependent activation and inactivation. Parameter studies were performed to obtain sparks from varying models to compare with known experimental release site statistics. The comparison of simulated sparks to those observed in myocytes containing control and known arrhythmogenic CASQ2 mutants gives insight to the mechanisms of luminal regulation in cardiac myocytes. These studies also give insight towards the importance of varying activation and inactivation mechanisms present in cardiac myocytes. This project is joint work with Sandor Gyorke and Gregory D. Smith.

Numerical simulations of acoustic parametric arrays

Presenter: Eric A. Dieckman
Advisor: Mark Hinders
College of William & Mary,
Applied Science

Acoustic parametric arrays exploit the interaction of high-frequency sound in a nonlinear medium to make a highly-directional loudspeaker. This makes it possible to project narrow sound beams over long distances in a controlled manner. We present numerical simulations of sound propagation from a parametric array using the nonlinear Khokhlov-Zabolotskaya-Kuznetsov (KZK) equation. Combining these simulations with existing Acoustic Finite Integration Technique (AFIT) codes gives complete numerical simulation of parametric array beams scattering from objects. Applications such as stand-off security screening, non-lethal wildlife deterrents, and echolocation sensors for autonomous robotics are discussed.

Identification of Interface Exchange Bias in Fe/MgO(001) Bilayer

Presenter: Yichun Fan
Co-Authors: K. Smith, A. Hanbicki, C. Li, B. Jonker
Advisor: Gunter Lüpke
College of William & Mary, Applied Science

The increasing demand for non-volatile memory and reprogrammable logic coupled with low power consumption has led to the rapid development of magnetic tunneling junctions (MTJs). The interface magnetic properties primarily affect the spin tunneling efficiency of MTJs. The magnetization-induced second-harmonic generation (MSHG) technique provides a direct optical way to characterize the interface magnetic properties of ferromagnetic/nonmagnetic heterojunctions. The experiments on Fe/MgO(001) bilayers reveal a subtle interface exchange bias not observed in the bulk. The magnitude of the exchange bias increases with interface oxygen concentration suggesting the presence of canted anti-ferromagnetic spins caused by Fe-O-Fe bonds. The blocking temperature is found to be 343 K, which is above the FeO bulk value. This result is important for elucidating coherent spin tunneling processes at the Fe/MgO(001) interface, vital for the realization of spintronic devices.

A Langevin description of the stochastic dynamics of calcium release sites composed of multiple intracellular channels

Presenter: Yan Hao
Advisor: Gregory Smith
College of William & Mary, Applied Science

Compositionally defined Markov chain models have been used to study the relationship between single channel gating of intracellular calcium (Ca^{2+}) channels and the stochastic dynamics of Ca^{2+} "puffs" and "sparks," intracellular Ca^{2+} release events that arise from the cooperative activity of clusters of Ca^{2+} channels. In such models, the transition probabilities of individual channels depend on the local Ca^{2+} concentration and thus the state of the other channels. Consequently, Markov chain models of Ca^{2+} release sites often possess intractably large state spaces that impede computational analysis. To overcome this difficulty, we derived a general Langevin formulation for the stochastic dynamics of Ca^{2+} release sites complosed of a large number of intracellular Ca^{2+} channels. We validate this Langevin formulation by comparison to Markov chain simulations and perform benchmark simulations that demonstrate its computational efficiency for single channel models with 2 to 6 states and release sites composed of 19 to 80 channels.

Proton NMR and spin relaxation in viscous and multi-component systems with magnetic nanoparticles

Presenter: Rabia Hussain
Co-Author: Aleksandr Andreyev
Advisor: Natalia Noginova
Norfolk State University,
Center for Materials Research

Understanding the specifics of the nuclear magnetic resonance (NMR) and relaxation in media with magnetic nanoparticles (MNPs) is important for efficient use of particles in magnetic resonance imaging (MRI) and other biomedical applications. As was found earlier, MNP-related effects to proton NMR spectra and spin relaxation of host media are very sensitive to the size, magnetization and surfactant of particles, and critically depend on the system viscosity, being very different for solid and liquid systems. Here we present results obtained in viscous systems in broad range of viscosities with and without MNPs of different sizes which demonstrate combination of multi-component liquid-like response to injection of particles to the system under study. The results are explained in terms of diffusion related mechanism of relaxation. Applicability and limitations of the standard outer sphere model are discussed.

Group Sequential Designs for Evaluation of Measurement Errors in Reliability Studies

Presenter: Mei Jin
Co-Author: Aiyi Liu
Advisor: Zhaohai Li
The George Washington University,
Statistics

The intraclass correlation coefficient (ICC) derived from a one-way ANOVA model has a lengthy history of application in several different fields of research, such as epidemiologic studies, clinical trials, psychology and genetics. ICC is a widely recognized index of reliability which is one of the principle characteristics of any measurement in general. In studies involving human samples, the measuring cost can be often high and the resource is limited, therefore prime concerns require termination of the study if early evidence shows the measurement error is within (or beyond) the level of tolerance in order to keep the number of samples as low as possible to reduce the study cost. The group sequential designs are proposed to lead to savings in sample size, time and cost when compared with standard fixed sample procedures. We summarize Liu's two-stage group sequential test using Lan and DeMets error spending approach and optimize the design. Furthermore, motivated by the idea of Simon's optimal design, we present another two-stage test that is optimal in the sense that the average sample number (ASN) is minimized when the measurements have low reliability subject constraints upon the size of the type I and type II errors. The performance of the proposed technique is examined using simulation studies for a range of design parameters and optimal designs are tabulated. As an example of applications, the method is used to assess the genotypic correlation. In addition, the proposed method is extended to the optimal design for group sequential tests of the ICC derived from a two-way ANOVA model.

Interaction of epidemic and information spreading in adaptive networks

Presenter: Yunhan Long
Co-Author: Thilo Gross
Advisor: Leah Shaw
College of William & Mary,
Applied Science

Many real world networks are believed to change their structures adaptively in response to processes occurring on their nodes. For example, people may change their social connections to protect themselves from infectious disease. We model simultaneous spreading of an epidemic and information about the epidemic on an adaptive social network. We use a Susceptible-Infectious-Susceptible (SIS) model for the epidemic, and susceptible and infectious nodes are differentiated into informed and uninformed types. Information is interpreted as awareness of the need to practice disease avoidance behavior by rewiring one's network connections adaptively. The effects of adaptation, external information sources (e.g., media) and node-to-node communication on the dynamics of epidemic spreading, information spreading and the network structure are explored, and stochastic simulations are compared with a moment closure approximation. Depending on parameter values, network adaptation can generate steady state behavior or periodic oscillations, and the moment closure approximation predicts both types of dynamics. Our results indicate that information can play a significant role in minimizing disease spread.

Ultrasonic Flaw Detection and Classification for Structural Health Monitoring

Presenter: Corey Miller
Advisor: Mark Hinders
College of William & Mary,
Applied Science

We describe the use of pattern classification techniques to identify flaw severity using guided ultrasonic waves in aluminum plates for structural health monitoring. The raw ultrasonic data is transformed into two-dimensional tomographic reconstructions using a simultaneous iterative reconstruction technique (SIRT) in order to accurately locate and size the flaws. Waveforms are selected from these reconstructions to be fed through pattern classification routines to provide a measure of flaw severity. The Dynamic Wavelet Fingerprint (DWFP) technique is used to automate the interpretation of these complex multi-mode ultrasonic signals in the classification routines. The results show accurate classification of the ultrasonic data as the severity of the flaw was sequentially increased.

Development and Characterization of Thin Film SRF Surfaces for Accelerator Cavities

Presenter: William M. Roach
Co-Authors: D. Beringer, K. Yang, C. Clavero
Advisor: R. Ale Lukaszew
College of William & Mary, Applied Science

Bulk niobium is the material currently used for superconducting radio frequency (SRF) cavities in linear accelerators such as the one at Jefferson Lab in Newport News. However, these cavities are nearing their fundamental limits and there is a strong interest in the field to research thin film superconducting coatings as well as superconducting/ insulating/superconducting (SIS) multilayer structures. Thin film coatings and SIS structures may provide a route to increase the efficiency and decrease the size of particle accelerators. Before SIS structures can be successfully fabricated, a fundamental understanding of the superconducting material's growth and SRF performance must be obtained. Therefore, a study correlating the structure, morphology, and SRF properties of niobium grown on magnesium oxide is underway in preparation for future fabrication of SIS devices.

Enhanced Topography Characterization Method for Niobium Surfaces

Presenter: Chen Xu
Co-Authors: C. Reece, H. Tian
Advisor: Michael Kelley
College of William & Mary, Applied Science

Surface topography characterization is a continuing issue for the Superconducting Radio Frequency (SRF) accelerator community. Effects are underway to both to improve surface topography and its characterization and analysis using various techniques. In measurement of topography, Power Spectra Density (PSD) is a promising method to quantify local surface parameters and develop scale specific interpretations. PSD can also be used to indicate how chemical processes modify the roughness at different scales. However, generating a correct and meaningful topographic PSD of an SRF surface requires careful analysis and optimization. In this report, polycrystalline surfaces with different process histories are sampled with AFM and stylus/ WLI profilers and analyzed to indicate topography at different scales evolving during etching. Moreover, a PSD analysis protocol will be optimized to serve the SRF needs.

Enhancement of the magneto-optical activity via surface plasmon resonance on Au-Co nanocomposite thin films

Presenter: Kaida Yang
Co-Authors: C. Clavero, J. Skuza
Advisor: R. Ale Lukaszew
College of William & Mary,
Applied Science

Appropriately designed metallic and metallo-dielectric nanoparticle arrays and thin film structures are suitable platforms for sensing application based on their optical and magneto-optical properties. Most current biosensing schemes based on surface plasmon resonace are "passive", i.e., they are based on changes in the optical properties at the sensor surface -typically gold- when a biological specimen to be detected is bound to it and surface plasmon are excited. It is possible to enhance the sensitivity of thin film under suitable external magnetic field modulation in order to develop “active” plasmonic systems. In this research, the magneto-optical properties of Au-Co nanocomposite thin films have been investigated by modifying growth parameters such as growth temperature and relative Au:Co concentration. Theoretical models are also applied to simulate nanocluster-matrix aggregation. The correlation between the nanocomposite films’ microstructure, morphology, with their optical response and their magneto-optical enhancement is discussed.

Effect of Surface Flow on Topography in Niobium Electropolishing

Presenter: Liang Zhao
Advisor: Michael Kelley
College of William & Mary,
Applied Science

Electropolishing (EP) can produce surfaces with roughness less than 0.5 μm on macro scale and therefore is needed to provide a smooth surface for high field applications such as superconducting RF cavity. Flow is an important parameter affecting polishing rate and surface finishing during EP. Niobium samples are electropolished in a rotating electrode set-up at different rotating speeds from 2 to 10 rpm, seeking to duplicate surface flow rates during horizontal EP. Surface roughness of these samples is obtained at two scales with AFM and stylus profilometry. The topography of Nb samples before and after EP is obtained with the Hirox digital optical microscope. The influence of flow rate on fluoride ion mass transport is discussed and related to the EP current-time curve and Nb surface roughness. Comparing with static EP, rotating electrode EP reduces surface roughness slightly on small scale but has no significant influence on large scale. The effect of surface flow rate on the thickness of the near-surface stagnant layer (boundary layer) was assessed by a simple fluid mechanical model and compared to the previously reported thickness of the fluoride-depleted layer (mass transfer layer). The boundary layer thickness is comparable to, or greater than, the mass transfer layer. This suggests that the surface flow rate differences previously predicted by computational fluid dynamics modeling will not themselves lead to differences in surface topography.

Spatially and Temporally Homogenized Multipass Chirped Pulse Amplified Laser System

Presenter: Wei Zheng
Advisor: Gunter Lüpke
College of William & Mary,
Applied Science

In a multipass chirped pulse amplification (CPA) system, a pump beam with high fluence or energy density is always desired, because the pumping fluence is critical for the single-pass amplification rate. However, due to the Gaussian distribution of the beam profile, the fluence in the center part of the pump beam is much higher, which may lead to crystal damage, while the average fluence may not be high enough to guarantee sufficient gain. Furthermore, high-energy pump lasers unavoidably have hot spots in the central area of the laser beam and have a multi-mode output, which makes the situation worse. We designed a spatially and temporally homogenized pumping system for a 5-pass, 30-Hz, terra-watt CPA system. Spatially, the crystal is pumped from both sides so that the highest population inversion (gain) can be achieved along the light path. The gain is also homogenized along that direction, which is favorable for multipass amplification. In each direction, the pump beam is further split into two parts. They are arranged symmetrically in the transverse direction, which produces a uniform light fluence and decreases significantly the danger of crystal damage by the hot spots. Temporally, five and three-nanosecond delays are applied between the two pump beams in each direction. These time delays separate the peak intensities of the pump beams so that the instantaneous pumping fluence decreases while the population inversion (gain) persists. This design protects the Ti:Sapphire crystal and generates up to 130-mJ pulses with a total amplification rate of 300 and a conversion efficiency of 20%.
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Mercury's Effect on Spatial Memory in the Zebra Finch, *Taeniopygia guttata*

Presenter: Amanda M. Bessler
Advisor: Daniel Cristol
College of William & Mary,
Biology

Mercury is a global and persistent neurotoxin which occurs naturally but is also emitted by several anthropogenic industrial processes. Research on mercury contamination has focused largely on determining the extent of damage to organisms in mercury-contaminated food webs. Though studies have documented some effects on breeding behaviors and reproduction in birds, little attention has been paid to cognitive processes. Research that was performed on mammal cognition substantiated that mercury causes harm during development. We focus on the effect of mercury on spatial memory of a model songbird, the zebra finch. Spatial memory is important for locating nests, food, territory boundaries and potentially migration routes (in other species), and is thus important for survival and fitness. We compared the spatial memory of methylmercury -dosed zebra finches to control birds. The subjects' spatial memory was quantified as the number of mistakes made in relocating food and the acquisition time necessary to learn a spatial task. Using mercury doses equivalent to high levels found at contaminated sites (0.5 ppm and 1.0 ppm) this experiment helps us understand whether anthropogenic mercury has the potential to damage a necessary cognitive function in terrestrial songbirds. Our analysis contributes to the applied question of how much environmental mercury can be tolerated by birds, as well as the basic question of what specific effects this potent neurotoxin has on animal cognition.

Sublethal effects of mercury on avian flight: a captive dosing study on European Starlings

Presenter: Jenna R. Carlson
Advisor: John Swaddle
College of William & Mary,
Biology

My proposed study aims to test whether environmentally realistic mercury levels effect flight performance in passerine birds, a taxa that is understudied in relation to mercury despite its accumulation in terrestrial habitats. I plan to measure flight performance in two assays that test the following parameters of flight: 1. Take off angle and speed combined into a metric of energy gained during flight 2. Maneuverability. I will run these experiments multiple times over the next year in outdoor aviaries alongside a feather analysis to look at the effect of mercury over time on feather quality and flight. Two experimental groups dosed at 1.5ppm and 3.0ppm and a control group will be used in the study. Within individual changes and changes among treatment groups will be analyzed over time. I expect to see a change in flight performance at some level because there is extensive literature indicating that mercury disrupts several neurological, physiological, and behavioral mechanisms behind flight. If mercury is shown to negatively impact any of the flight parameters I am testing, my study will provide a basis for further research aimed at detecting possible mechanistic disruptions and their significance. Additionally, my study will provide information on variation of blood mercury levels, feather quality, and pectoralis muscle mass in birds exposed to different levels of dietary mercury. The overarching purpose of my proposed research is to contribute to the larger goal of determining how much mercury is too much for common and charismatic animals like songbirds.

Host Type Drives Genetic Variation in the Bovine and Piscine Pathogen *Streptococcus parauberis*

Presenter: Stephen D. Cole
Co-Authors: A. Haines, J. Quigley, M. Gillespie
Advisor: Mark Forsyth
College of William & Mary, Biology

Streptococcus parauberis is a gram-positive, food animal pathogen that causes mastitis in dairy cattle (*Bos taurus*) and streptococcosis in several species of aquacultured fish. Recently, a non-pathogenic infection has been identified in Striped Bass (*Morone saxatilis*) of the Chesapeake Bay. The project aimed to identify genetic differences in strains isolated from multiple host types, as well as differences between pathogenic and commensal strains. Three molecular typing schemes were designed: Multi-locus Sequence Typing (MLST), Randomly Amplified Polymorphic DNA PCR (RAPD) and Pulse-field Gel Electrophoresis (PFGE). These schemes were applied to a global collection of isolates from different host species. Results show that isolates are more closely related to those from the same host species than those from similar geographic regions. Further analysis has shown that only isolates from fish contain a plasmid. This research begins to elucidate the evolutionary history of this emerging pathogen and identify potential targets for vaccine design.

SUMO-binding is involved in targeting the SUMO protease Ulp1 to the bud neck of dividing yeast cells

Presenter: Zachary C. Elmore
Advisor: Oliver Kerscher
College of William & Mary, Biology

Eukaryotic cells utilize the dynamic addition and removal of SUMO, a small ubiquitin-like modifier to modulate protein function. SUMO modification and demodification is facilitated by SUMO ligases and SUMO proteases respectively. In the yeast *Saccharomyces cerevisiae*, the SUMO protease Ulp1 is responsible for removing SUMO from target proteins and for processing precursor SUMO into its conjugation competent form. Yeast cells lacking Ulp1 are not viable and arrest in the G2/M phase of the cell cycle (Li and Hochstrasser, 1999). Ulp1 is enriched at nuclear pores and also desumoylates bud neck localized septins. However, the localization of Ulp1 to the septins has never been shown conclusively. Using a structure function approach we set out to elucidate details about the dynamic localization of Ulp1 to NPCs and septins. We find that the cycling of Ulp1 between the NPC and septins depends on distinct and separate domains in Ulp1 and its ability to bind SUMO non-covalently. Our data provides novel insights into how the dynamic localization and SUMO-dependent targeting of Ulp1 may affect cell cycle progression in budding yeast.

The galactolipid sulfatide is a negative regulator of cell proliferation

Presenter: Sean A. Freeman
Co-Author: Anthony Pomicter
Advisor: Jeffrey Dupree
Virginia Commonwealth University,
Anatomy and Neurobiology

Myelin is an electrically insulating sheath that oligodendrocytes wrap around neurons, greatly increasing the speed and efficiency of electrical signaling between neurons. Unlike other membranes, myelin is lipid rich and composed of approximately 70% lipid. Myelin is also unique in that it contains an abundance of galactolipids. The two most prominent myelin galactolipids are galactocerebroside and its sulfated derivative sulfatide, made by the enzyme cerebroside sulfotransferase (CST). The sulfatide null mouse exhibits an increased population of oligodendrocytes due to enhanced proliferation and decreased cell death in the spinal cord, but the mechanism of these changes is not known. The goal of this project is to determine if the inhibition of sulfatide results in increased proliferation in Madin Darby canine kidney (MDCK) cells, a sulfatide expressing, immortal cell line. In separate experiments, we will utilize sodium chlorate to block sulfation and siRNA to block CST protein production. The sulfatide antibody O4 and bromodeoxyuridine will be used to examine the amounts of sulfatide and proliferation, respectively. We will use thin layer chromatography to examine whether there is less sulfatide following disruption of sulfation and following siRNA treatment. Western blot will be utilized to check the efficiency of CST knockdown after siRNA treatment. Preliminary results suggest that MDCK cells treated with sodium chlorate exhibit an elevated cell population via a mechanism favoring increased proliferation. Understanding the complex factors that regulate oligodendrocyte proliferation is critical for future production of therapeutics for multiple sclerosis patients.

Are Gizzard Shad Capable of Feeding Selectively Within the Oral Cavity?

