8th Annual

# Graduate Research Symposium

March 27-28, 2009

The College of
William & Mary
Sadler Center
Williamsburg, Virginia

*"Preparing Scholars, Presenting Excellence"*

# Table of Contents

# Schedule at a Glance

**Friday, March 27, 2009 -- Sadler Center**

| | |
|---|---|
| 7:45 am - 8:30 am | Registration<br>*Second Floor Lobby* |
| 8:30 am - 7:00 pm | Poster Displays<br>*Second Floor Lobby* |
| 8:30 am - 9:30 am | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, and York Room* |
| 9:45 am - 10:45 am | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, and York Room* |
| 11:00 am - 11:30 am | Featured Lecture in Humanities and Social Sciences<br>*Commonwealth Auditorium* |
| 11:45 am - 12:45 pm | Lunch & Welcoming Remarks<br>*Chesapeake A* |
| 1:00 pm - 1:30 pm | Featured Lecture in Natural and Computational Sciences<br>*Commonwealth Auditorium* |
| 1:45 pm - 2:45 pm | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, York Room, and Chesapeake C* |
| 3:00 pm - 4:00 pm | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, and York Room* |
| 4:15 pm - 5:15 pm | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, York Room, and Chesapeake C* |
| 5:30 pm - 7:00 pm | Evening Networking Reception<br>*Chesapeake A* |

**Saturday, March 28, 2009 -- Sadler Center**

| | |
|---|---|
| 7:45 am - 8:30 am | Registration<br>*Second Floor Lobby* |
| 8:30 am - 12:00 pm | Poster Displays<br>*Second Floor Lobby* |
| 8:30 am - 9:30 am | Concurrent Sessions<br>*Tidewater A, Tidewater B, James Room, and York Room* |
| 9:45 am - 10:45 am | Concurrent Sessions & General Interest Lectures<br>*Tidewater A, Tidewater B, James Room, and York Room* |
| 11:00 am - 12:00 pm | Poster Presentations with Q&A<br>*Second Floor Lobby* |
| 12:00 pm - 1:30 pm | Luncheon and Awards Ceremony<br>*Chesapeake A* |

Dear Members of the William & Mary Community and Guests,

Welcome to the College of William & Mary's Eighth Annual Graduate Research Symposium. The Planning Committee has worked extremely hard to organize the largest symposium yet, with a presenter increase of 40% over last year and representation of all twelve Graduate Arts & Sciences departments and programs! Plus, let us not forget the more than thirty presenters from eighteen visiting institutions who have traveled here to share their research with us.

We hope that you will attend many of the more than 115 engaging presentations that will facilitate the interdisciplinary exchange of ideas. This is the goal of this two-day gathering, as it brings together graduate students from the sciences and humanities at William & Mary and visiting institutions. The institutions represented this year are the College of Charleston, Duke University, James Madison University, Johns Hopkins University, Marshall University, North Carolina Central University, Old Dominion University, Radford University, University of Delaware, University of Maryland-Baltimore, University of North Carolina-Chapel Hill, University of North Carolina-Wilmington, University of Richmond, University of South Carolina, University of Virginia, Virginia Commonwealth University, Virginia State University, and Virginia Tech.

In addition to the many graduate student presenters, there are two featured lectures, one in the humanities and social sciences and one in the natural and computational sciences. Dr. Scott Nelson, Legum Professor of History, will give a lecture entitled, "What Do Scholars Do All Day?" and Dr. Mark Forsyth, Associate Professor of Biology, will give a lecture entitled, "Perception of the Host Environment by Human Bacterial Pathogens." Further information on these presentations is available in the following pages of the program.

We thank all of the speakers for joining this event and helping to produce a truly extraordinary conference experience, as well as all of the support from various individuals and groups, all of whom cannot be named here. In order to keep striving to make this symposium more engaging, rewarding, and enjoyable, we will appreciate your feedback on the symposium in its entirety, so please take a moment to fill out the survey provided.

We look forward to meeting all of you during the symposium and hope that you enjoy the festivities!

Jonathan R. Skuza
Science Chair

Alix Méav Ellinwood-Jerome
Humanities Chair

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Dear Students and Friends,

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

This year's theme — "Preparing Scholars, Presenting Excellence" — resonates powerfully with William & Mary's mission in graduate education. Our students contribute seriously to human understanding on their way to advanced degrees. Then they continue to do so as teachers and scholars. The Symposium provides an opportunity for our graduate students to present their work alongside that of peers from other institutions — and for the rest of 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 2009 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 2009 Graduate Research Symposium, funding the Distinguished Thesis/Dissertation Awards 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, 2008-09

**President**: Larry McEnerney '76 BA English & History
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David R. Daugherty '69 BS Biology, '71 MA Biology
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
Robert Saunders '00 BS Physics
William Tropf '68 BS Physics
Edwin Watson II '68 BA History, '70 MA History

# 2009 Graduate Research Symposium

**Program Chairs**
Jonathan R. Skuza, *Physics*
Alix Méav Ellinwood-Jerome, *American Studies*

**Graduate Student Committee**
Ashley R. DeCarme, *Biology*
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Karl Mendoza, *Biology*
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Christian Wilbers, *American Studies*

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Chasity Roberts

**Distinguished Faculty Speakers**
President W. Taylor Reveley, III
Dr. P. Geoffrey Feiss, *Provost*
Dr. Dennis M. Manos, *Vice Provost for Research & Graduate Professional Studies*
Dr. S. Laurie Sanderson, *Dean of Graduate Studies*

**Featured Speakers**
Dr. Mark Forsyth, *Biology*
Dr. Scott Nelson, *History*

**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. Award categories could be eliminated based on the number and quality of submissions.

Humanities and Social Sciences
Dr. Marley Brown, *Anthropology*
Dr. John Burton, *Graduate Studies Advisory Board*
Mr. Nelson Daniel, *Graduate Studies Advisory Board*
Dr. Cheryl Dickter, *Psychology*
Ms. Ann Koch, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Dr. Brett Rushforth, *History*

Natural and Computational Sciences
Dr. David Daugherty, *Graduate Studies Advisory Board*
Dr. Irina Novikova, *Physics*
Dr. Leah Shaw, *Applied Science*
Dr. William J. Tropf, *Graduate Studies Advisory Board*
Dr. Haining Wang, *Computer Science*
Dr. Patty Zwollo, *Biology*

**Session Chairs**
Dr. Timothy Barnard, *American Studies*
Dr. Patricia Barry, *Graduate Studies Advisory Board*
Dr. Christina Berndt, *Anthropology*
Dr. Marley Brown, *Anthropology*
Dr. John Burton, *Graduate Studies Advisory Board*
Dr. Daniel Cristol, *Biology*
Dr. Christopher Del Negro, *Applied Science*
Dr. Phil Kearns, *Computer Science*
Dr. Arthur Knight, *American Studies*
Dr. Kris Lane, *History*
Dr. Kathrin Levitan, *History*
Dr. Gunter Luepke, *Applied Science*
Dr. R. Ale Lukaszew, *Physics & Applied 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. Leisa Meyer, *History*
Dr. Cynthia Morton, *Graduate Studies Advisory Board*
Dr. Lee Roberts, *Graduate Studies Advisory Board*
Dr. Betsy Schroeder, *History & American Studies*
Dr. Frederick Smith, *Anthropology*
Dr. Gregory D. Smith, *Applied Science*
Dr. Todd Thrash, *Psychology*
Dr. John van Rosendale, *Computer Science*
Dr. Stewart Ware, *Biology*
Dr. Janice Zeman, *Psychology*
Dr. Patty Zwollo, *Biology*

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