Presenter: Matthew Heidman
Advisor: Laurie Sanderson
College of William & Mary,
Biology

Suspension-feeding detritivorous fish are an important link in the food chain because they consume particles of decaying matter that are suspended in the water. Previous studies have suggested that fish such as gizzard shad (*Dorosoma cepedianum,* Clupeidae) can selectively choose particles that are more nutrient-rich, but have not determined whether this selectivity is behavioral or morphological. Selectivity can be quantified by comparing the nutrient composition of the food in the environment vs. in the fish's foregut. Lammons (2009) reported that nutrient-rich mucus constituted 30% to 60% of gizzard shad foregut contents, which could explain the higher nutrients in the foregut. We tested Lammons' findings using a homogenized high-quality food added to experimental aquaria. Nutrient content of the gut nearly matched that of the aquarium water, demonstrating that mucus contributes very little to foregut content. We performed three experiments with varying levels of nutrient within aquaria: (1) sediment, a poor-quality food, (2) a 50/50 mixture of sediment and a high-quality food, and (3) a 25/75 mixture. A fourth experiment was performed using an unhomogenized 50/50 mixture, allowing particles to settle. When aquarium water was homogenized, foregut nutrient content was similar to water nutrient content, indicating that gizzard shad do not have a functional morphological mechanism for selection of high-quality particles. When particles were allowed to settle in the aquarium, gizzard shad foreguts had higher nutrient content than samples from the water and the bottom of the aquarium. Additional experiments are in progress to test for the cause of this selectivity.

The clustering of voltage-gated sodium channel 1.6 at the peripheral node of Ranvier is altered in the absence of sulfatide

Presenter: Eva L. Kwong
Co-Authors: A. Pomicter, H. Herman
Advisor: Jeffrey Dupree
Virginia Commonwealth University,
Anatomy and Neurobiology

Myelin is an essential component of the nervous system as it facilitates the timely, efficient conduction of action potentials along axons. Made by Schwann cells in the peripheral nervous system (PNS), myelin is unique in that it is composed of a high percentage of lipids, particularly galactolipids. Sulfatide, one such galactolipid, is made by cerebroside sulfotransferase (CST) and plays a role in the initial clustering and maintenance of distinct protein domains in myelinated axons. The node of Ranvier, and the Nav1.6 clusters therein, is a domain of particular interest as it is the point along a myelinated axon at which an action potential is propagated. Adjacent to the node of Ranvier is the paranode, the point of adhesion between the myelin and axon. A previous study involving CST knockout (CST KO) mice reported a normal number of Nav1.6 clusters in the CST KO PNS between 1-5 months of age, but clusters were consistently elongated reminiscent of immature nodal clusters. Thus, we hypothesized the Nav1.6 clusters in CST KO mice would be delayed in initial clustering and prone to breakdown with age. Using immunohistochemistry, we observed fewer paranodal protein clusters in the CST KO sciatic nerve at all ages investigated (4 and 15 days, 1 and 7 months), while disruption of the nodal proteins differed temporally depending on the cell of origin. These results support the existing hypothesis that there are two compensatory mechanisms responsible for the clustering of Nav1.6 clusters at the node of Ranvier. Additionally, we show that sulfatide in the Schwann cell is required for the proper establishment and maintenance of the nodal and paranodal protein domains.

A Captive Dosing Study on Zebra Finch to Determine the Effects of Mercury on Stress, Thyroid Function, and Reproduction

Presenter: Sarah R. Lemelin
Co-Authors: E. Bradley, C. Ramos, J. Swaddle
Advisor: Daniel Cristol
College of William & Mary,
Biology

Mercury is an ubiquitous environmental contaminant associated with a host of adverse effects in wild birds. Although passerines accumulate mercury at rates equivalent to well-studied species, the effects of mercury bioaccumulation in songbirds remain understudied. Songbirds are an important part of many ecosystems and a growing number of species are experiencing precipitous declines. Little is known about mercury's effect on endocrine physiology, yet mounting evidence indicates that mercury may disrupt the function of the Hypothalamic-Pituitary-Adrenal (HPA) and Hypothalamic-Pituitary-Thyroid (HPT) axes. The HPA and HPT axes play fundamental physiological roles in stress responses, metabolic activity, development, and reproduction. Hence, proper functioning of these endocrine systems is imperative in maximizing individual fitness. Field- based correlations suggest that mercury exposure may alter levels of the primary avian stress hormone, corticosterone, as well as thyroid hormones T3 and T4. Thus, mercury exposure may compromise fitness through deregulation of the HPA and/or HPT axes. Adult zebra finches, a model system songbird, dosed with 0, 0.5, and 1.0 ppm dietary methylmercury (environmentally relevant levels) were sampled for corticosterone three days after pairing at week 10 of treatment . Birds were resampled approximately 25 weeks later while caring for late-stage fledglings. Corticosterone was not statistically significantly affected by mercury exposure. We are currently investigating the effects of mercury on thyroid hormones T3 and T4 and relationships with reproductive output in exposed birds.

Sequence Analysis of a *Helicobacter pylori* Prophage Found Predominantly among cag PAI Negative Isolates

Presenter: Kevin Leslie
Advisor: Mark Forsyth
College of William & Mary,
Biology

Helicobacter pylori colonizes the human stomach and causes gastroduodenal complications ranging from ulcer disease to cancer. A major virulence determinant of this pathogen is the cag Pathogenicity Island (cag PAI) and isolates possessing this element are more frequently associated with severe disease outcomes. For bacteria in general, prophage are also frequently associated with bacterial virulence. Currently, none of the published *H. pylori* genome sequences possess recognized prophages. We have identified a putative prophage in an unsequenced, cag PAI (-) clinical isolate, J68. We sought to identify prophage sequences in a battery of clinical isolates and to determine if prophage-positive isolates could be induced. 53 clinical isolates (23 cag PAI -, 31 cag PAI +) were screened using PCR primers for four regions of the prophage sequence determined thus far in strain J68. In addition, viral induction was attempted using mitomycin on *H. pylori* strains J68 and J190. RT-PCR was then used to query the transcription of two prophage genes (integrase and orf6). Our results indicate that a prophage preferentially infects cag PAI – strains of *H. pylori*. Additionally, integration seems to occur at the same location in the majority of isolates (within the chromosomal HP453 gene). Lack of viral transcription indicated by RT-PCR may suggest viral induction uses an unusual mechanism or the genes targeted are not highly expressed during induction.

The sublethal effects of mercury on the songbird immune response: an experimental study

Presenter: Catherine Lewis
Advisor: Daniel Cristol
College of William & Mary,
Biology

Mercury is a global contaminant with effects that have been documented in many wildlife populations. Research has focused on fish, which is the main route of mercury for humans, and fish-eating predators such as waterbirds. However, recent studies have found comparable blood-mercury levels, as well as survival and reproductive effects in insectivorous, terrestrial songbirds. One fundamental endpoint that is still poorly understood is the effect of mercury on the songbird immune system, a vital component of survival. Suppressed immune function can lead to increased susceptibility to parasites and pathogens, which may be of particular importance as habitats are destroyed and populations of many species are crowded closer together. This research represents the first experimental study to investigate the effects of mercury on songbird immune response. A serious difficulty in assessing immunocompetence in songbirds is the absence of validated, reliable immune reagents. Thus, two new assays were developed to measure: 1) liver macrophage phagocytosis and 2) B cell proliferation. Each assay addresses a specific aspect of the immune system. Macrophage phagocytosis is an assay of the nonspecific, innate immune system, and the B cell proliferation assay is one test of the adaptive immune response. Results from these assays will allow researchers to provide government and private sector regulators with the essential information necessary to set guidelines for the clean-up of contaminated sites.

The Correlation between Calcium Activity and Neurotransmitter Phenotype in the Developing Retina of *Xenopus laevis*

Presenter: Elizabeth A. MacMurray
Advisor: Margaret Saha
College of William & Mary,
Biology

To establish proper visual functioning, neurons of the retina must communicate using the appropriate chemical messengers known as neurotransmitters. The mechanisms driving early retinal cells to acquire a particular neurotransmitter phenotype remain unclear. While the role of transcription factors in retinal cell specification has been well documented, few researchers have examined the role of early calcium activity. In this study, we use a *Xenopus laevis* model to elucidate the correlations between calcium activity, transcription factor expression, and neurotransmitter phenotype at the individual retinal cell level. Specifically, we hypothesize that early calcium activity will modulate transcription factors to induce a specific neurotransmitter phenotype. We predict that specific patterns of calcium activity will correlate with both neurotransmitter phenotype and transcription factor expression, as analyzed through mRNA expression. Using confocal microscopy, we are analyzing the calcium activity of individual retinal cells across four early developmental stages of *Xenopus* embryos. For each retinal cell, an in situ hybridization is performed using an mRNA probe for markers of two retinal neurotransmitters: GABA and Glutamate. Additionally, we are assessing calcium activity for cells expressing the GABA inducing transcription factor, Ptf1a. By comparing calcium activity across cells expressing these markers, we can establish if there is a role for calcium activity in neurotransmitter specification. Deciphering the mechanisms driving retinal cell specification has implications in both regenerative medicine and tissue repair, particularly for neurodegenerative diseases.

Characterization of Novel Protein SPE-7

Presenter: Kari L. Messina
Co-Author: Marc Pressler
Advisor: Diane Shakes
College of William & Mary,
Biology

Using the model organism *Caenorhabditis elegans*, a nematode worm, we can study the meiotic divisions of spermatogenesis that result in the formation of highly specialized, motile sperm. The process of spermatogenesis in *C. elegans* requires that two distinct cellular processes, meiotic division and cellular differentiation, work together to produce male gametes. However, spermatogenesis mutants can disrupt this crosstalk resulting in defective sperm. One such mutant, spe-7, exhibits both meiotic cell cycle defects and developmental defects ultimately causing the spermatocytes to arrest before spermatids are formed. Continued analysis of the SPE-7 mutant phenotype is required to fully understand the role of SPE-7 in the spermatogenesis pathway. Genetic and biochemical assays will be performed to further examine the dynamic localization patterns of SPE-7 and potential post-translational modifications that could explain its dynamic localization within the developing spermatocyte.

Understanding Post-fledging Survival and Dispersal along an Urban Gradient in the Coastal Plains of Virginia

Presenter: Morgan D. Niccoli
Advisor: Matthias Leu
College of William & Mary,
Biology

As the human population continues to grow, urban land cover will become the dominant land cover type world-wide. Urbanization of wild land (i.e. land cover types not overlapping with human development), has direct implications on avian fitness and population dynamics. However, most studies to date have focused on the effects of urbanization on events during the breeding season, but we do not know much about how urban areas affect the most vulnerable and population limiting life stage in a passerine bird: the post-fledgling period. In passerines, the post-fledging period begins when a nestling leaves the nest and terminates when an individual transitions from dependence of parental care to independence. Survival during this transition period has been shown to be quite low with the highest percentage of fledgling deaths occurring during the first week after nestlings leave the nest. The objectives of this study are to determine the effects of urbanization on fledgling survival and habitat use during the breeding and post-fledgling period. The Northern Cardinal (*Cardinalis cardinalis*) and Wood Thrush (*Hylocichla mustelina*) have been selected as the two study species because they differ in life history strategies (resident vs. migrant) and overlap with urban areas (high vs. low). I will determine fledgling survival along an urban gradient using radio-transmitters to track individuals until they either die or initiate migration. I will also compare habitat use within home ranges of adult males and fledglings to compare resources utilized by each.

Genetic Regulation of Acetone Metabolism in *Helicobacter pylori*

Presenter: Vanessa H. Quinlivan-Repasi
Advisor: Mark Forsyth
College of William & Mary,
Biology

The bacterial pathogen *Helicobacter pylori* exclusively colonizes the human gastric epithelium, causing chronic inflammation which leads to gastritis in most of those who are infected. The long-term presence of *H. pylori* also promotes the development of more severe conditions such as ulcers, and is a significant risk factor for gastric cancers such as adenocarcinoma. In addition to being an important human pathogen, *H. pylori* is also an ideal system for basic study of bacterial gene regulation. This species controls expression of a wide array of target genes in response to environmental signals using only three two-component signal transduction (TCST) systems. Evidence of co-regulation of some genes by more than one of these pathways suggests that *H. pylori* compensates for this apparent deficiency in regulatory ability through a complex network of cross-regulation interactions. The acetone carboxylase operon, acxABC, may be regulated by all three of these signal transduction pathways. This extensive regulation of acetone metabolism suggests that this capability is important for *H. pylori's* ability to infect and survive in the gastric mucosa, and may reveal promising targets for drug development. In order to identify and characterize the activity of transcription factors that regulate this operon, I have cloned, expressed, and purified the response regulator component of each of *H. pylori's* TCST systems for use in a mobility shift assay. I will also use qRT-PCR to establish how varying environmental concentrations of acetone and other potential TCST inducers affect acetone carboxylase expression.

The Response of Anuran Species Distributions to Anthropogenic Disturbance: Using Circuit Theoretic Analysis to Model Landscape Connectivity

Presenter: Daniel Ramos
Advisor: Matthias Leu
College of William & Mary,
Biology

Species conservation strategies emphasize preserving fragmented habitat patches as reserve networks embedded in a landscape matrix of anthropogenic land use. Landscape connectivity is critical to maintaining viable populations within reserve networks and is a function of the matrix's resistance to an organism's movement. As land use within the matrix varies it can be expected that landscape connectivity will vary as well. Our study proposes to model Anuran, frog and toad, species distributions in relation to anthropogenic variation in landscape matrix connectivity. We will use calling survey data of breeding Anurans to model occupancy probabilities in potential breeding ponds in eastern Virginia. In a Geographic Information System environment, we will conduct a circuit theoretic analysis of landscape connectivity using Anuran occupancy data and spatial datasets of landscape and anthropogenic features known to influence matrix permeability. Circuit theoretic analysis is a novel approach to modeling landscape connectivity as it applies the principles of resistance and current to a continuous landscape surface. The output of this analysis will be used to predict the distribution of Anuran species at unsurveyed sites throughout our study area. We intend to validate our model predictions with further calling surveys and subsequently re-parameterize the model with our findings. Our connectivity model will enable land managers to evaluate the impacts of proposed land uses on landscape connectivity and Anuran population viability.

Nuclear Export of Thyroid Hormone Receptor β

Presenter: Kelly S. Subramanian
Advisor: Lizabeth Allison
College of William & Mary,
Biology

Thyroid hormone receptors (TRs) bind to DNA to control gene transcription involved with metabolism, growth, and development. These nuclear receptors shuttle between the nucleus and cytoplasm but are primarily found in the nucleus. Although TRs have been shown to be able to use a CRM1-dependent pathway, TRs also utilize CRM1-independent nuclear export pathways. Both CRM1-independent and dependent NESs are present in TR. In vivo approaches with HeLa cells transfected with GFP-TRβ were used to investigate TRβ nuclear export. RNA interference from shRNA was used to knock-down transportin 1, transportin 2, exportin 5, and exportin 6 gene expression. Treatment with leptomycin B, a specific inhibitor of CRM1, was used to block CRM1-dependent pathways. Visualization of HeLa cells showed changes in the compartmentalization of TRβ with addition of leptomycin B. When CRM1 export pathway was blocked, TRβ shifted towards a more nuclear distribution. Inhibiting CRM1 and knocking-down transportin 1, transportin 2, exportin 5, and exportin 6 expression showed no additional change in TRβ distribution. To date, exportins 4 and 7 remain to be tested. Since TRs can use CRM1-independent pathways, there must be other exportin (s) TRs can use in their nuclear export; however, additional approaches to study rapid nuclear export in real-time are needed to further characterize the exact mechanism.

A Role for the Nuclear STUbL Subunit Slx5 in Cytosolic Protein Sumoylation

Presenter: Jason W. Westerbeck
Advisor: Oliver Kerscher
College of William & Mary,
Biology

The budding yeast proteins Slx5 and Slx8 constitute the two subunits of a SUMO-targeted Ubiquitin Ligase (STUbL). In vitro the Slx5/Slx8 STUbL complex has been shown to target specific proteins for ubiquitylation in SUMO-dependent and SUMO-independent manners (Xie *et al*., 2007, Wang and Prelich, 2009, Xie *et al*., 2010). Slx5 is the targeting subunit of the Slx5/Slx8 complex and both subunits are required for the ubiquitin ligase function. Slx5 is a nuclear protein that forms distinct foci and interacts with double stranded DNA breaks (Cook *et al*., 2009). However, little is known about the precise functional interactions of Slx5 in the nuclei of living cells. The goal of this research is to better characterize STUbL activity through structure function assays of individual Slx5 domains. Here we present our analysis of I) the domains involved in the subnuclear localization of Slx5, II) the domains within Slx5 required for interaction with its known binding partners, and III) a potential role for the Slx5/Slx8 STUbL in the regulation of cytosolic protein sumoylation through the interaction with and putative regulation of the SUMO E3 ligase Siz1. Our research has the potential to further our understanding of the human STUbL RNF4 which has been implicated in the SUMO dependent turn-over of the oncogenic fusion protein PML-RAR (Lalemand- Breitenbach *et al*., 2008).

Ontogeny of limb growth and locomotor behavior in *Lemur catta* and *Propithecus verreauxi*

Presenter: Stephanie A. Wolf
Co-Author: Richard Lawler
Advisor: Roshna Wunderlich
James Madison University,
Biology

Propithecus verreauxi and *Lemur catta* differ in adult locomotor behavior and morphology, especially in terms of specializations for hindlimb-dominant locomotion. Little is known of the ontogenetic trajectories by which these adult forms are acquired. We examined changes in locomotor behavior and limb morphology from 0-2 years in *L. catta* and *P. verreauxi*. Limb segment lengths and body mass were recorded every 2 weeks (infants) or 4 weeks (yearlings) at the Duke Lemur Center (DLC). Locomotor data were collected on infants and yearlings of each species in free-ranging enclosures at the DLC using locomotor bout sampling. Bouts were classified as hindlimb, forelimb, or "all-limb" dominant locomotion. Positive allometric growth was observed in all limb segments (except *L. catta* radius) and was highest in femur length from 0-6 months in both species. No significant differences in allometric growth were found between species or age classes. Propithecus have significantly longer limb segment lengths than *L. catta* during infancy, and both species have relatively higher intermembral indices during 0-6 month versus 6-12 months of age. More hindlimb dominant locomotion was observed in *L. catta* infants than yearlings. No differences were observed in locomotor behaviors between *P. verreauxi* infants and yearlings. *L. catta* displayed higher frequencies of all-limb locomotion than *P. verreauxi* in all age classes. Growth trajectories were similar between species, yet initial limb segment lengths and locomotor behaviors differed between species across age classes. These data suggest that differences between species in adult body proportions may be established early in neonatal life.

Computational investigation of the reactions of ebselen

Presenter: Sonia Antony
Advisor: Craig Bayse
Old Dominion University,
Chemistry and Biochemistry

Selenium is an essential trace element which is incorporated in the active site of several enzymes including glutathione peroxidase (GPx) which scavenges reactive oxygen species. There are several organoselenium compounds that are GPx mimics and one such compound is ebselen. The experimental mechanistic study of the reactions of this compound is difficult due to the different pathways it can undergo simultaneously resulting in multiequilibria systems between the intermediates. Different mechanisms have been proposed for the GPx-like activity of ebselen based on the intermediates detected or isolated under different reaction conditions. Computational modeling of the reactivity of these species can give us an insight into the mechanisms, but the process is complicated by proton exchanges associated with the mechanistic steps. In gas phase modeling, this may be corrected to a certain level using the solvent assisted proton exchange (SAPE) method. SAPE is a modeling technique that mimics solvent participation in proton transfer associated with chemical reactions. Within this microsolvation method, explicit water molecules allow relay of a proton between the protonation and deprotonation sites of the reactants and the products. Our aim is to propose mechanisms under normal cellular conditions and oxidative stress, using the energies obtained by DFT and SAPE methods. The activation barriers obtained by SAPE for the these mechanisms fall within the limits expected for a catalytic system at physiological temperatures, and are significantly lower than studies which force direct proton transfer.

Gas-Phase H/D Exchange of Non-protein Amino Acids

Presenter: Justine Arrington
Co-Authors: E. Marzluff, R. Straus
Advisor: John Poutsma
College of William & Mary,
Chemistry

Gas phase H/D exchange is a powerful technique that can be used to assess ion structure. Despite its widespread use in biomolecule structure determinations, the actual exchange mechanism is not completely understood. We have determined the H/D exchange behavior of three lysine homologs and an oxyanalog of arginine to further our understanding of the energetic and entropic contributions to the exchange process. All experiments were performed on a modified LCQ-DECA ion trap mass spectrometer. D_2O gas was leaked into the trap and allowed to react with the ion of interest for up to 10 s. Relative rate coefficients for the exchanging sites were obtained using the Kinfit routine of Dearden and coworkers. When possible, absolute rate coefficients were obtained by measuring the H/D exchange of betaine under identical conditions. We have obtained H/D exchange data for protonated lysine and its three shorter homologs ornithine (Orn), 1,4-diaminobutanoic acid (DABA), and 1,3-diaminopropanoic acid (DAPA). Preliminary results for protonated lysine agree with previous studies in that all six labile hydrogens exchange. In addition, we find that protonated ornithine exchanges all six hydrogens but at substantially slower rates. In contrast, the shorter protonated homologs (DABA and DAPA) exchange faster than lysine. These results indicate that side chain length has an important role in the H/D exchange process. We also have preliminary data for the H/D exchange of protonated arginine and its oxyanalog canavanine. Protonated arginine does not exchange under our experimental conditions whereas protonated canavanine exchanges up to eight hydrogen atoms; reasons for this will be presented.

Charge Transport Studies of End Functionalized Polymers Self-Assembled on Conducting Surfaces

Presenter: Tanya David
Co-Author: Cheng Zhang
Advisor: Sam Sun
Norfolk State University,
Center for Materials Research

Charge mobility along the main-chain is believed to produce the best charge mobility in conjugated polymeric materials in the solid state. It has been well known that interactive (docking) functional groups such as RNH2, -RSH, and -RCN have been used in self assembly of monolayers (SAMs) on gold and silver metal substrates. These functional groups have been attached to non-conjugated alkyl chains as well as conjugated molecules and polymers (i.e., phenyl, oligo-thienylvinylene, poly(para-phenyleneethynylene)) to modify the effective work functions of the metal electrodes. Research is still ongoing to study the interaction of these and other docking groups with metal substrates such as Au and Ag as well as conducting Indium-Tin oxide substrates (ITO). This research focused on the synthesis of end-functionalized conjugated polymers for self-assembly on conducting surfaces, for charge mobility and conductivity studies along the main-chain. Synthesis of the end functionalized polymer as well as characterization using various methods such as NMR, UV-Vis, MALDI-TOF, etc will be presented.

Interactions Between Glyceraldehyde-3-Phosphate Dehydrogenase and Microtubules

Presenter: Tara Hagedorn
Advisor: Lisa Landino
College of William & Mary,
Chemistry

Microtubule-associated proteins (MAPs) are defined on the basis of their binding interactions with microtubules, composed of the cytoskeleton protein tubulin. Our lab is currently studying glyceraldehyde-3-phosphate dehydrogenase (GAPDH) as a potential MAP. While GAPDH is an essential enzyme in the glycolytic pathway, it has recently become of interest to neurodegenerative disease research as more studies reveal that it is a multifunctional protein whose non-glycolytic functions are regulated by reactive oxygen species. This is important because oxidative damage to proteins is a major characteristic of Alzheimer disease pathology. There has also been evidence that GAPDH is able to enhance microtubule polymerization by binding tubulin. The exact nature of the interactions between tubulin and GAPDH is being explored. We hypothesize that the interaction may be a result of inter- and/or intramolecular disulfide bond formation between GAPDH and tubulin. Studies from our lab confirm the presence of GAPDH in MAPs isolated from bovine and porcine brains using SDS-polyacrylamide gel electrophoresis and immunoblotting techniques. GAPDH enzymatic activity has been observed in these isolates and suggests that GAPDH is stable even after exposure to the elevated temperatures used in the purification process. Additionally, a redox interaction between tubulin and GAPDH has been observed. This suggests a novel interaction between microtubules and binding proteins and is presently undergoing further investigation.

SAPE modeling on biological reactions of sulfur and arsenic

Presenter: Lenora K. Harper
Advisor: Craig Bayse
Old Dominion University,
Chemistry and Biology

Nucleophilic (SN2-type) attacks are common reactions in aqueous solution and biological systems. In the present study, two examples of this type of reaction, the disulfide bond formation and the reduction of arsenous acid by methyl thiol, are modeled in gas phase using density functional theory (DFT) and solvent-assisted proton exchange (SAPE). SAPE is a type of microsolvation method which facilitates the transfer of a proton from the deprotonation to protonation site through a minimal number of water molecules in the solvent network. SAPE mimics solvent participation in proton exchange processes and avoids the strained transition states and high activation barriers obtained by purely gas phase models. Disulfide bond formation was modeled using four-, nine- and ten-water clusters to examine the dependence of the activation barrier to the size of the SAPE network. Modeled barriers of the thiol reduction of arsenous acid is consistent with the high toxicity of arsenic.

The role of orbital interaction in the geometric dependence of π-π stacking

Presenter: Patricia B. Lutz
Advisor: Craig Bayse
Old Dominion University,
Chemistry and Biology

Attractive forces between pi systems help stabilize protein and DNA structure. They influence molecular recognition and are involved in the intercalation of drugs between the bases in DNA. Although it is widely accepted that the major contributor to pi-pi interactions is dispersion, the nature of the observed stacking geometries is not well understood. One of the mysteries of π-π interactions is that the completely overlapped structure is not the most stable conformer as would be predicted by maximum dispersion. The pi-pi interactions in the parallel-displaced benzene dimer were studied using density functional theory and energy decomposition analysis to explore the possibility that orbital overlap determines the preference for a parallel-displaced stack over the sandwich stack. Walsh diagrams and Lowdin bond population analysis suggests that the interstack interaction is maximized at the calculated minimum energy structure. The pi-pi interactions of the guanine dimer, cytosine dimer, and cytosine-uracil stacks are also studied.

Structural Characterization of HIV-1 Gag Membrane Targeting

Presenter: Peter Y. Mercredi
Co-Author: Justin Dolan
Advisor: Michael Summers
University of Maryland, Baltimore County, Biochemistry

The HIV-1 Gag polyprotein is essential for mediating viral assembly, and recently has been implicated as a potential drug target for inhibiting viral replication. Gag contains an N-terminal matrix (MA) domain that functions in plasma membrane (PM) targeting. Targeting is mediated by phosphatidylinositol 4,5-bisphosphate [PI(4,5)P2], which interacts directly with MA and induces a conformational change that exposes a sequestered myristate group. Although viral assembly occurs predominately at punctate sites within the PM in many cell types, in macrophages, evidence has been presented that assembly may also occur at PM invaginations that can retain large reservoirs of viral particles. Furthermore, identification of these invaginations supports the idea that native HIV-1 assembly does not occur at late endosomes/multivesicular bodies (MVBs) for productive viral release. Interestingly, recent in vivo work has shown that modest mutations within MA of Gag can lead to actual retargeting of Gag to true MVBs for efficient intracellular assembly and particle production. To further characterize the mechanism of membrane targeting, we synthesized two recombinant MA mutants (K29E/K31E, E16K/K29E/K31E) that were observed to retarget Gag to MVBs. Using NMR we will gain structural insight if atypical membrane binding is due to alterations in MA-MA or MA-PI(4,5)P2 interactions. This information will improve our understanding of the viral assembly step and provide new information for the design of novel anti-assembly therapeutics. This work is funded by NIH-5R37AI30917.

ESI-MS study of ligand exchange between Zn(II) and Hg(II)

Presenter: Madeline R. Nestor
Co-Authors: P. Wang, J. Viehweg, R. Pike
Advisor: Deborah Bebout
College of William & Mary, Chemistry

The mechanisms for cellular uptake, transport, accumulation, and excretion of Hg(II) remain poorly understood. To model the metal-ligand exchange processes that are likely involved, soft electrospray ionization mass spectrometry (ESI-MS) coupled with low-energy collision-induced dissociation (CID) was used to explore the preferred metal:ligand stoichiometries of solutions containing varying mole ratios of Hg(II) and Zn(II). Two tridentate NN'S ligands, N-(2-pyridylmethyl)-N-(2-(ethylthiolato)amine (MEPAH) and N-[2-(6-methylpyridyl)methyl]-N-(2-(ethylthiolato)-amine (MeMEPA), were compared. Metal complexes of MEPA and MeMEPA were further characterized by complementary X-ray crystallography and solution 1H NMR studies.

A Synthetic Route for Spirooxazine Functionalized Poly (phenylene vinylene)

Presenter: Kathryn A. Peth
Advisor: Elizabeth Harbron
College of William & Mary,
Chemistry

Conjugated polymers are highly fluorescent molecules that have many practical applications in organic LEDs, photovoltaic cells, molecular electronic devices, and biomedical imaging. Adding substituents onto the backbone of a conjugated polymer can affect many of its physical and electrical properties, such as its solubility in organic solvents or its fluorescence. This work proposes a synthetic route for creating spirooxazine functionalized poly (phenylene vinylene) (SO-PPV). Attempts made to synthesize the poly (phenylene vinylene) involve usage of the Heck and the Gilch polymerization techniques, where the Gilch polymerization technique proved to be more successful in obtaining the desired polymer. After successful polymerization, the spirooxazine functional group is added to the polymer chain via an SN2 reaction. Adding a spirooxazine group to the backbone of a conjugated polymer like poly (phenylene vinylene) would present a chance to control the fluorescence of the polymer via a process called fluorescence resonance energy transfer (FRET). If FRET takes place within a molecule, photomodulation will occur during fluorescence studies; the fluorescence of the molecule will decrease upon irradiation with UV/VIS light, and then be restored once that irradiation is stopped. Several different fluorescence and absorbance studies of a 100% and 25% functionalized SO-PPV molecule will be presented, where one particular study shows small but definite photomodulation. This photomodulation suggests a successful binding of the spirooxazine group, thus obtaining the ability to selectively quench the fluorescence of the conjugated polymer.

On the time-dependent probabilities of a stochastic variable-virulence SI epidemic system

Presenter: Samiur R. Arif
Advisor: Stephan Olariu
Old Dominion University,
Computer Science

One of the side-effects of the climate changes that are upon us is that infectious diseases are adapting, evolving and spreading to new geographic regions. It is, therefore, imperious to develop epidemic models that shed light on the interplay between the dynamics of the spread of infectious diseases and the combined effects of various vaccination and prevention regimens.With this in mind, in this work we propose a variable-virulence epidemic model operating on a large population; we restrict our attention to strains of infectious diseases that resist treatment. The time-dependent variable virulence of the epidemic accounts, among others, for the effects of improved sanitation, education and vaccination. Our first main contribution is to derive the time-dependent probability mass function of the number of infected individuals in such a system. Our derivation does not use probability generating functions and partial differential equations. Instead, we develop an iterative solution that is conceptually simple and easy to implement. Somewhat surprisingly, the variable-virulence epidemic model also provides insight into various growth phenomena noticed in sociology, macroeconomics, marketing, transportation and computer science. Our second main contribution is to show, by extensive simulations, that suitably instantiated, our variable-virulence epidemic model be used to model growth phenomena describing the adoption of durable consumer goods, the spread of AIDS and the dissemination of traffic-related advisories.

Detection of Rip Currents with Wireless Sensors

Presenter: Nancy Carter
Advisor: Gang Zhou
College of William & Mary,
Computer Science

Rip currents are natural phenomena along sandy beaches which claim the lives of many unwary swimmers each year. Rip currents arise when changing ocean bottom conditions focus the returning water from breaking waves into a narrow region or channel. The concentration of seaward returning water flow forms a powerful stream tiring out swimmers fighting against the current. At the present time, the watchful eyes of lifeguards are the only effective means of detecting rip currents and warning swimmers. This research employs the use of floating wireless sensor nodes to detect the outward flowing rip current amidst an environment of shoreward moving waves. The Rip Current Detection Network utilizes an array of moored sensors deployed in a linear configuration parallel to beaches subject to rip current formation. Each sensor carries an accelerometer which samples the forces impacting the sensor by passing waves. The maximum magnitude of forces experienced by each sensor during a sample time window is recorded and exchanged with neighboring sensors. Sensors physically residing within the boundaries of existing rip currents will experience markedly smaller impact forces. Sensors recognizing the existence of a rip current then transmit a warning message to a Base Station located on shore. Wireless communications between sensors and with the shore is complicated by periodic path obstruction due to moving waves of water. The hardware design is established and research will refine the timing parameters for optimal data sampling, data exchange and communications success.

Who is Tweeting on Twitter®: Human, Bot, or Cyborg?

Presenter: Zi Chu
Co-Authors: S. Gianvecchio, S. Jajodia
Advisor: Haining Wang
College of William & Mary,
Computer Science

Twitter® is a new web application playing dual roles of online social networking and micro-blogging. Its popularity and open structure have attracted a large number of automated programs, known as bots, which appear to be a double-edged sword to Twitter®. Legitimate bots generate a large amount of benign tweets delivering news and updating feeds, while malicious bots spread spam or malicious contents. More interestingly, in the middle between human and bot, there has emerged cyborg (either bot-assisted human or human-assisted bot). To assist human users in identifying who they are interacting with, the project focuses on the classification of human, bot and cyborg accounts on Twitter®. The project conducts a set of large-scale measurements on Twitter® accounts, and observes the difference among human, bot and cyborg in terms of tweeting behavior, tweet content, and account properties. The proposed classification system uses the combination of features extracted from an unknown user to determine the likelihood of being a human, bot or cyborg.

A Set-Theortic Model for Dynamic Firewall Analysis

Presenter: James Deverick
Advisor: Phil Kearns
College of William & Mary,
Computer Science

A firewall is a commonly deployed security mechanism designed to filter network traffic traveling to or from a computer or set of computers. Usually, IT departments or end users define a static security policy using individual rules that the firewall enforces. An active area of research has been formal modeling and analysis of firewalls to detect anomalies in rulesets that lead to security vulnerabilities. Previously, we presented a method whereby firewalls could observe network traffic related to specific applications and adapt in real-time to changing conditions on various connections. This allowed us to enhance security of legacy applications by observing their traffic and injecting authentication controls. By dynamically injecting rules into the firewall policy to intercept and delay certain traffic until authentication could be determined, a previously insecure application could be modified out-of-band to achieve secure connectivity. The problem with this approach is that existing policy analysis tools assume a static firewall policy. Because our firewall extensions result in a dynamic set of rules over the lifetime of the firewall, existing tools cannot be used to analyze the policy or prove its correctness. We propose a new set-based model that is able to capture the state of the firewall over time, without depending on static policies. By allowing the model to change as events at the firewall occur, we can formally analyze firewalls that employ dynamic rules, and prove that runtime changes to the firewall enforce the desired transient behavior without violating the overall security policy.

Using RFID for the Vehicular communications in NOTICE Systems

Presenter: Samy El-Tawab
Advisor: Stephan Olariu
Old Dominion University,
Computer Science

We introduce the use of Radio Frequency Identification (RFID) as a communication device for the NOTICE system proposed for notification of traffic incidents. NOTICE system uses short-range wireless communication between vehicles and sensor belts embedded in the highway which impose constraints on time available for connection and data exchange, and we study the possibility of using a RFID technology for communication. The incident detection time, which is the time needed by a sensor belt to determine that a traffic incident has occurred, is influenced by various parameters such as the spatial density of the vehicles in traffic, the spacing of the sensor belts, how conservative the belt inference mechanism is, and the number of vehicles that are able to exchange information with the sensor belts. We present more information about RFID implementation and then analysis of the requirements associated with the actual communication between a passing vehicle and a RFID tag, and we derive an expression for the probability of successful information exchange between vehicles and sensor belts. We extend our analysis by analytical expressions that calculate the probabilities as functions of time for handshaking, average vehicle speed, data rate and amount of information exchanged between the RFID and the RF tags. Our numerical results showed that the use of RFIDs is a possible solution. The main advantages of using RFIDs are its low cost, easy to deploy and maintain.

Exploiting Sensing Diversity for Confident Sensing in Wireless Sensor Networks

Presenter: Matthew A. Keally
Co-Authors: G. Xing, J. Wu
Advisor: Gang Zhou
College of William & Mary,
Computer Science

Wireless sensor networks for human health monitoring, military surveillance, and disaster warning all have stringent accuracy requirements for detecting or classifying events while maximizing system lifetime. We define meeting such user accuracy requirements as confident sensing. To perform confident sensing and reduce energy, we must address sensing diversity: sensing capability differences among heterogeneous and homogeneous sensors in a specific deployment. We are among the first to explore the impact of sensing diversity on sensor collaboration, exploit diversity for sensing confidence, and apply diversity exploitation for confident sensing coverage. We show that our diversity-exploiting confident coverage problem is NP-hard for any specific deployment and present a practical solution, Wolfpack. Through a distributed and iterative sensor collaboration approach, Wolfpack maximizes a specific deployment's capability to meet user detection requirements and save energy by powering off unneeded nodes. Using real vehicle detection trace data, we demonstrate that Wolfpack provides confident event detection coverage for 30% more detection locations, using 20% less energy than a state of the art approach.

VM Resource Utilization Information Calibration - A Signal Processing Approach

Presenter: Lei Lu
Co-Author: Hui Zhang
Advisor: Evgenia Smirni
College of William & Mary,
Computer Science

Server consolidation brings benefits to IT management, and also leads to new challenges. The challenge this paper addresses is on profiling physical resource demand of individual Virtual Machines (VMs) when they are consolidated in a single server. The profiling problem is difficult due to dynamic mapping relationships of the resource activities between the virtual layer and the physical layer. The problem is further complicated by utilization convolution among different resources due to virtualization, and utilization multiplexing among different VMs due to consolidation. We formulate the profiling as a source separation problem originally studied in digital signal processing, and design an extended factor graph to model the multivariate dependence relationships among different resources (CPU, memory, disk, network) between the virtual and physical layers. A run-time calibration methodology is proposed to materialize the parameters in the graph model, and output physical resource demand estimation on individual VMs based on both VM virtual resource activities and physical server aggregate resource activities. In the case study of a Xen-virtualization test-bed, we run a set of micro-benchmark and benchmark applications to build the factor graph, and apply the calibration methodology to profile the VM resource utilization. The evaluation is done through different consolidation decisions on a set of VMs running benchmark applications and 3-tier web service applications. The results show that the profiling errors can be confined in small percentage.

Relational Database with Fuzzy Domains

Presenter: Bob Morrissett
Advisor: Lorraine Parker
Virginia Commonwealth University,
Computer Science

This presentation gives a context in which the relational database model is extended using fuzzy sets. The goal is to support imprecise data, ambiguous data classification, and vague database query for applications that may benefit from fuzzy logic. An underlying assumption of the relational model is data representation based on classical two-valued logic and set theory, but real-world objects often do not fit a crisp category. If the notion of classification is ambiguous, people approximate using intuition. Numbers are approximated using a possible value within a range. Fuzzy sets formalize a representation that models this process. The relational model, based on first-order predicate logic, presents a collection of predicates over a set of domains. Data is represented by relations created from attributes defined over these domains. This mathematical model of data may be manipulated by relational operators. The addition of fuzzy attributes to the relational model adds fuzzy logic. This talk will discuss how this can be done. Fuzzy domains are data types composed from precise domains and one or more associated fuzzy weights indicating a degree of membership in a fuzzy category. A crisp attribute value present in a relation is true while a missing value is false. Fuzzy attribute values are true with a membership weight from the interval (0,1] and values not present are false. Each row of a query result on fuzzy data is true to the extent of the weights of its attributes. Extending the relational model to include attribute types derived from fuzzy set theory adds support for more intuitive applications while retaining a foundation of logic and mathematics.

A Prototype System for Cardiac Telemetry

Presenter: Zhengrui Qin
Co-Authors: H. Han, F. Xu, B. Wang
Advisor: Qun Li
College of William & Mary,
Computer Science

We present a cardiac telemetry system that includes ECG (electrocardiography) sensor, cell phone, and remote servers. ECG sensor collects ECG signals and performs automatic delineation, which is usually used by doctors for heart disease diagnosis. The delineation results will be sent to the cell phone through short range communication. Then the cell phone transmits the results to remote servers so that medical practitioners may monitor the patient's heart physiology. When the ECG delineation indicates that the signals are abnormal, the raw ECG signal data can be transmitted to the remote servers to provide doctors more information. This design enables dramatic reduction in information transmission on the sensor side and thus can save a large amount of battery power. We implemented a prototype system that is composed of a wavelet transform based ECG delineation module on Mote sensors, a compression module based on delineation results, and a transmission module for communication between sensor and cell phone.

SybilDefender: A Sybil Defense Mechanism via Large Social Networks

Presenter: Wei Wei
Co-Authors: F. Xu, C. Tan,
Advisor: Qun Li
College of William & Mary,
Computer Science

Distributed systems without trusted identities are particularly vulnerable to sybil attacks, where an adversary creates multiple bogus identities to compromise the running of the systems. This paper presents SybilDefender, a sybil defense mechanism that leverages the topology of social networks to defend against sybil attacks. Based on performing random walks within social graphs, SybilDefender is scalable to large social networks. Our experiments on two 3,000,000 nodes real-world social topologies show that SybilDefender can effectively identify sybil nodes and detect the sybil community around a sybil node, even when the number of sybil nodes introduced by each attack edge is close to the theoretical lower bound. Besides, SybilDefender proposes two approaches to limiting the number of attack edges in real-world social networks.

Considering a Database Application Using the Principles of Fuzzy Set Theory

Presenter: Larry R. Williams, Jr.
Advisor: Lorraine Parker
Virginia Commonwealth University, Engineering

The purpose of this presentation is to analyze a real world database application and how fuzzy set theory both contrasts with and lends significant new capabilities to traditionally crisp database applications. In a fuzzy database system, users will have the ability to see data that is shared among any number of result sets given their weighted level of membership within the set. Crisp set theory adheres to a number of consistent, well defined and mathematically provable laws of thought. Any practical application of fuzzy set theory within a database system must consider these laws while logically expanding them to enhance the application's capability. For example, the logic associated with crisp set theory states that an object can exist only within that set for which its defining predicate is said to be true. Fuzzy set theory, however, provides for the ability of an object to possess membership in more than one set, a 'foot in both worlds' given varying degrees of 'truth'. In this way, a database designed around the tenets of fuzzy set theory can take advantage of a data element's ability to exist and, at the same time, not exist to a measurable and meaningful degree of membership within the result set of the application. This presentation will provide an abstraction of an application which both contrasts and compares crisp set theory with the enhanced capability of fuzzy set principles within a real world database.

NetDEO: Automating Network Design, Evolution, and Optimization

Presenter: Zhenyu Wu
Co-Authors: Y. Zhang, G. Jiang
Advisor: Haining Wang
College of William & Mary, Computer Science

Challenged by the increased quantity and variety of application deployment, today's data centers try to meet the growing demand by adding low-cost commodity servers. However, the underlying network of data center suffers from several issues that severely limit its scalability, such as internal fragmentation, low bisection bandwidth, etc. We propose a topology independent placement optimization approach that improves the scalability of the data center network by relocating virtual machines (VMs), matching resource demand and availability. Our approach emphasizes the real-world applicability. Unlike previous approaches, we recognize the placement optimization in a data center as a continuous, incremental task, with the goal of balanced performance and cost. We facilitate a swam intelligence optimization model and design a simulated annealing based metaheuristic optimization algorithm. Our algorithm can continuously optimize existing VM placement in a data center, and derive optimal deployment plan for newly added VMs. Moreover, it is also capable of providing incremental hardware upgrade suggestions, allowing the data center to evolve as the workload increases. For evaluation, we apply our algorithm using production server traces on simulated large data center networks with various typologies. We show that our approach not only can achieve high optimization-per-migration, but it can also provide a wide selection of alternative optimization solutions, each having its unique performance-cost characteristics, enabling the data center operators to easily customize optimization plans according to their budget.

IMDGuard: Securing Implantable Medical Devices with the External Wearable Guardian

Presenter: Fengyuan Xu
Co-Authors: Z. Qin, C. Tan
Advisor: Qun Li
College of William & Mary,
Computer Science

Recent studies have revealed security vulnerabilities in implantable medical devices (IMDs). Security design for IMDs is complicated by the requirement that IMDs remain operable in an emergency when appropriate security credentials may be unavailable. In this paper, we proposed IMDGuard, a secure scheme for heart-related IMDs to fulfill this requirement. IMDGuard incorporates two novel techniques to provide appropriate protection for IMDs. One is an ECG based secure key establishment without prior shared secrets, and the other is an access control mechanism resilient to adversary spoofing attacks.

Optimization Models for Runway Configuration Management

Presenter: Rui Zhang
Co-Authors: M. Haines, J. Thorne
Advisor: Rex Kincaid
College of William & Mary,
Computational Operations Research

The Runway Configuration Management problem governs what combinations of airport runways are in use at a given time for an airport or a collection of airports, metroplex. Runway configurations (groupings of runways), operate under Runway Configuration Capacity Envelopes (RCCEs) which limit arrival and departure capacities. The RCCE identifies unique capacity constraints based on which tarmacs are used for arrivals, departures, and their direction of travel. When switching between RCCEs, due to a change in weather conditions or a change in the demand pattern, some decrement in arrival and departure capacities is incurred during the transition. We report computational experience with three distinct model approaches---robust optimization, deterministic mixed integer linear program, and a ranking selection scheme. Strengths and weaknesses of each approach are discussed. Test case scenarios are based on data from the John F. Kennedy International airport in New York.

ETCH: EfficienT Channel Hopping for Communication Rendezvous in Dynamic Spectrum Access Networks

Presenter: Yifan Zhang
Co-Authors: G. Yu, B. Wang
Advisor: Qun Li
College of William & Mary,
Computer Science

In a dynamic spectrum access (DSA) network, communication rendezvous is the first step for two secondary users to be able to communicate with each other. In this step, the pair of secondary users pick the same channel, over which they negotiate on the communication parameters, to establish the communication link. This paper presents ETCH, an efficient channel hopping based MAC-layer protocol for communication rendezvous in DSA networks. We propose two versions of ETCH protocols, SYNC-ETCH and ASYNC-ETCH, based on whether global clock synchronization is available. SYNC-ETCH efficiently exploits frequency diversity, which is one of the key benefits offered by the DSA technique, such that every channel can be used for communication rendezvous in any hopping slot, and hence greatly increases the capacity of a DSA network at the communication setup stage. SYNC-ETCH also markedly reduces the time that two secondary users need to rendezvous (i.e. time-to-rendezvous). ASYNC-ETCH allows secondary users to establish control channels without global clock synchronization. The efficiency of ASYNC-ETCH is embodied in that the time-to-rendezvous of this approach is bounded and shorter than those of existing schemes.

Transpacific Internments: Dismantling "Little Tokyo" and Constructing "Little America"

Presenter: Jack E. Cohen
Advisor: Hiroshi Kitamura
College of William & Mary,
History

During World War II, thousands of civilians relocated to internment camps on opposite sides of the Pacific Ocean. Although both white Americans in the Philippines and Japanese-Americans in the United States faced dire internment experiences; they ultimately approached their captivities with drastically different objectives in mind. In the Philippines, white American internees rarely collaborated with their Japanese commandants. Instead, they sought to establish communities which relied upon the perseverance and cooperative efforts of the internees themselves, constructing autonomous "Little Americas." In contrast, Japanese-Americans in the United States turned outward to integrate themselves into mainstream American society, working hand-in-hand with the War Relocation Authority (WRA). The WRA and Japanese-Americans labored collaboratively to dispel myths of treachery and inability to assimilate, as well as to demonstrate that Japanese-Americans were no different from white Americans. Japanese-Americans strove to dismantle the "Little Tokyos" that had so defined their experience in the United States leading up to World War II. My research questions include: How did the role of citizenship affect how internees approached their captivity situations? What were the goals of internment--as far as the internees were concerned--and how did they work to achieve these goals? Finally, how does the examination of both transpacific internments elucidate a common conclusion, one that could not be accomplished through the study of these two models in isolation?

"Give to Greece her Ancient Liberty and Ye Shall Live Immortal": American Public Response to the Greek War for Independence, (1821-1830)

Presenter: Maureen Connors Santelli
Advisor: Rosemarie Zagarri
George Mason University,
History

Americans were enraptured by the unfolding events of the Greek War for Independence, (1821-1830). Americans fostered this enthusiasm through a long tradition of interest in the classical world and connected their own recent revolution with the plight of the modern Greeks against the Ottoman Empire. Some historians have argued that a classical influence on the early republic demonstrates that the founders had an admiration for the ancients, read classical works, and may have modeled the new republic after those of Greece and Rome. Positive response to the Greek War emerged through newspapers, novels, plays, and speeches, which increased fervor among the public to provide aid to Greece. People from different walks of life participated in an active response to the Greek War by writing to their congressmen. When Congress declared they would remain neutral, the public raised and contributed aid to the Greeks directly. I argue that the importance of the classics in early America extended farther than a mere recreational fascination among the elite; it became an inseparable entity of American popular culture. As the classical influence increased over time through aesthetic, literary, and public participation in politics, civic duty as an active endeavor took hold in American society. Public reaction to the Greek War for Independence demonstrates the flowering of this sense of active civic duty as founded in the classical tradition. This paper primarily examined printed materials and popular images of the day to illustrate the vibrant public response to the Greek War in the 1820s.

Adoption, Assimilation, and Treatment: Indian Captivity Narratives during the French and Indian War

Presenter: Heather N. DiAngelis
Advisor: Paul Mapp
College of William & Mary,
History

Many white war captives have published narratives based on their experiences in Indian society. By examining various Indian captivity narratives from the French and Indian War, one can see that these North American captives faced similar situations despite differences in geographic location and the Indian nations involved. Narratives from this period include such locations as Fort Michilimackinac, Crown Point, and New York, and describe such Indian nations as the Chippewa, Seneca, and Abenaki. Three processes—adoption, assimilation, and treatment—provide evidence for commonalities across geographic and national boundaries and make up the themes of this paper. The paper begins with an examination of secondary literature. I show that there has been an evolution in the scholarly treatment of these narratives with regard to rhetoric, romanticism, and Indian culture; I also demonstrate that the historiography lacks an analysis that considers present-day conceptions of Indian cultures, especially in the context of the French and Indian War. Finally, I use the captivity narratives to analyze the themes of adoption, assimilation, and treatment across national and geographic lines, showing that commonalities defied borders. This analysis not only examines cross-cultural interactions between Indians and whites but also suggests the existence of a blurred border between diverse Indian nations.

Nathan F. Leopold and the Maturity Narrative

Presenter: John C. Fiorini
Advisor: Leisa Meyer
College of William & Mary,
History

From roughly 1944-1958, Nathan Leopold, perhaps the most infamous prisoner in the United States at the time, launched a prolonged and ultimately successful media campaign to reform his public image and obtain parole. In 1924, Leopold and his partner, Richard Loeb, had pled guilty to the United States first nationally recognized thrill killing, the carefully premeditated murder of a fourteen-year-old boy solely for the experience of the act. After Leopold and Loeb narrowly avoided the death penalty, it seemed inevitable that they would spend the rest of their lives in prison, and they remained singularly notorious criminals and cues for public outrage for decades. By the post-World War II era, Leopold had decided that his only hope for securing parole lay in changing public sentiment towards him. This paper explores how Leopold and his advocates, with the advent of what I will call the maturity narrative – Leopold's largely self-styled story of rehabilitation – challenged the view of Leopold as monolithically and therefore incorrigibly criminal. The narrative invoked popular and professional psychological perceptions about youth, sexuality, and certain types of criminality in the postwar era in a manner that both affirmed those perceptions and depicted Leopold as a man who had become compatible with dominant postwar conceptions of normality. By the time of Leopold's final parole hearing in 1958, the Leopold-Loeb case had become reinfused with new symbolic power for a new era, particularly in regards to homosexuality, sexual psychopathology, juvenile delinquency, and, most emphatically from Leopold's position, rehabilitation.

Widows, Goddesses, Hags and Whores: Female Icons in the Work of Salman Rushdie

Presenter: Anne T. Frommelt
Advisor: Delores Phillips
Old Dominion University,
English

Through an analysis of Salman Rushdie and his subversion of traditional historiography, my project identifies the important work of Rushdie's postcolonial fiction in conveying the truth from below. I will analyze three female characters in three distinct novels within the Rushdie corpus: the Prime Minister Indira Nehru Gandhi, i.e. the Widow, in *Midnight's Children* (1981), the film actress Nargis Dutt in the *The Moor's Last Sigh* (1995), and the fictional superstar Vina Apsara in *The Ground Beneath Her Feet* (1999). All these constructions, both within and outside the texts, including Rushdie and India itself, will be problematized by way of myth, nation, celebrity and globalization. Each female figure will be examined using methodologies attendant to the field of postcolonial studies as well as to the broader framework of postmodern historiography. Character analysis of the Widow in *Midnight's Children* will be done through the lens of what Linda Hutcheon calls "historiographic metafiction." The work of Vijay Mishra provides the cinematic tools with which the *The Moor's Nargis* will be dissected. The fictional character Vina Apsara will be examined through cosmopolitics, as defined by Pheng Cheah and Bruce Robbins. This work will rethink the mythical representations of Indian womanhood and global celebrity, to reveal the ways in which imperialism, nationalism and globalization are implicated in their construction.

The Struggle for Monacan Tribal Identity in Amherst County, Virginia

Presenter: Jennifer M. Huff
Advisor: Philip Dillard
James Madison University,
History

As an undergraduate student in Texas, I became captivated by the history of American Indians and began to study the various tribes throughout America. I became fascinated with the Virginia Indians in the Piedmont area of Virginia and started to look closely at the Monacan Indians in Amherst County, Virginia as I felt this area had been neglected by historians. The conflicts between the Monacan tribe and the Powhatan Confederacy in the seventeenth century forced the Monacan tribe out of the Fall Line of the James River and into the Piedmont of Virginia in the Blue Ridge Mountains. My research will attempt to uncover the history of the Monacan tribe from the mid to late-eighteenth century and explore their possible relations with the English, French, and other tribes in the region. Although many believe that the tribe struggled during this period and one theory indicates that they vanished due to disease, my research will uncover that although they did struggle like any community, they not only survived but thrived in Amherst County and how this has shaped their identity and view of their past today. I also hope to explore how they would like to present their history to audiences today and how they have currently conveyed this to all communities.

The Otter Trawl

Presenter: Jeff Johnson
Advisor: Carolyn Biltoft
Georgia State University,
History

To contribute to the understudied field of marine environmental history, I propose a paper that examines an obscure piece of poacher's tackle that revolutionized ocean fisheries around the world. The otter trawl was invented in England in 1860, an adaptation of a crude device long used by poachers to land large catches of freshwater fish. Ocean fishermen perfected the invention at the end of the nineteenth century as a means of keeping their nets wide open as they were drawn through the water column. The nearly worldwide diffusion of the otter trawl meant that, within twenty years, commercial fishermen used significantly larger nets on much larger steam-powered trawlers, fishing in deeper water for catches that were orders of magnitude greater than those possible with earlier technologies. Using theories of environmental history developed by Richard White and William Cronon, the paper will show that the otter trawl was a human economic response to ecological conditions, one that was derived specifically from ideas of the commons. Use of the otter trawl, in turn, debilitated both the environment it was designed to exploit and the economic and social systems that relied on that environment.

Native Americans, Socialist Propaganda, and the Politics of the Oppressed

Presenter: Lucie Kyrova
Advisor: Andrew Fisher
College of William & Mary,
History

During the Cold War, Native American activism received international attention and became part of an ideological battle between the United States and the Soviet Union. Treatment of Native Americans was criticized in the Eastern Bloc countries, in attempt to show their citizens the supposed superiority of their regime. Occasionally, Native activists used the rhetoric of the Soviet propaganda to help with their struggles. Scholars such as Daniel Cobb and Paul Rosier have discussed Native activism within the context of the Cold War ideological battle. However, they did not examine the nature of the socialist propaganda and its impact. My paper examines how the socialist propaganda developed and influenced private defiance and public resistance. The American Indian Movement, through its activities in the 1970s, helped to spark interest in indigenous issues internationally and became part of the socialist anti-US propaganda in Eastern Europe. However, images of Indians resisting oppression did not always result in appreciation of the socialist system. For some people, Native Americans were a reminder of their own political oppression. Unable to resist openly, people used the Native imagery, combined with romanticism, to carve out a private space in which to escape the political realities of their lives. In the United States, the existence of the socialist propaganda and the presence of Soviet journalists sometimes provided a tool for an open public resistance by Native activists, helping them to achieve their goals.

The Chesterbelloc and Imperialism: Hilaire Belloc, G. K. Chesterton and the British Empire, 1900-1920

Presenter: Stephen M. Santelli
Advisor: Joseph Hodge
West Virginia University,
History

This paper explores the relationship that British writers Hlaire Belloc and G. K. Chesterton had with the British Empire. Traditional studies of these two Edwardian intellectuals have focused on their religious, cultural and economic ideas. However, it is the author's contention that their writings and opinions on Imperial Britain form a heretofore largely unexamined body of work that is necessary to understanding their political positions and ideas. Belloc and Chesterton wrote in a High Church, cultural milieu. They were writers (sometimes called "Men of Letters") who were in search of a vaunted "Third Way" (neither capitalism nor socialism). Their ideas influenced later famous authors such as C. S. Lewis and J. R. R. Tolkien. The politics of Edwardian Britain (1901-1910) were in a state of flux. The two major political parties (the Liberals and the Conservatives) were fractured over issues of Empire. Belloc and Chesterton were Liberals who opposed such Conservative programs as the Imperial Tariff. However, they found themselves increasingly at odds with the direction that the Liberal Party was taking. Their later ideas, steeped in anti-modernism and notions of traditional England, came as a result of this split over Imperial affairs. This paper not only focuses on their intellectual background, but it also illuminates the debates going on in Britain over the Empire.

Missionary Zeal Against the Persistent Press: The First Lecture Tours of Sir Arthur Conan Doyle and Harry Houdini

Presenter: Stefanie M. Strosnider-Hollis
Advisor: Raymond Hyser
James Madison University,
History

One night I stumbled across the auction of Harry Houdini's priceless collection of straitjackets, handcuffs, oversized milk cans, and a very large water torture cell on the History Channel. The auction was intertwined with a program on Houdini's life and career as a master magician and debunker of the cult-like religion Spiritualism. I have constructed my Master's thesis around the Spiritualist lecture tours of Harry Houdini and Sir Arthur Conan Doyle. The famed British author was an ardent Spiritualist who believed it was his personal mission to spread the religion and practices of Spiritualism in Europe, Australia, and America. Houdini, on the other hand, strove to expose deceitful mediums as con artists and fakes. In the early 1920s, both men embarked on lecture tours throughout the United States, spreading their views and attempting to sway the minds of curious Americans. The lectures were well attended, often before full houses, and were well publicized. My research makes use of Conan Doyle's writings, newspaper coverage and the correspondence of Houdini to examine the lectures and the public reactions and what they conveyed about American's attitudes toward Modern Spiritualism. Many historians have glanced at the tours and Spiritualism as part of a larger picture in the twentieth century, but this short-lived religious phenomena my help explain how and why Americans were intrigued about an odd, almost cult-like religion. Since there has not been an in depth look at the tours, this will fill a gap in the history of American's response to organized religion in the early twentieth century.

Pacific Trade Winds: Towards a Global History of the Manila Galleon

Presenter: Matthew F. Thomas
Advisor: Kris Lane
College of William & Mary,
History

Columbus' renowned 1492 voyage marked the beginning of Spain's quest to reach the riches of Asia by sailing west rather than east. Eighty years later, Columbus' dream of establishing a westerly trade route to China was achieved with the founding of Spanish Manila. Within a few short decades, millions of pesos' worth of New World silver and Asian goods flowed annually across the Pacific via the Manila Galleon trade network. Historians have not neglected the sudden rise of transpacific commerce in the late sixteenth century. Woodrow Borah, William L. Schurz, O.H.K. Spate, and other twentieth-century scholars were all drawn to the topic. While more recently, economic historians have thrown new light on the Manila Galleon through their efforts to estimate the amount of New World silver being shipped directly to Asia from the sixteenth to nineteenth centuries. This scholarship however, has failed to offer a truly global account of the Manila Galleon's immediate impact on Spanish imperial policy or global trade patterns outside of bullion flows. With the aim of fostering a greater understanding of transpacific trade, this paper situates the early development of the Manila Galleon within a global framework. Its goal is to map out a more comprehensive and interdisciplinary research plan to challenge existing narratives and enlarge the scope of analysis. In doing so, it identifies and outlines future avenues of research regarding the ways transpacific commerce impacted historical developments in colonial Latin America specifically and the early modern trading world more generally.

Restoring St. Stephen's Realm: The First Vienna Award and Hungarian Territorial Nationalism

Presenter: Leslie M. Waters
Advisor: Ivan Berend
UCLA,
History

In the long process of reorganizing multi-national East-Central Europe into ethnically homogeneous nation-states, 1938 stands out as a critical year. The First Vienna Award, arbitrated that November, returned approximately 12,000 sq. km. of territory to Hungary along its northern border, which had been awarded to Czechoslovakia in 1920 by the peace treaty ending World War I. Bowing to the popular rhetoric of the time, Hungarian demands emphasized national self-determination and initially centered upon bringing the Hungarians living in Czechoslovakia back into their ethnic homeland; the arbiters, the German and Italian foreign ministers, redrew the border accordingly. However, rather than re-conceptualizing their nation in ethnic terms, as their demands would suggest, Hungarians maintained an irredentist, territorial nationalism. Hungary envisioned the First Vienna Award as a springboard to the restoration of the entire historic Hungarian kingdom along with the millions of non-Hungarians living there, an ideology counter to the ethnicist fervor of the time. Hungarian leaders believed that successful reintegration of the area would justify further territorial revisions. Using documents from the British and Hungarian national archives as well as published propaganda materials, this paper demonstrates that ironically, the Hungarian government attempted to convince the international community to expand its borders to include large minority populations using arguments based on self-determination. This challenges the traditional dichotomy between civic/territorial and ethnic/cultural nationalism and reveals that these two national conceptions are not mutually exclusive.

Evaluation of Th doped solids for Laser Cooling Applications

Presenter: Herbert B. Brown
Advisor: Uwe Hömmerich
Hampton University,
Physics

There has been great interest in the area of laser cooling of solids within the last decade. Laser cooling by means of anti-stokes fluorescence can be achieved using rare-earth doped solids. An optical refrigerator built on this principle can be an ideal alternative to present day coolers, because of its compact size, non-moving parts and less maintenance is required. Laser cooling has been demonstrated in ytterbium-doped fluoride glass (ZBLAN:Yb^{3+}) down to temperatures as low as 208 K. In this work thulium doped potassium lead chloride, Tm:KPC, was evaluated as a potential solid-state material for laser cooling applications. A spectroscopic study of Tm:YAG, Tm:BYF, Tm:KYF, and Tm:YLF, was performed. $PbCl_2$ and KCl were synthesized and purified through horizontal zone refinement. $TmCl_3$ was purified through chlorination to reduce oxide impurities. $TmCl_3$(0.5wt %) was mixed with KPC. The Tm:KPC was grown with the Bridgman Technique. Absorption studies were performed on the polished Tm:KPC crystal. Following 1907nm excitation, all samples showed infrared emission with center wavelengths of ~1.8 μm. Under 1907nm pumping conditions, it was calculated that an emission efficiency of ~ 95% is needed to obtain a positive cooling efficiency for Tm:YAG. Based on temperature dependent decay time studies the emission efficiencies of Tm: KPC was estimated to be only ~65-75%. Since non-radiative decay via multiphonon relaxation is negligible in Tm: KPC, energy transfer processes to hydroxyl(OH^-) impurities and other defects seem to cause the low emission efficiency. Further purification of host and dopant materials are needed to optimize the quality and emission efficiency of Tm:KPC.

BB Potential in Unquenched Lattice QCD

Presenter: Zachary S. Brown
Advisor: Kostas Orginos
College of William & Mary,
Physics

The potential between two B mesons, each consisting of a light quark and very heavy bottom quark, is studied on the lattice. Since the bottom quark is heavy enough to be considered static, the potential is a well defined quantity and can be defined as the difference between the energy of the BB system at a given separation R, and twice the mass of the B meson. In the limit of infinitely heavy bottom quarks the spin of the bottom quark can be neglected and the system can be classified according to the quantum numbers of the light quarks. By choosing the quantum numbers wisely, the system will obey the same symmetries and thus exhibit behavior similar to that of a nucleon-nucleon pair. This allows us to gain much insight into internuclear forces by studying a much simpler system. Up until recently, the BB potential has only been studied in the quenched approximation, meaning that the effects of producing quark-antiquark pairs from the vacuum were neglected. Although the results of previous studies exhibited some of the expected qualitative features such as an attractive or repulsive potential, the quenched calculation unphysical and differs fundamentally from the physical BB system. In our calculation, we have taken advantage of a novel analytic trick which allows for a very speedy calculation of BB systems with various quantum numbers while still including these vacuum quark effects. This analytic trick also gives rise to a greatly boosted signal, which is apparent in preliminary results.

Hamiltonian Monodromy

Presenter: Chen Chen
Co-Authors: M. Ivory, S. Aubin
Advisor: John Delos
College of William & Mary,
Physics

We say that a system exhibits monodromy if we take the system around a closed loop in its spectrum space, and we find that the system does not come back to its original state. We report a method for experimental realization of a newly discovered dynamical manifestation of monodromy by investigating the behavior of atoms in a trap. The trapping potential has long range attraction to and short range repulsion from the center. Calculations include two parts. First, we consider atoms as classical particles for which we can choose any desired set of initial conditions. As was shown previously for different systems, when we take the system around a monodromy circuit, a loop of initial conditions evolves into a topologically different loop. Second, we incorporate the limitations that would appear in experimental implementation. The atoms have a range of initial angles, initial angular momenta, and initial energies. Our work shows how real atoms can be driven by real forces around a monodromy circuit, and thereby shows how one can observe dynamical monodromy in a laboratory. Finally, we extend classical dynamical monodromy to quantum dynamical monodromy by examining wave function evolution under comparable conditions.

MINERvA Test Beam Experiment

Presenter: Joshua D. Devan
Advisor: Jeffrey Nelson
College of William & Mary,
Physics

The MINERvA experiment is a neutrino scattering experiment at Fermi National Accelerator Laboratory outside Chicago, Illinois. MINERvA will analyze neutrino cross-sections, final states and nuclear effects, primarily to reduce systematic uncertainties in neutrino oscillation experiments such as MINOS and NOvA. The MINERvA detector consists of a fully-active tracking region surrounded by a calorimeter. The primary technology is extruded plastic scintillator bars read by wavelength-shifting fiber optic cables and photomultiplier tubes. The detector is located underground, in front of the MINOS near detector, in the NuMI beamline. NuMI provides an intense beam of neutrinos or anti-neutrinos. In order to calibrate the main detector, a small version was constructed and exposed to momentum-analyzed hadrons and electrons, and non-analyzed muons from both cosmic and accelerator sources. The small version is reconfigurable, allowing it to simulate the tracking and calorimeter regions of the main detector. The project required the development of an additional beamline at the Fermilab Test Beam Facility to generate particles (primarily pions, protons and electrons) with energies from 300 MeV to a few GeV. The beamline consists of two pairs of wire chambers to track particles through dipole magnets. The degree of deflection by the magnet allows for the determination of the particle's momentum. A time of flight system allows for the determination of the particle's mass and thus species.

Electromagnetic Shower Identification in NOvA

Presenter: Alena V. Gavrilenko
Advisor: Patricia Vahle
The College of William & Mary,
Physics

The NuMI Off-Axis ve-Appearance project (NOvA), is a second generation neutrino oscillation experiment consisting of two liquid scintillator detectors 810 km apart and 14 mrad off-axis in the NuMI muon neutrino beam at the Fermi National Accelerator Laboratory. NOvA is optimized for the detection of oscillations between muon and electron neutrinos. The electron neutrino appearance probability depends on θ13, sin2(θ13), and δCP , where θ13 is a mixing angle between the two neutrino flavors and δCP is the neutrino CP-violating phase. Current limits on the mixing angle have been set by the MINOS collaboration. No measurements have yet been done on δCP . NOvA will have a sensitivity an order of magnitude greater than MINOS towards the mixing angle and will be able to make a first pass on measuring the limits on δCP . When an electron neutrino interacts with matter through the charged current (CC) interaction, an electron is produced that initiates an electromagnetic shower within the detector. To see the desired oscillations, a particle identification (PID) algorithm must be developed to look for the presence of an electron in the final state of the neutrino interaction. The development for such a PID is presented here. First pre-selection cuts are applied to remove obvious background events from candidate electron neutrino CC events. Then several variables are calculated to describe the shape of the electromagnetic shower and input into a neural network to enhance the signal/ background separation.

Optical Properties of Er^{3+} Doped Oxide Ceramics and Halide Crystals for Applications in Resonantly Pumped ~ 1.5µm Eye Safe Lasers

Presenter: Craig B. Hanley
Co-Author: E. Brown
Advisor: Uwe Hömmerich
Hampton University,
Physics

There exists a significant current interest in the development of a new generation of long-wavelength eye-safe bulk solid-state lasers with resonant diode laser pumping. Applications of laser sources that operate in the eye-safe wavelength regime near 1.5 -1.6µm include remote sensing, ranging and material processing, long distance telemetry, and optical communications. Eye-safe laser wavelengths can be achieved by using trivalent Er^{3+}, a rare –earth ion that has an emission transition at ~1.5 µm. Prior to the development of resonantly pumped erbium lasers, there were two practical means of eye-safe laser generation, Nd-based lasers driving nonlinear optical parametric oscillators (Nd/OPOs) and the erbium-doped glass (Yb, Er:Glass) lasers. Disadvantages for Nd-based lasers include cost, complexity, and overall efficiency, whereas Yb,Er: Glass lasers are limited by upconversion losses and heat deposition due to a large quantum defect between pump and laser wavelengths. Trivalent erbium Er^{3+} (4f11) has been considered an important activator ion in many infrared solid-state lasers. For eye-safe laser operation Er:YAG continues to be the main material under consideration. In this investigation novel materials were evaluated as potential gain media for the 1.5 µm spectral region including ceramic Er:YAG, ceramic Er:Yttria, Er KPb_2Cl_5, and Er:KPb_2Br_5. Results of a comparative spectroscopic study of these materials will be presented at the conference including infrared absorption and emission studies, lifetime measurements and calculation of the 1.5µm transition cross-section.

Polarization Self-Rotation in an Ultra-Cold Atomic Cloud

Presenter: Travis S. Horrom
Advisor: Eugeniy Mikhailov
College of William & Mary, Physics

Squeezed states of light are quantum states in which the noise of the electromagnetic signal can be altered and even drop below the noise of normal laser light caused by quantum fluctuations. These states are of interest for applications in communications, precision measurements, and quantum information. One mechanism for generating squeezed states is polarization self-rotation (PSR), a nonlinear process where a light beam interacts with atoms causing its axis of polarization to rotate as it moves through the atomic medium. These processes have previously been studied in hot atomic vapors and are known to lead to squeezing. Now I present on research studying the dynamics of PSR in an ultracold atomic sample with temperatures on the order of 100 microkelvin above absolute zero. We have studied the effects of laser power, frequency, and initial light ellipticity on the rotation which is complicated by magnetic fields and the mechanical effect of the laser pushing the atoms from the trap. We have also measured the noise properties of the laser light and the results are promising for eventually observing squeezing from this rotation effect in cold atoms.

Classical pumping with ultracold atoms

Presenter: Megan K. Ivory
Co-Author: John Delos
Advisor: Seth Aubin
College of William & Mary, Physics

The transport of electrons from one location to another continues to be a major topic of study in solid state physics. In electronics, current is generally induced by applying a voltage bias (such as a battery) to a circuit. However, it has been theorized that one could produce a current without an applied bias by using localized time-varying potentials. Unfortunately, due to difficulties associated with the strength of the Coulomb interaction in solid state systems, these theories have not yet been confirmed experimentally. Rather than studying electron transport, we are interested in the analogy for neutral particles: Can ultracold atoms be pumped from one reservoir to another without an external potential difference? We present results from classical numerical simulations which identify experimental schemes capable of yielding large currents using time-varying potential barriers or wells in the junction between two reservoirs of ultracold atoms. Our simulations explore both symmetric and antisymmetric pumps with rectangular and Gaussian potentials. We show that for a non-uniform distribution of initial momentum, we can expect significant pumping from our classical simulations. We present preliminary results for various schemes, and suggest experimental parameters for testing the theoretical predictions using ultracold atoms.

Whence doth the proton acquire its spin?

Presenter: Sucheta Jawalkar
Advisor: Keith Griffioen
College of William & Mary,
Physics

Measurements in the late 1980s at CERN revealed that quark spins account for a small fraction of the proton's spin. This so-called spin crisis spurred a number of new experiments to identify the proton's silent spin contributors, namely, the spin of the gluons, which hold the quarks together, and the orbital angular momentum of both quarks and gluons. Experiments at the Thomas Jefferson National Accelerator Facility in Newport News, Va., probe the spin of the proton by using a high energy electron beam. An electron that scatters from a quark within the proton provides information about that quark's spin orientation. The struck quark, which can be detected after it has congealed into a pion, contains information about its orbital angular momentum (L) before scattering. My research provides access to L using polarized inelastic scattering. I will discuss preliminary results for the scattering reaction where charged and neutral pions are formed in the final state.

The APEX Experiment and Test Run

Presenter: Eric L. Jensen
Co-Author: Bogdan Wojtsekhowski
Advisor: Todd Averett
College of William & Mary,
Physics

The A' Experiment (APEX) at Jefferson Lab will search for a new vector boson A' with weak electron coupling in a mass range of 65 MeV < mA' < 525 MeV. New vector bosons with such small couplings are one of the very few ways in which new forces can couple to the Standard Model, and have recently received considerable attention as an explanation of various dark matter related anomalies. A' bosons are produced by radiation off an electron beam, and could appear as narrow resonances with small cross-section in the QED e^+e^- spectrum. APEX will search for the A' by using the CEBAF electron beam at energies of 1-4 GeV incident on Tungsten multi-foil targets. The e^+e^- pairs that are produced will be measured using the High Resolution Spectrometer and PREX septum magnet in Hall A at Jefferson Lab. The APEX collaboration performed a 3-week test run this past summer. Concerns involving equipment performance were largely addressed, and 1.4 million e^+e^- pair events were collected. Statistics from the test run will allow greater A' measurement sensitivity than previous experimental measurements. Analysis of the data is currently underway, with results expected by early 2011. In my talk I will introduce the APEX experiment, discuss the analysis of the test run, and present preliminary results.

New visualization tools for vector wave equations: the need for the normal form

Presenter: David G. Johnston
Co-Authors: A. Kaufman, A. Brizard, N. Zobin
Advisor: Gene Tracy
College of William & Mary, Physics

The goal of fusion energy research is to heat a confined plasma to thermonuclear conditions to produce energy. In the laboratory, temperatures hotter than the center of stars must be attained to achieve this goal. To heat the plasma to such high temperatures, one can utilize the phenomenon of mode conversion, in which energy from a wave of one type (launched from an antenna) converts into a wave of another type (which is confined and damps within the plasma). The phenomenon of mode conversion inside a fusion reactor is inherently complex. In particular, because of the high dimensionality of the problem, it is difficult to visualize what is going on. One of the goals of our research is to develop novel visualization tools, based on ray-tracing methods, which will be physically intuitive and aid in the analysis of mode conversion in fusion machines. Starting with a simplified wave model, and applying ray-tracing methods, we will describe these visualization methods. However, in order to make use of these new visualization techniques for more realistic models, we must first cast the system into normal form. We will define what is meant by this term, and describe our attempts to develop a general numerical algorithm that can transform any two-component wave equation into normal form.

The Analysis of Pressure-Broadened Alkali Absorption Lines to Determine the Density of ^{3}He for Nuclear Physics Applications

Presenter: Kelly A. Kluttz
Advisor: Todd Averett
College of William & Mary, Physics

At the Thomas Jefferson National Accelerator Facility, glass target cells containing highly polarized ^{3}He nuclei are used in electron scattering experiments to study the substructure of the neutron. In order to extract this information with minimal uncertainty, the density of ^{3}He nuclei within the cell must be known to a high degree of accuracy. In addition to ^{3}He, the cells contain a small amount of Rubidium (Rb), Potassium (K), and Nitrogen (N_2), which facilitate the polarization process. The system we have developed to determine the density of ^{3}He examines the broadening of the absorption profiles of Rb and K due to collisions with a buffer gas, i.e., ^{3}He or N_2. However, in order to relate this broadening to the gas density, the value of the velocity-averaged collisional cross-section for the interacting pair of atoms must be known. While the value of the cross-section has been measured for Rb interacting with ^{3}He and N_2, no data have been published for the value of the cross-section for K colliding with ^{3}He or N_2. In order to determine this information for K, we have designed a set of re-fillable glass cells, which are compatible with our current system, to measure the K-^{3}He and K-N_2 cross-sections. We plan to collect data for a range of buffer gas densities at different temperatures in order to determine values for the cross-sections and to evaluate any temperature dependence.

Measurement of the Proton Electric to Magnetic Form Factor Ratio with Polarized Beam and Target

Presenter: Anusha Liyanage
Advisor: Michael Kohl
Hampton University,
Physics

Experiment E07-003 (SANE, Spin Asymmetries of the Nucleon Experiment) has been carried out in Hall C at Jefferson Lab in 2009 to study the proton spin structure functions with a dynamically polarized ammonia target and longitudinally polarized electron beam. Scattered electrons were detected by the Big Electron Telescope Array (BETA). By detecting elastically scattered protons in the High Momentum Spectrometer (HMS) in coincidence with the electrons in BETA, elastic measurements were carried out in parallel. The elastic double spin asymmetry allows to extract the proton electric to magnetic form factor ratio GE/GM at high momentum transfers, Q^2 = 5.25 $(GeV/c)^2$ and Q^2 = 6.25 $(GeV/c)^2$. In addition to the coincidence data, inclusively scattered electrons from the polarized ammonia target were detected by HMS, which allows to measure the beam-target asymmetry in the elastic region with the target spin nearly perpendicular to the momentum transfer, and to extract GE/GM at low momentum transfer, Q^2 = 2.2 $(GeV/c)^2$. This alternative measurement of GE/GM will verify the dramatic discrepancy at high Q^2 between the Rosenbluth and the recoil polarization transfer method with a different measurement technique and systematic uncertainties uncorrelated to those of the recoil polarization measurements. The current status of the analysis and some preliminary results will be presented.

Moller Polarimetry in the Qweak Experiment

Presenter: Joshua Magee
Advisor: David Armstrong
The College of William & Mary,
Physics

The Standard Model of particle physics has been extremely successful in describing particle interactions in a wide-ranging regime of energy scales. Low-energy, parity-violating experiments enable high-precision experimental confirmation of Standard Model predictions. Currently, Jefferson Lab is undergoing one such investigation to determine the weak charge of the proton, Qweak, to 4% precision. This experiment will provide confirmation in measuring Standard Model predictions or provide tighter constraints on emerging “new physics” theories. To determine Qweak knowledge of the incoming electron beam polarization is necessary; the polarization is used to calculate the parity-violating e-p scattering asymmetry. This experiment utilizes both Moller and Compton polarimeters to accomplish this. Being a purely Quantum Electrodynamics process, Moller e-e scattering can be calculated to high precision and is well understood. The Moller polarimeter used in Jefferson Lab’s Hall C is unique as it uses a superconducting magnet to saturate thin iron foils, polarizing them out of plane. This results in extremely precise measurements to within 1%. It was built last decade and has been successfully used in many experiments. However, modification of the beamline for Qweak and installation of the Compton device has required alterations to the Moller. The Moller has recently been recommissioned, and several polarization studies are currently underway to determine the beam polarization and re-certify the Moller as an absolute device. This talk will briefly discuss the Standard Model and give an overview of the Qweak experiment, but will mainly focus on initial Moller polarization results.

Perturbative renormalization of quark bilinear operators on the lattice

Presenter: Ekaterina V. Mastropas
Advisor: David Richards
College of William & Mary,
Physics

In order to obtain finite information from a physical theory, regularization by introducing appropriate cutoff in the momentum region and further renormalization of divergent expressions are needed. In lattice quantum chromodynamics, the quantum fields are studied using a discretized version of space-time. Such a lattice can itself be considered as a non-perturbative regularization and used for the study of low-energy phenomena. In this work, we are interested in performing lattice calculations to relate properties measured on the lattice to those we need in the continuum. In particular, our main goal is to study momentum distribution of the quarks inside hadrons. This information is encoded in so-called quark distribution amplitudes. These amplitudes can be extracted from the matrix elements of bilinear quark operators, and the main focus in our work is on renormalization of these operators. We calculated the renormalization coefficients in one-loop lattice perturbation theory, using both Wilson and, in order to reduce discretization errors in lattice calculations, an improved Sheikholeslami-Wohlert ("clover") action. A perturbative lattice calculation of these renormalization parameters bridges the gap between lattice results and continuum quantities enabling us to confront experiment.

The GEp-2gamma experiment at Jefferson Laboratory: a search for effects beyond the Born approximation in polarization transfer observables in electron-proton scattering

Presenter: Mehdi Meziane
Advisor: Charles Perdrisat
College of William & Mary,
Physics

Elastic electron-proton scattering, based upon the electromagnetic interaction well understood by the quantum electrodynamics theory, is a powerful tool to study the internal structure of the proton by allowing measurements of fundamental observables: the electromagnetic form factors. At the leading order of the process, the electron and the proton interact with each other by exchanging a single virtual photon. This is called the Born approximation. There are two experimental methods for extracting the electric and magnetic form factors of the proton from elastic electron-proton scattering: unpolarized cross-section measurements and polarization experiments. These last use a polarized electron beam together with either a polarized target, or a measurement of the recoil polarization of the scattered proton. Intensive theoretical and experimental efforts over the past decade have aimed at explaining the discrepancy between data for the ratio of the electric to the magnetic form factors of the proton obtained by these two methods. A possible explanation for this difference is a two-photon-exchange contribution in the scattering process. I will present the results of the GEp-2gamma experiment, carried out at Jefferson Laboratory, which aimed at searching for effects beyond the Born approximation in polarization transfer observables using the recoil polarization technique.

Nonlinear optics using whispering gallery mode resonators for quantum information applications

Presenter: Matt T. Simons
Co-Authors: D. Gribbin, E. Mikhailov
Advisor: Irina Novikova
College of William & Mary,
Physics

We are developing a source of narrowband single photons and bright squeezed light via whispering gallery mode resonators. Many quantum information applications require sources of non-classical light. We aim to produce single photons and squeezed light, two types of non-classical light. Both can be produced through nonlinear frequency conversion. Frequency down-conversion can take one photon and spontaneously convert it to two lower energy (lower frequency) photons. Detection of one of these photons lets us know the other (now single) photon exists. Frequency conversion selectively converts closely spaced photons, reducing its intrinsic noise – leading to what is known as "squeezed light", which behaves non-classically. Whispering gallery mode resonators (WGMRs) made from nonlinear crystals can enhance the production of both single photons and squeezed light by reducing power requirements and bandwidth. We have developed a method for making whispering gallery mode disks out of nonlinear crystals. We have produced disks with a high quality factor of 10^7. We subsequently demonstrated second harmonic generation (a frequency conversion process from 1064nm to 532nm) inside our WGMRs. This is a step toward the production of single photons and squeezed light. In addition to generation of 532nm light we have observed emission of several yellow-shifted frequencies from our WGMR disk. While we are making progress toward our goal of non-classical light generation we are also investigating this new, unexpected behavior.

Laser Melt Smoothing of Niobium Superconducting Radio-Frequency Cavity Surfaces

Presenter: Senthilraja Singaravelu
Co-Authors: M. Klopf, G. Krafft
Advisor: Michael Kelley
Old Dominion University,
Physics

Superconducting Radio frequency (SRF) niobium cavities are at the heart of an increasing number of particle accelerators. Their performance is dominated by a several nm thick layer at the interior surface of the SRF cavity. Maximizing the smoothness of this surface is critical and aggressive chemical treatments are now employed. We describe laser-induced surface melting as an alternative "greener" approach. Modeling predicts the surface temperature for a range of per-pulse energy density. Guided selection of laser parameters for irradiation on the niobium reduces the surface roughness and may also smooth and repair surface damage resulting from the fabrication process. The resulting topography was examined by SEM, and AFM and the analysis of those results are presented here.

Plasmonics and Enhanced Magneto-Optics in Core-Shell Co-Ag Nanoparticles

Presenter: Lei Wang
Co-Authors: C. Clavero, Z. Huba, K. Carroll
Advisor: R. Ale Lukaszew
College of William & Mary,
Physics

We present theoretical and experimental studies that explain the observed strong enhancement of the magneto-optical (MO) Faraday rotation in all-metal core-shell Co-Ag nanoparticles (NPs) attributed to localized surface plasmon resonance (LSPR). We also explain why the optical absorption and MO spectra peaks appear blue-shifted with increased Co core size while keeping the NPs size constant. Further, we demonstrate direct correlation between the strong LSPR induced electromagnetic fields and the enhanced MO activity of the NPs.

Kinematics Determination of the Qweak Experiment

Presenter: Siyuan Yang
Advisor: David Armstrong
College of William & Mary,
Physics

Our present best understanding of the elementary particles and three of the four fundamental natural forces is described in the Standard Model of particle physics. One of the most important and challenging tasks of modern particle physics is to test, and perhaps, to find the evidence for new physics not contained in the Standard Model. One such test, the Qweak experiment, is currently being conducted at JLab in Newport News, VA. The goal of the experiment is to measure the value of the weak charge of proton, Qweak, to a 4% precision, which ,if it confirms the Standard Model prediction, will provide tighter constraints on new physics; or, if it is in disagreement with that prediction, will provide clear evidence for new physics. In this experiment, polarized electron beam is used on a 35cm thick hydrogen target to make the elastic ep scattering happen at a four-momentum transfer Q^2=0.03(GeV/c)^2. The reason we use the polarized electron beam is that in the weak interaction, the left and right handed electrons interact with protons in different ways, therefore results in a parity-violating asymmetry, which allows us to measure the weak charge. To determine the weak charge, we must also precisely determine the kinematics of the scattering process, namely, the Q^2. Therefore, the experiment is also designed to run in a mode in which low beam current is employed to determine the Q^2 to a high precision by using the tracking detector system. The experiment started with a commissioning run n the summer of 2010 and is now in the phase I production data taking, which will end in May. In my poster, I will show the result from Q^2 measurements and other progress in the experiments.

Atom trapping and precision interferometry via Microwave and RF potentials

Presenter: Austin R. Ziltz
Co-Authors: J. Field, M. Ivory
Advisor: Seth Aubin
College of William & Mary,
Physics

We present progress towards the development of microwave and radio frequency (μ/RF) potentials using atom chip technology for novel trapping of ultracold potassium atoms and interferometry. Atom chips are capable of generating steep μ/RF potentials that are inherently conservative and spin-dependent and can be combined with DC magnetic Feshbach resonances to tune atom-atom interactions and form ultracold molecules. We have completed a first generation, modular 'chip stack' apparatus which allows for control of both DC and μ/RF signals in vacuum. Ongoing research into the difference between traditional DC magnetic and μ/RF potentials has led to a better understanding of μ/RF potential roughness. Using industrial microwave circuit simulation software, we are designing new chip configurations based on transmission lines to create novel μ/RF potentials for trapping and manipulation of atoms. We focus on designs for trapping potassium isotopes whose relatively small hyperfine splitting simplifies the engineering of μ/RF potentials, while also providing both bosonic and fermionic species. We present applications of spin-dependent μ/RF potentials for high accuracy interferometry, isothermal sympathetic cooling and 1D interacting quantum gases.

The Effect of Interactivity in an Online Course on Behavior Change and Self-Efficacy Among Health Care Professionals

Presenter: Monica Blackwell
Advisor: Diane Wilcox
James Madison University,
AHRD/Education

Continuing Medical Education interventions continue to be an important factor in the continuous learning of health care professionals. Online interventions have become increasingly popular with in the inception of the Internet. Many CME courses (traditional and online) are evaluated solely on knowledge gain and participant reactions. However, this study focused on the instructional design of online CME courses and how the design affected the self-efficacy of the learner and the amount of knowledge transferred into the professionals' practice. Specifically, this study answered the following research questions: 1) How can one design online instruction that will foster a change in health care professionals' behavior from the course and into medical practice? 2) How can one design online instruction that will increase health care professionals' self-efficacy with the presented content? The researcher designed two online CME courses regarding the clinical diagnosis of Lyme disease. One course incorporated very few instructional elements, while the second course incorporated audio, video, and interactive elements. The researcher collected data using quantitative methods via pre-tests, post-tests, and a final survey given to participants three weeks after completing the online course. Preliminary findings indicate that the participants' self-efficacy was improved. Some of the behaviors tested were reported that a change in behavior did occur. However, the preliminary results do not show the media as being the primary reason for behavior improvement. This suggests that future CME designers should incorporate more instructional design components which may or may not include interactive and audiovisual elements.

Examining the relationship between self-esteem and social influence through the lens of the unified theory

Presenter: Chauncy T. Brinton
Co-Author: Catherine Munns
Advisor: Gregg Henriques
James Madison University,
Psychology

A new unified theory of psychology (UTP) (Henriques, 2003) makes specific predictions about the relationship between self-esteem and social influence and how this relationship is affected by culture. Interestingly, the predictions from this new theory overlap some with a prominent theory in social psychology called sociometer theory (Leary, 1995). Leary's theory argues that self-esteem functions as a gauge for belongingness to a group and that the reason for self-esteem stems from evolutionary forces. The UTP agrees with key elements of Leary's theory; however, it takes into account culture on top of evolutionary forces. For instance the UTP argues that the human self-consciousness system functions to 'download' cultural justifications which will impact self-esteem. Stemming from this theoretical analysis, we have made the prediction that since males are socialized by gender roles (cultural justification) to be more self-enhancing than females (Abele, 2003), we would expect to see that, controlling for social influence, males should report higher levels of self-esteem than females. We administered the Influence Matrix-Social Motivation Scale and the Rosenberg Self-esteem Scale to 494 (303 females and 101 males) students from James Madison University. We will conduct an ANCOVA on the gender differences in self-esteem, controlling for social influence. If we find the expected results, we will be able to add to the existing collection of empirical support for the UTP. We hope this will help establish the UTP as a viable framework by which psychologists from different schools of thought can communicate ideas and better understand one another.

Collaborative Online Formative Evaluation

Presenter: Aaron J. Clark
Advisor: Diane Wilcox
James Madison University, Education

This study examined the impact of a collaborative online formative evaluation of learning environment on co-regulated learning in higher education courses. The research was conducted in a semester-long undergraduate human resource development course at a mid-size east coast university. The study involved using a pilot Internet-based course management tool with anonymous discussion board features. The instructor and learners were given the opportunity to participate in asynchronous dialog about teaching and learning in the course. Through orientation sessions, the instructor and students were encouraged to provide quality feedback to one another continuously throughout the four weeks of the study. The researcher primarily used qualitative methods such as face-to-face interviews and focus groups, as well as open-ended discussion questions online, to gather data. Data collection is currently underway. The researcher hypothesizes that the state of engagement, and accountability between instructors and learners will be relatively improved when the pilot-program is utilized as intended.

Understanding the experiences of the young matched sibling hematopoietic stem cell donor

Presenter: Tania M. Fitzgerald
Co-Authors: J. D'Auria, C. Moore
Advisor: Kimberly Kasow
University of North Carolina at Chapel Hill, Social Work

Human leukocyte antigen matched sibling donor hematopoietic stem cell transplantation is the standard of care for many malignant and non-malignant hematological disorders. Yet in the flurry of activity that the health care team and family undergoes to treat the child afflicted with a transplantable disease, the needs of the young sibling donor — both emotional and physical — may be overlooked. The purpose of this study was to explore and describe how sibling donors who participated in the transplant process during childhood and young adulthood viewed their past transplant experience, including critical contextual influences and critical life events across the transplant trajectory. A grounded theory approach was used to guide the exploratory descriptive qualitative study. Participants were recruited from a single regional bone marrow transplant center in the Southeast. Semi-structured interviews were conducted with eight participants who served as a sibling donor between 1999 and 2009. Transcribed interview data will be systematically analyzed using the constant comparative method. Analysis of data will be completed prior to March 2011. Study findings will (a) generate an explanatory model of how young sibling donors come to think about and manage the transplant experience, and (b) guide the design and testing of interventions that are sensitive to changing needs of young sibling donors along the course of the transplant trajectory.

Evaluating the Content and Reception of Video Messages from Incarcerated Parents to their Children

Presenter: Johanna B. Folk
Advisor: Danielle Dallaire
College of William & Mary,
Psychology

The Messages Project gives incarcerated parents a unique opportunity to send a personal video-message to their children, in the hopes of maintaining, or rebuilding these relationships. Parents are provided minimal direction regarding the message content, leaving them with their own knowledge of what will be best received by their children. The focus of the current project is to determine whether participation in a parenting program prior to the Messages Project will effect the content of the message, and subsequently, the child's reaction. Inmates at multiple correctional facilities in Virginia were interviewed prior to taping their message. The messages were then sent to the caregivers, along with scales to assess the child's reaction to the message. The caregivers completed the Positive and Negative Affect Scale for Children, rating 10 positive and 10 negative emotional states to evaluate the child's reaction to the message. Preliminary analyses suggest that when parents engaged in behaviors such as crying or promising to change upon release, caregivers reported the children experienced more negative moods after viewing the tape. On the other hand, when parents sang or offered advice, caregivers reported children had overall more positive moods. It is expected that parents who completed parenting programs will send more age-appropriate and emotion regulated messages that are received more positively by their children. If confirmed, results will suggest the addition of an educational component to the Messages Project could increase its efficacy. Ongoing data collection has yielded 115 participants so far.

Spectral Analysis of Sequential Time Reproductions

Presenter: Philip C. Frum
Advisor: Thomas Pierce
Radford University,
Psychology

Fifty-seven undergraduates performed a time reproduction task in which they were presented with a series of tones occurring at 2.5 second intervals. Participants were instructed to press a button as close to the onset of each tone as possible. Superlab software presented the tones and recorded the number of milliseconds between button presses. After one minute the tones stopped and participants continued pressing the button at the same rate from memory for an additional 110 trials. A spectral analysis was conducted on each participant's series of sequential time reproductions. Spectral analysis is based on the idea that faster and slower cycles exist across a series of trials and that various numbers of trials are required for the completion of these cycles (e.g., a complete cycle every 10 trials, every 20 trials, etc). Spectral analysis calculates the variance associated with every possible cycle length. If variations in time reproductions from trial to trial were purely random then all cycle lengths should be represented in the data to approximately the same degree and account for approximately the same amount of variance (a pattern known as "white noise"). Results show that longer cycle lengths have significantly more variance than shorter cycles, indicating the presence of "pink noise" or non-random patterns of change over time. We anticipate that additional analyses will show that the presence of "pink" noise in the variability of sequential time reproductions will be associated with more negative scores from the Connors Adults ADHD Rating Scale.

Attentional Highlighting: Applying Learning Theory to the Category Accentuation of Racial Stereotypes

Presenter: Ivo Gyurovski
Co-Author: Paul Kieffaber
Advisor: Cheryl Dickter
College of William & Mary, Psychology

The purpose of this project is to apply the tenets of Attention Theory (Kruschke, 1996) to the understanding of how racial stereotypes are formed. Stereotypes are thought to be based on the perception of exaggerated similarities within groups as well as the misperception that specific groups are associated with certain traits. Attention theory experiments demonstrate that majority traits are learned earlier, whereas minority traits are learned later. Additionally, the traits most commonly associated with the minority are those that most saliently distinguish it from the majority, a phenomenon resulting from attentional asymmetry towards group-trait pairings, facilitating group differentiation. Research by Sherman and colleagues (2009) used AT to show that participants learn to associate group traits more strongly with contrived minority groups relative to contrived majority groups. Stemming from these findings, the current project sought to apply AT to examine the formation of racial stereotypes, by assessing the extent to which people are likely to group together stereotypic traits. Through a series of three studies, participants spontaneously grouped stereotypical traits into novel categories representing different social groups, without explicit instructions for group differentiation and without given feedback for their groupings. Results indicated that majority and minority racial stereotypes were placed in different categories. The tendency to form stereotypic groups was further moderated by explicit measures related to racial prejudice. These findings have implications for stereotype formation.

Orexins and Attention

Presenter: Adam Hirsh
Advisor: Josh Burk
College of William & Mary, Psychology

Orexins are neuropeptides that originate from neurons located in the lateral hypothalamus and that are released in numerous brain regions, including the basal forebrain, a structure known to be necessary for normal attentional processing. Boschen et al. (2009) found that administration of an orexin-1 receptor antagonist results in attentional processing deficits. The purpose of the current study was to examine whether central infusions of orexin A could negate some attentional processing deficits, including when attentional demands were increased. Eight Fisher Brown Norway hybrid rats were initially trained in an attention-demanding task that required the animals to distinguish visual cues from trials with no visual cues. Once this task had been learned, all animals were presented with a new task consisting of three training blocks. The first and third blocks were identical to the standard task while the second was similar, with the exception of an added flashing houselight in order to distract the rats. After being briefly exposed to this new task, all animals were trained for four sessions in which a different dose of orexin A was administered prior to training (vehicle, 10pM, 100pM, 1000pM). Preliminary results indicate that rats' performance is significantly better during distraction trials when administered lower doses of orexin A compared with vehicle administration. These results support the idea that orexins contribute to attentional functioning. Moreover, it may be critical to recruit the orexin system in order to overcome increases in attentional demands.

Examining Student Employees' Perceptions of Their Roles in an Outbound Call Center

Presenter: Chiquita King
Advisor: Jane Thall
James Madison University,
Education

A number of case studies in the research literature address the negative effects and perceptions associated with working at a call center. The present study focused on student employees who work at an outbound call center operated by and for James Madison University. The purpose of this study was to examine the students' perceived roles as call center employees, as well as how these perceptions change over time. In addition, the researcher will analyze the relationships between role perception and organizational identification, as well as role perception and self-efficacy. The sample comprised approximately 38 employees at the outbound call center. The researcher collected data using quantitative and qualitative methods via an online survey and interviews, which were conducted within 30 days of employment and after 60 days of employment. The researcher anticipates that the student employees will initially have a positive perception of their roles; however, over time, the new employees will have a less positive perception than their experienced counterparts. The researcher also predicts that role perception will have a positive relationship with both organizational identification and self-efficacy. Overall, the results of this study will contribute to the literature gap of U.S.-based outbound call centers. In addition, managers of call centers can use the findings to reduce role conflict and ambiguity and enhance organizational identification and self-efficacy among their employees.

The Effects of Stereotype Primes on the Attentional Processing of Ambiguous Faces

Presenter: Julie A. Kittel
Advisor: Cheryl Dickter
College of William & Mary,
Psychology

Psychological research has demonstrated that we categorize unknown individuals quickly and effortlessly based on visually prominent features such as skin color (e.g., Zarate & Smith, 1990). In fact, people attend to the race of strangers automatically within several hundred milliseconds (Ito & Urland, 2003). Using Black, White, and Asian faces, many researchers have studied how automatic stereotype activation affects perceivers' categorization of an individual (e.g., Willardsen-Jensen & Ito, 2006). However, less research has examined the perception of individuals whose race is ambiguous. In today's multicultural society, perceivers often encounter multiracial individuals, or those whose race is simply ambiguous; thus, it is becoming increasingly important to examine how ambiguous-race individuals are socially categorized. Recent behavioral studies have shown that the categorization of ambiguous race individuals can be affected by the presentation of stereotypical cues (e.g., Dickter, Newton, & Gyurovski, 2010), but less research has explored how these cues affect neural categorization. The purpose of the current study was to determine how stereotype activation affects the social categorization and early attentional processing of faces that are racially ambiguous. Participants saw a series of trials presenting positive or negative racial stereotypes followed by race-unambiguous and -ambiguous faces. Physiological data in the form of EEG was collected and it is hypothesized that the stereotypicality of the prime will affect the categorization and early neural processing of the ambiguous race faces.

The effects of socially-mediated exposure to ethanol on the self-administration of ethanol in adolescent rats

Presenter: Maria Markhelyuk
Advisor: Pamela Hunt
College of William & Mary,
Psychology

The broad aim of this research was to address the impact of early social learning about alcohol on initial experimentation with alcohol during late childhood and adolescence. Given the recent concern about unhealthy alcohol use among this age group and its consequences, it is important to direct research efforts toward the contributing factors of this behavior. The current study used an animal model to examine the effect of early home exposure to alcohol odor cues on the onset of drinking behavior during adolescence. Preweanling rats (demonstrators) were administered alcohol on postnatal days (PD) 8-12 and allowed to freely interact with same-age siblings (observers) in the home cage for five consecutive days. During the second phase of the experiment, observers were given a choice between water and ethanol in a 24-hour two-bottle preference test on PD 30 and tested for ethanol intake. Observer rats that received the social interaction condition consumed a significantly higher percentage of ethanol (relative to total fluid intake) than controls. The results of this study indicate that early learning about ethanol during the infancy period in rats contributes to higher ethanol intake at drinking onset during periadolescence.

Flavor-Flavor and Flavor-Calorie Conditioning in Children

Presenter: Victoria Marshall
Advisor: Catherine Forestell
College of William & Mary,
Psychology

Research with animal-models has demonstrated that flavors become more positive when paired with sugar in a Pavlovian conditioning paradigm. In these studies one flavor (CS+) paired with a sweet-tasting and/or caloric reinforcer and a different flavor (CS-) with a noncaloric, neutral tasting source. After repeated trials, animals demonstrate a preference by consuming more of the CS+ relative to the CS- in two-bottle tests. Although both paradigms have been studied in animal-models and adults, the mechanisms involved in conditioned flavor preferences in children are still unclear. To address this need, the proposed study aims to assess the relative strength of flavor-taste associations (i.e., between a flavor cue and sweet taste), flavor-calorie associations (between the flavor cue and the caloric reinforcement) in a sample of children between the ages of 7-12 years. Children receive one flavor of ice tea paired with either a sweet tasting reinforcer (aspartame), a calorific, sweet-tasting reinforcer (sucrose), or a calorific but minimally sweet-tasting reinforcer (Polycose) during an eight day home exposure. A second flavor of ice tea (CS-) is mixed in water on alternate days of the home-exposure. Before and after the home-exposure children's relative consumption of the CS solutions will be measured to determine whether preference shifts occur as a function of conditioning. A better understanding of the mechanisms underlying the formation of conditioned flavor preferences in children, a generation who will struggle with obesity and diabetes, may lead to more effective evidence-based strategies to overcome obesity.

Can Motive Congruence Be Classified as Normative, Temporal or Configural? The Introduction of Three Concepts for Precision and Prediction

Presenter: Chris C. Martin
Co-Author: Amanda Fuller
Advisor: Todd Thrash
College of William & Mary,
Psychology

Implicit (hidden) and self-attributed (conscious) motives are two discrete components of the human motivational system. Incongruence between these two components can cause low life satisfaction, depression and other negative outcomes. Measuring incongruence has hitherto only used the individual as the unit of analysis. We propose three other units of analysis: groups, occasions and motive contents. Using groups as a unit of analysis, we posit that some persons have normative congruence: Their profile of incongruence is normal in their social group, and thus paradoxically they are internally incongruent but socially congruent. Using occasions as the unit of analysis, we posit that some persons—particularly those high in mindfulness and goal imagery use—achieve temporal congruence, that is, consistent congruence across long periods of time. The Blue-Monday effect and similar occasional effects may, however, harm temporal congruence. Using motive contents as the level of analysis, we posit that implicit and explicit scores may show configural congruence, that is, congruence in a small and stable subset of life areas. Self-identified high achievers may, for instance, strongly value the life areas for which they have the strongest implicit motivation. Using weekly questionnaires to assess motives and other indicators over an eight-week span, we are current investigating whether our newly defined constructs are meaningful. We predict each construct is useful for assessing individual and social constructs. One implication is the estimation of persons with high normative congruence as psychologically healthy although low normative congruence may be ideal among peer groups that overemphasize certain values.

Chronic exposure to cannabinoids in adolescence: Anxiety and depression in rats

Presenter: Angel L. Medina
Co-Authors: A. Furrow, M. Mosbach
Advisor: Pamela Jackson
Radford University,
Psychology

Recent studies have shown that chronic marijuana use during adolescence resulted in behavioral alterations that lasted into adulthood. The present study focused on symptoms of anxiety and depression after exposure to CP 55,940, a potent synthetic cannabinoid similar to THC. Male Long-Evans rats received daily injections of either drug or vehicle for 10 or 28 days beginning just before puberty. Behavioral assessment on four different tasks began 28 days after the last injection (when they were fully adult). The drug rats displayed increased anxiety on the elevated plus-maze and the open-field activity measure, regardless of length of exposure to the drug. However, exposure to the cannabinoid did not increase anxiety in terms of reactivity to a novel flavor, nor were the drug animals less interactive with a new conspecific in the social interaction task as compared to the vehicle control animals. There was some suggestion of increased depressive symptoms for the drug animals on the sucrose preference test across days (measuring anhedonia) and the Forced Swim Test (measuring behavioral despair). In sum, chronic exposure to cannabinoids during adolescence predisposed male Long Evans rats toward displaying depression and anxiety-like symptoms on multiple tasks. As length of drug exposure had little impact in this study, further research is needed to determine which stage of adolescence is critical, as well as exactly how prior experience serves to exacerbate or protect them from the effects of chronic exposure to cannabinoids in adolescence.

Parental Emotion Socialization and its Associations to Internalizing Symptoms and Externalizing Symptoms: Does Parent Gender Matter?

Presenter: Wesley Sanders
Co-Author: Joseph Pochedly
Advisor: Janice Zeman
College of William & Mary,
Psychology

Although some research has studied how mothers or the combined efforts of parents socialize children's emotional expressivity, very little research has compared how fathers and mothers may socialize their children's emotion in similar or unique ways and the influence of differential strategies on children's psychological functioning. Mothers (N = 35) and fathers (N = 33) completed the CBCL to provide indices of oppositional-defiant and conduct disorder symptoms for their daughters (N = 22) and sons (N = 13) who are in the 3rd-5th grades (M age = 9.7). Children completed measures assessing parental emotion discussion styles and internalizing symptoms. Using regression analyses, the findings indicate that fathers' discussion styles significantly predicted to depressive symptoms in daughters and oppositional defiant behaviors for both daughters and sons. Mothers' discussion styles were predictive of both anxiety and oppositional defiance for sons, while no significant results were found between mothers and daughters.

The Effects of Missing a Target Face in a Crowd on Heart Rate

Presenter: James T. Streett
Advisor: Thomas Pierce
Radford University,
Psychology

This study examined the ability to learn a set of 6 target faces, each presented in black and white with a black background, and then accurately detect them while embedded within 3x3 matrices of distracter faces. Each participant's heart rate was monitored while performing this task. The purpose of the study is to identify a unique heart rate response for each of four signal detection response categories. In particular, its purpose is to identify a unique pattern of change in heart rate on miss trials, where a target face was present within a 3x3 matrix, but the participant did not indicate this through button response. Participants consisted of undergraduate students with ages ranging from 18 to 24. Materials used in this experiment consisted of two dell computers, with one running a stimulus presentation program called SuperLab 4.0 which presented the each of the 6 target faces as well as the 84 matrices of faces to the participants. The other computer ran a heart rate monitor program called WINDAQ DATA Acquisition Software which recorded each participant's heart rate. The anticipated results of the experiment are that an orienting reflex will occur despite whether the participant overtly states that they have seen a target face during the target face present trials. Specifically, heart rate is expected to decelerate significantly during both "miss" trials and "hit" trials, providing evidence for recognition of the presence of a target face, even in the absence of an overt behavioral response.

Critical Review of Literatures on American Single Mothers

Presenter: Saori Takahashi
Advisor: Gay Young
American University,
Sociology

Recent social changes in family structure show that the there are more numerous forms of families in the United States than before. These social changes indicate that single mother-headed family is not a monolithic group of people if you closely look at their economical, racial and cultural background. However, some existing literatures on single mothers and their lives do not always capture these social phenomena appropriately. Therefore, the presentation provides a critical review of those literatures to show that the situations surrounding single mothers in U.S. are more complex and it is not always appropriate to group them together. As an example of those social phenomena, one can observe that there are increasing numbers of white single mothers, who dropped out of conventional 'white middle-class family' and upward social mobility of African American single mothers enabled them to have economically more stable families. Racialized and stereotypical understandings of single mothers are no longer applicable to these cases. The presentation aims to complicate these somewhat simplistic explanations of U.S. single mothers.

Insight Problem Solving in Groups and Alone

Presenter: Viktoria Tidikis
Advisor: Ivan Ash
Old Dominion University,
Psychology

The question of how people solve creative problems has been the focus of research in psychology for many years. Most studies predominantly examined how individuals solve problems, paying little attention to how working in a group affects performance. To simulate creative problem solving in this research, we focused on insight problems. Insight problems are defined as unfamiliar and misleading problems that require solver to shift perspective in order to successfully solve. Two hundred and six undergraduate students from Southeastern university participated in the study, half were men and half were women. Initially, the participants were assigned to either a same gender or a mixed gender pair resulting in three types of dyads (all-man, all-woman, and mixed gender). Next, the paired participants were assigned to work together or work separately. This design compared participants working physically together in one room to participants working individually and later assigned to statistical pairs. Participants' performance was video recorded and later coded for: the number of problems correctly solved, solving time, number of impasses, number of problem solving suggestions and number of communications. The results showed that the number of impasses was significantly related to the number of interactions and to the number of problem solving suggestions. Number of impasses was negatively related to the number of problems solved; and number of problem solving suggestions was negatively related to the number of problems solved. Number of passed solutions was negatively related to the number of problems solved; and passed solutions and interactions were positively correlated.

Relations Between Peer Victimization and Social Competence: The Moderating Roles of Gender and Learning Disability Status

Presenter: Lisa J. Ulmer
Advisor: Terri Sullivan
Virginia Commonwealth University, Psychology

Peer victimization occurs frequently with prevalence rates among youth ranging from 40% to 80% (Graham & Juvonen, 2001), and is linked to maladaptive outcomes including decreased social competence (Greco, Freeman, & Dufton, 2006). Although some studies have examined relations between victimization and social competence, few have tested separate constructs of physical and relational victimization or considered how the strength of these relations may differ for sub-groups of individuals. This study's goals were to test the moderating effects of gender and learning disability status on relations between physical and relational victimization and social competence. Survey data was collected from 308 sixth graders (86% African American, 50% female) attending two urban middle schools in Spring 2009 as part of a larger violence prevention study. Four path models were run using M-Plus Version 3.1 to test these relations (i.e., separate models testing students' peer victimization experiences as reported by teachers versus by students for each potential moderator). For all models, significant negative relations were found between physical and relational victimization and social competence. However, only learning disability status in the teacher model had a moderating effect. Implications for findings will be discussed.

A Program Review of Peer Health Education on a University Campus

Presenter: Nina Uqdah
Advisor: Diane Wilcox
James Madison University, AHRD/Education

Peer education has become a widely used and accepted way of reaching out to young persons of all ages as a means of advocating, informing, educating, and presenting of issues regarding the many facets of positive health behaviors. There has been little done in the realm of evaluating these programs in terms of the effectiveness in reaching the targeted population. This paper aims to determine the impact of a peer health education program on a university undergraduate student population, focusing on the visibility, effectiveness, and availability. The researcher administered and electronic based survey to the entire undergraduate student body population of close to 16,800. The results of this survey will be analyzed in early portion of January 2011. The researcher hypothesizes that less than half of the undergraduate population will not be able to identify pertinent aspects of the peer health education program and the services that are available. Services being that of programming, workshops, events, help phone line, etc. The results of this program evaluation will indicate the overall effectiveness and impact of this program on this campus. Through the positive or negative responses received will enable the individuals overseeing this program as well as the university to understand where the sponsorship and resources are being used and allocated in the proper manner.

Learning Environments, Instructional Strategies, and Instructional Media for the Training, Development, and Success of Employees with Attention Deficit Hyperactive Disorder

Presenter: Jessica Wade
Advisor: Diane Wilcox
James Madison University,
Education

The purpose of this study was to investigate the impact of instructional media and learning environments on the training, development, and success of employees with Attention Deficit Hyperactive Disorder (ADHD). In this study, instructional media refers to the variety of educational learning options that trainers can use to facilitate learning. Past research indicates that employees with ADHD are more successful when trainers understand their learning needs, use sound instructional design practices, and provide creative learning environments and structured activities. The researcher conducted a survey of employees from Bridgewater College, Eastern Mennonite University, and James Madison University who were formally diagnosed with ADHD. This survey was followed by interviews of two employees with ADHD from James Madison University. The researcher analyzed the data using quantitative and qualitative methods. Results indicated that the instructional media has a minor impact on learning, whereas the learning environment and instructional strategies greatly affect the learning and development of the employee with ADHD.

"Why Will You Say That I Am Mad?": Madness and Evil in the Nineteenth Century

Presenter: Brian R. Wall
Advisor: Cynthia Ward
College of William & Mary,
Law

The modern insanity defense is commonly critiqued on the grounds that, in contemporary criminal jurisprudence, defendants have an incentive to manufacture insanity in order to avoid the more stringent punishment inflicted on mentally culpable criminals. However, throughout the nineteenth century, the reverse was actually true: for a criminal defendant, a finding of guilt for a crime would have been better than a ruling of "not guilty by reason of insanity." Essentially, I argue that being considered evil was likely preferable to being considered mad. This distinction is critical in evaluating the state of nineteenth-century criminal law and psychological treatment, and should also inform contemporary debate over the insanity defense. My argument will proceed in three parts. First, I will explore the contrast between due process rights in the legal system and the lack of procedural protections in asylum admittance and exit. Second, I will examine the relative cultural stigmas associated with madness and evil. Finally, I will develop how the penitentiary and moral treatment models developed into a sharp contrast in the treatment methods of criminals and the insane.

Aligning Organizational Culture to Training and Development

Presenter: Jasmine Williams
Advisor: Jane Thall
James Madison University,
AHRD/Education

Drawing on research about the increasing number of organizations that label themselves Christian-based companies (Ibrahim, Rue, McDougal, & Greene, 1991), training and development, and spirituality in the workplace, this study investigates the ways in which the Chick-fil-A Corporation aligns their training and development practices toward achievement of their corporate purpose. The corporate purpose of Chick-fil-A as recorded on the company's website is "to glorify God by being a faithful steward of all that is entrusted to us. To have a positive influence on all who come into contact with Chick-fil-A" (CFA, 2010). The researcher seeks to determine whether the organizational culture of Chick-fil-A as expressed through training and development positively impacts the lives of employees through the presence of a spiritual workplace. This research examines how Chick-fil-A's corporate foundation in spiritual principles permeates its franchises to promote a spiritual organizational culture that fulfills the corporate purpose. This study will be conducted at two Virginia Chick-fil-A franchises. The researcher will use a mixed methods approach, combining survey and interview protocols, to determine whether Chick-fil-A's spiritual principles are adequately reflected in training and development to meet their corporate purpose. The researcher hypothesizes that training and development is used as a major catalyst to meet corporate purpose of Chick-fil-A is met. The researcher posits that training is used to positively impact Chick-fil-A employees through the creation of a spiritual work environment that promotes pride in work and excellence.
with ADHD.

James City County Parks & Recreation: An Economic Impact Study

Presenter: Katherine E. Ballard
Co-Authors: E. Vestal, D. Rippy
Advisor: Eric Jensen
College of William & Mary,
Public Policy

We evaluate Parks & Recreation (P&R) services through revenue and spending streams. Tournaments & youth sporting events hosted at P&R facilities generate direct revenue for JCC P&R through rental fees & generate revenue for the County through tax revenue while also raising household & corporate income. Tax revenue subsidizes fees for Community Center (CC) & Recreation Service users. These users receive direct & indirect benefits, including health and behavioral outcomes. Finally, parks provide indirect benefits to nearby property owners and direct health benefits for users. We estimate that a sports showcase/recruitment camp generates an average of $13,000 in local tax revenue & $70,000 in household income, whereas youth sports tournaments generate on average $35,000 in household income. P&R hosted 15 outside sporting events in 2010, resulting in net positive cash inflows. These revenues benefit P&R users, who receive direct use benefits. Programs including before/after school, summer camps, & youth sports are offered at discounted rates & result in a healthier population. CCs provide the benefits of a health club to JCC residents at subsidized rates. We estimate that tax revenue from tournaments & user fees result in nearly a 60% recovery rate for JCC Recreation Services and CCs. Parks produce positive externalities in the form increased property values & health benefits. Proximity to parks increases property values and increases tax revenue & seller returns. Health benefits include lower obesity rates & a decrease in public health costs. We estimate that increased property tax revenue & user fees result in a 45% recovery rate for JCC Parks.

Administrative Failure in Bosnia: A Case Study of UN Crisis Management During the Fall of Srebrenica

Presenter: Katherine Cook
Advisor: Amanda Cleveland
James Madison University,
Political Science

On July 11, 1995, nearly 8,000 Bosniak men and boys were massacred following the fall of the United Nations Protected Area at Srebrenica. The massacre along with the displacement of over 25,000 refugees was carried out by the Bosnian Serb Army as part of an ethnic cleansing campaign aimed at eradicating the Bosnian Muslim population from their shared homeland. This paper investigates the struggle between the UN Protection Force (UNPROFOR) and the Army of the Republicka Srpska in the days preceding the safe area take over by Bosnian Serb forces. Methodologically, this case study employs a qualitative data-gathering approach, which will feature data from expert interviews, witness accounts from the International Criminal Tribunal for the former Yugoslavia, pertinent local and international news releases, and the UN official report of the incident. As such, this case offers key areas of applicability to the study of public administration and crisis management. First, the case highlights failure to coordinate international communications systems, specifically, in addressing language barriers between Dutch UN peacekeeping forces on the ground and the UN Peacekeeping Headquarters. Second, the case explores political implications of the UN “impartiality” doctrine, and addresses implementation failure in the policy making process.

International Trends in "Green" vs. "Dirty" Aid Allocation - An Investigation of Donor/Recipient Relationship

Presenter: Steven C. Hanson
Advisor: Rob Hicks
College of William & Mary,
Public Policy

Bilateral and multilateral donors often allocate monetary aid for the purpose of environmental preservation. The recipients, who are often less developed countries, receive aid in the form of grants and low-income loans to address issues such as biodiversity, endangered species, and critical habitats. Concurrently, many of these recipient countries are significant contributors to global warming due to their reliance on heavy polluting, inexpensive methods of power production. This presents a difficult situation- should donors allocate their money to strict environmental projects, which are variable in success, or target clean energy projects that might possess positive externalities for the economy and, to a lesser degree, biological phenomena associated with climate change? Although is it vital to make headway on both fronts, a delicate balance must be achieved. It is therefore necessary to analyze the trend of aid flows to environmental preservation verses clean energy production. The time period of interest, 1980 − 2008, affords an investigation of the paradigm shift caused by the 1992 Earth Summit conference. Interestingly, it seems as though bilateral donors have steadily increased aid allocation to “green” projects, while multilateral donors have remained neutral. Using AidData, a comprehensive development finance database, the specific donor/ recipient relationships were identified.

Increasing Saving for College by Low-income Households: Economic Theory and Tax Policy Options

Presenter: Daniel S. Ramsey
Advisor: Joseph Cordes
The George Washington University,
Public Policy

Students and their families face significant constraints in their efforts to finance postsecondary education. Both state and federal governments have responded by providing numerous grant and loan programs and, more recently, a number of tax incentives to help students and their families pay and save for college. Among these are tax-favored savings accounts, including federal Coverdell Education Savings Accounts and state-sponsored Qualified Tuition Programs (also known as 529 plans). However, a number of features of these plans offer limited incentives for low-income households to save for college. This paper reviews the economic theories which explain this problem, including issues related to marginal costs of saving, intertemporal choice, uncertainty, and choice complexity. By applying these theories, a number of shortcomings to these tax incentives are found. These problems include the facts that low-income households have limited resources with which to save, the incentives to save largely do not apply to low-income households with low tax burdens, and that low educational expectations and perverse incentives in financial aid rules may limit low-income households’ willingness to save. A number of policy remedies, many of which have been experimented with at the state level, including shifting from tax deductions to refundable tax credits, excluding college savings accounts when determining financial aid packages, and streamlining enrollments through partnerships with programs such as Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP).

Municipal Participation in Environmental Agreements

Presenter: Aaron Ray
Advisor: Ann Wolverton
Georgetown University,
Georgetown Public Policy Institute

One thousand forty-four mayors have signed the US Conference of Mayors' Climate Protection Agreement (USMCPA), committing to the reduction of greenhouse gas emissions. This study analyzes participating and non-participating cities nationwide in order to identify factors that predict participation of US cities in the USMCPA. Studies of nation-state participation in international environmental agreements have found that predictors of participation include the character of a nation's economic base, emissions levels, previous cooperation on environmental problems, political participation levels, pressure by nongovernmental organizations, the percentage of women in parliament, and levels of environmental foreign assistance. Investigations into local climate change agreements have identified some drivers of participation: the existence of co-benefits, an opportunity to exercise leadership, peer pressure, a moral imperative to act, the existence of policy entrepreneurs, and financial and political resources and legitimacy offered by participation. This study uses an empirical model to assess the relative significance of socio-economic, economic, environmental, and political factors in predicting municipal participation in environmental agreements.

From the Marshall Plan to the Millennium Development Goals: US Foreign Aid as Foreign Policy

Presenter: Sagar Rijal
Advisor: Simon Serfaty
Old Dominion University,
International Studies

In the last decade the US foreign aid policies have been affected by the twin shocks of its commitment to the Millennium Development Goals (MDGs) and the global war against terrorism. While political leaders, diplomats and development experts have always touted the moral and compassionate imperative for foreign aid, the often unspoken aims of aid has been geostrategic and political interests. Furthermore, in the last two decades, critics of Western developmental efforts have focused their attention on the issue of aid efficacy or lack thereof. This paper examines the historical trajectory of US developmental aid policies after the Second World War to the present time. Within that historical time frame, the paper examines the evolving theoretical and policy debates regarding the nature, goals and claims of developmental aid policies, the avowed and underlying motives behind aid, and if and how aid has been used as a diplomatic tool to further US foreign policy on the political front. Additionally, the paper touches on the issue of aid efficacy and maximum impact in light of the recent multilateral policy development, namely the MDGs, and the historical advent of the era of global terrorism. Such qualitative, analytical study finds that a broad multilateral agreement on the aims, methods and best practices on foreign aid will be beneficial not only to long-term prospects of the aid-receiving countries but also assist the larger foreign policy goals of the United States.

Fiscal Stimulus during Financial Crises: Does Fiscal Stimulus Work?

Presenter: Andrea Schirokauer
Advisor: Robert Bednarzik
Georgetown University,
Georgetown Public Policy Institute

The 2007-2009 financial crisis and the attendant surge in fiscal stimulus packages among the world's major advanced economies have exposed economists' divergent views on the effectiveness of fiscal policy on the economy. During this particular crisis episode, the line between fiscal and monetary policy in the U.S. became considerably blurry, raising the question of whether fiscal stimulus, at staggering levels, really had a hand in bringing the economy out of the Great Recession. This question is an important one, as public debt levels have built up to unprecedented heights, and concomitantly, questions surrounding debt sustainability are now at the forefront of policy debates. Based on a cross-country sample for the period 1970-2009, this study will examine the current crisis along with other severe economic downturns, especially whether in the presence of financial crises, government spending and tax changes have a significant effect on short-run economic growth and unemployment. It is important to isolate the impact of government spending and taxes on growth by controlling for other important influences, such as monetary policy and structural characteristics such as trade openness. Country fixed effects may also be important. Given the considerable likely back-and-forth relations surrounding the variables in a model of this nature, this study will not attempt to produce fiscal multiplier estimates. Instead, it will attempt to shed some light as to the potential direction of GDP growth in the presence of a crisis, and whether fiscal policy significantly contributes to it.

Mutual Deterrence among Members: Why Don't Organizations Take Action to Prevent Disasters?

Presenter: Junko Shimazoe
Advisor: Howard Aldrich
University of North Carolina at Chapel Hill,
Sociology

Why don't organizations take necessary action even when it seems very likely that inaction will lead to disasters? This question is important because organizational inaction will cost the public its safety, lives, and property. Since an organization is a collective group of members, and organizational life consists of their interactions, it is important to understand how the interactions cause members to choose inaction collectively even when they notice that something is going wrong. To answer this question, I used agent-based simulation and replicated members' interactions in an organizational setting. In the simulation, a disaster was still in its "incubation period," and no immediate threats were posed to organizational performance and survival. Members had developed a common understanding about what was desirable in and for their organization. They had also developed power and status structure based on formal titles and informal appreciation of competency and helpfulness. In deciding whether an action was necessary or not, members would consider other members' perceptions about a possible disaster, their own expertise, and power relations in the organization. The results of this study show that members' interactions discourage, not encourage, actions. In an organizational setting, members try to avoid embarrassment in front of other members who evaluate and develop impressions about them. The results suggest that when organizations do not take action to prevent disasters, it is because members are more interested in peace and harmony inside their organizations than possible danger to the public.

Renewable Energy and the Nevada Test and Training Range

Presenter: Hannah Vargason
Co-Authors: M. Baker, J. Yost
Advisor: Eric Jensen
College of William & Mary,
Public Policy

A team of graduate research consultants in the Thomas Jefferson Program in Public Policy examined the issue of encroachment at the Nevada Test and Training Range due to renewable energy infrastructure development—or congestion of the airspace by 200MW capacity solar power towers. Nevada has a competitive advantage in producing solar power, and both the Nation at large and the Department of Defense have ever-increasing renewable energy goals; however, the development of 116+ power plants (solar thermal and others) around the Range would significantly impede the critical training and munitions testing that occur there. The graduate team identified several mitigation options and make short and long term policy recommendations that aim to both preserve Air Force capabilities and advance renewable energy technology in the United States. Many are based on a variety of land acquisition methods, but they offer solutions merely on a case-by-case basis, and only with regard to solar power in Nevada. It seems as though a broad national policy is necessary, so this initial analysis should provide a basic framework for addressing encroachment from like sources at other Air Force bases, as well as those of the other branches of the armed forces. Finally, the graduate team inventoried further considerations including the political environment, community and environmental impacts, and tribal and mineral rights.

Notes

ARTS & SCIENCES


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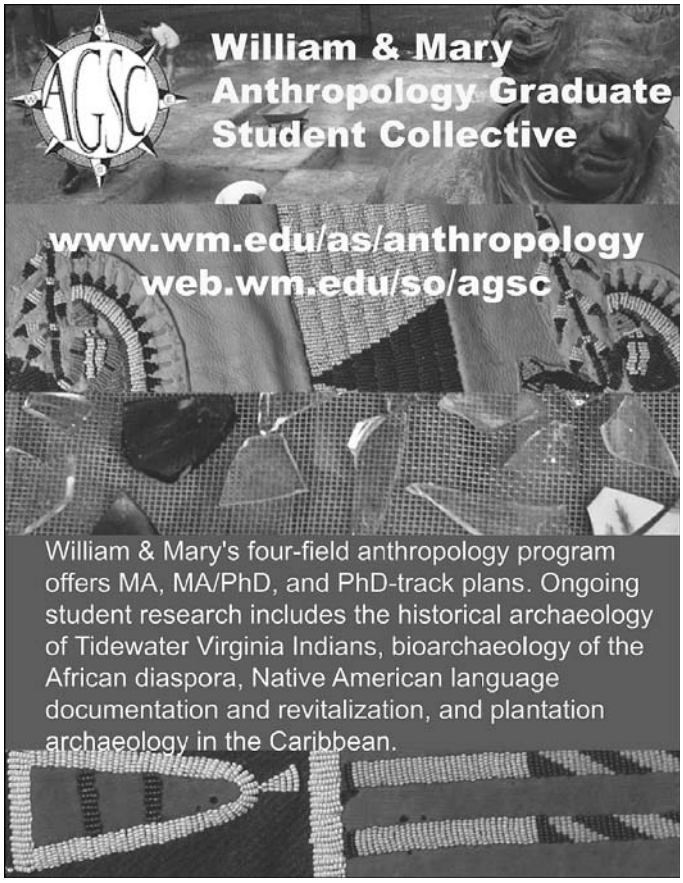
AGSC
William & Mary
Anthropology Graduate
Student Collective
www.wm.edu/as/anthropology
web.wm.edu/so/agsc
William & Mary's four-field anthropology program offers MA, MA/PhD, and PhD-track plans. Ongoing student research includes the historical archaeology of Tidewater Virginia Indians, bioarchaeology of the African diaspora, Native American language documentation and revitalization, and plantation archaeology in the Caribbean.

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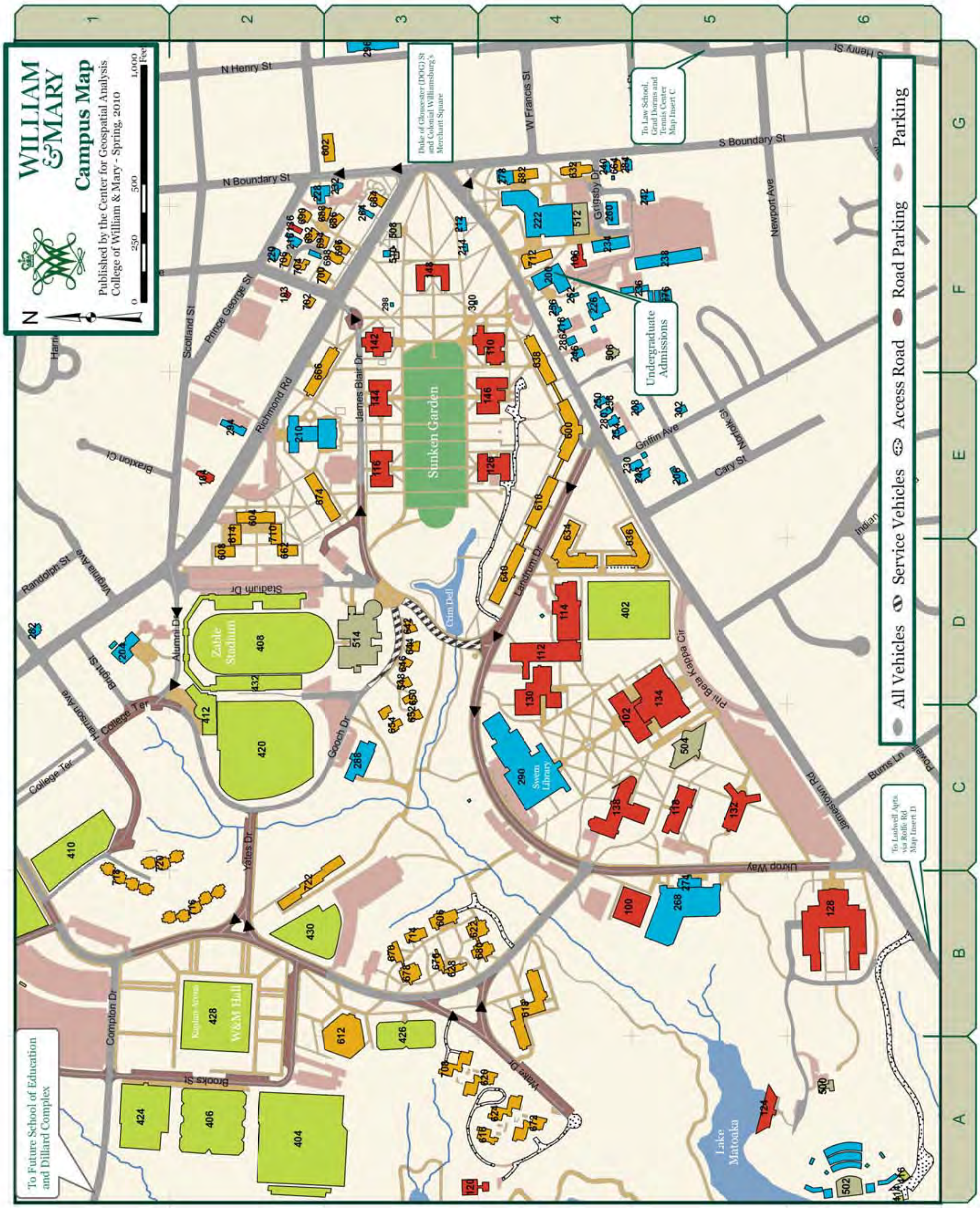
WILLIAM & MARY
Campus Map
Published by the Center for Geospatial Analysis
College of William & Mary - Spring, 2010
All Vehicles
Service Vehicles
Access Road
Road Parking
Parking
Undergraduate Admissions
Sunken Garden
Zable Stadium
Swem Library
Crim Dell
Lake Matoaka
N Henry St
N Boundary St
S Boundary St
W Francis St
Newport Ave
Richmond Rd
Prince George St
Scotland St
James Blair Dr
Griffin Ave
Cary St
Landrum Dr
Stadium Dr
Alumni Dr
Gooch Dr
Yates Dr
Ukrop Way
Jamestown Rd
Phi Beta Kappa Cir
Compton Dr
Brooks St
Wake Dr
College Ter
Harrison Ave
Virginia Ave
Randolph St
Braxton Ct
Burns Ln
To Future School of Education and Dillard Complex

MAP#	BUILDING	GRID
	ACADEMIC	
100	Adair Hall	B4
102	Andrews Hall	C4
	Blow Memorial Hall (#210)	E2
103	Bozarth Garage	F2
104	ARC (#224)	E2
106	Ceramics Studio	F4
108	Endocrinology (Pop) Lab.	Ins C
110	Ewell Hall	F4
112	ISC1 (Integrated Science Ctr.)	D4
114	ISC2 (Integrated Science Ctr.)	D4
116	James Blair Hall	E3
118	Jones Hall	C5
120	Keck Environmental Field Lab	A3
122	Marshall-Wythe Sch. of Law	Ins C
124	Matoaka Art Studio	A5
126	McGlothlin-Street Hall	E4
128	Miller Hall (Mason Sch. of Business)	B6
130	Millington Hall	C3
132	Morton Hall	C5
134	Phi Beta Kappa Memorial Hall	D5
136	Prince George House	F2
138	Small Hall	C4
140	Sch. of Education (Future Site)	Ins B
142	Tucker Hall	F3
144	Tyler Hall	E3
146	Washington Hall	E4
148	Wren Building	F3
	ADMIN & SUPPORT SERVICES	
200	Admission (Undergraduate)	F4
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204	Alumni House	D1
206	Bell Hall	E5
208	Blank House	E5
210	Blow Memorial Hall	E2
212	Brafferton	F3
214	Brafferton Kitchen	F3
216	Braxton House	F2
218	Bridges House	F4
220	Bull House	F2
222	Campus Center	F4
	ARC (#104)	
226	Child Care Center	F4
228	College Apartments	F2
230	Corner House	E4
232	Davis House	G3
	Ewell Hall (#110)	
234	Facilities Mgmt. Admin.	F4
236	Facilities Mgmt. Annex	F5
238	Facilities Mgmt. Shops	F5
240	Facilities Safety	F4
242	Facilities Supervisors	F5
244	Gabriel Galt	Ins A
246	Graduate House	F4
248	Grigsby House	E5
250	Holmes House	E4
252	Hoke House Annex	F4
254	Hornsby House	E4
256	Hoke House	F4
258	Lambert House	E4
260	Main Power Plant	F4
	Marshall-Wythe Sch. of Law (#122)	Ins C
264	Military Science	F3
266	Minson Galt	Ins A
268	Parking Deck	B5
270	Patrick Galt	Ins A
272	Patrick Galt Annex	Ins A
274	Police and Parking Services	B5
276	Quonset Huts	F5
278	Reves Center	G4
280	Rowe House	E4
282	Savage House	D1
284	School Leadership Institute	F4
286	Stetson House	F4
288	Student Health Center	C3
290	Swem Library	C4
292	Swem Off-Site Storage	Ins A
294	Thiemes House	E2
296	W&M Bookstore	G3
298	Wren Outbuilding North	F3
300	Wren Outbuilding South	F3
302	Young House	E5
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400	Albert-Daly Field	Ins A
402	Barksdale Field	D4
404	Busch Field	A2
406	Busch Tennis Courts	A2
408	Cary Field	D2
410	Intramural Fields	C1
412	Laycock Football Center	C2
414	Matoaka Boat House	A6
416	Matoaka Boat House 2	A6
418	McCormack-Nagelsen Tennis Ctr.	Ins C
420	Montgomery Field	C2
422	Plumeri Park	Ins A
424	Rec Sports Center	A1
426	Tennis Courts	B3
428	W&M Hall & Kaplan Arena	B2
430	Yates Field	B2
432	Zable Stadium	D2
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	Campus Center (#222)	
502	Lake Matoaka Amphitheatre	A6
504	Muscarelle Museum of Art	C5
	Phi Beta Kappa Memorial Hall (#134)	
506	Plumeri House	F4
508	President's House	F3
510	President's Guest House	F3
512	Trinkle Hall	F4
514	Sadler Center	D3
	W&M Hall & Kaplan Arena (#428)	
	Wren Building (#148)	
	STUDENT HOUSING & SERVICES	
600	Barrett Hall	E4
602	Brown Hall	G2
604	Bryan Hall	E2
606	Cabell	B3
608	Camm	D2
	Campus Center (#222)	
610	Chandler Hall	E4
612	Commons Dining Hall	A2
614	Dawson	E2
616	Dinwiddie	A3
618	Dupont	B4
620	Fauquier	A3
622	Giles	B3
624	Gooch	A4
626	Graduate Housing	Ins C
628	Harrison	B3
630	Hughes Hall	Ins A
632	Hunt Hall	G4
634	Jamestown North	D4
636	Jamestown South	D4
638	Jefferson Hall	F4
640	Landrum Hall	D4
642	Lodge 2: The Daily Grind	D3
644	Lodge 4	D3
646	Lodge 6	D3
648	Lodge 8	D3
650	Lodge 10	D3
652	Lodge 12	C3
654	Lodge 14	C3
656	Lodge 16	C3
660	Ludwell Apts: 100-700	Ins D
662	Madison	D2
664	Meridian Coffee House	G4
666	Monroe Hall	E3
668	Munford Hall	Ins A
670	Nicholas	B3
672	Nicholson	A4
674	Old Dominion	E2
676	Page	B3
678	Pleasants	B3
680	Preston	B3
682	Reves Hall	G4
	Sadler Center #514	
684	Sor. 1: Kappa Kappa Gamma	F3
686	Sor. 2: Alpha Chi Omega	F3
688	Sor. 3: Chi Omega	F2
690	Sor. 4: Tri Delta	F2
692	Sor. 5: Pi Beta Phi	F2
694	Sor. 6: Kappa Delta	F2
696	Sor. 7: Delta Gamma	F3
698	Sor. 8: Phi Mu	F3
700	Sor. 9: Kappa Alpha Theta	F2
702	Sor. 10: Bozarth	F2
704	Sor. 11: Gamma Phi Beta	F2
706	Sor. 12: Delta Phi (Mullen)	F2
708	Spotswood	A3
710	Stith	E2
712	Taliaferro Hall	F4
714	Tazewell	B3
716	Units (Fraternity) A,B,C,D,E	B2
718	Units (Fraternity) F,G,H,J	B1
720	Units (Fraternity) K,L,M	C1
722	Yates	B2

Meeting Space at the Sadler Center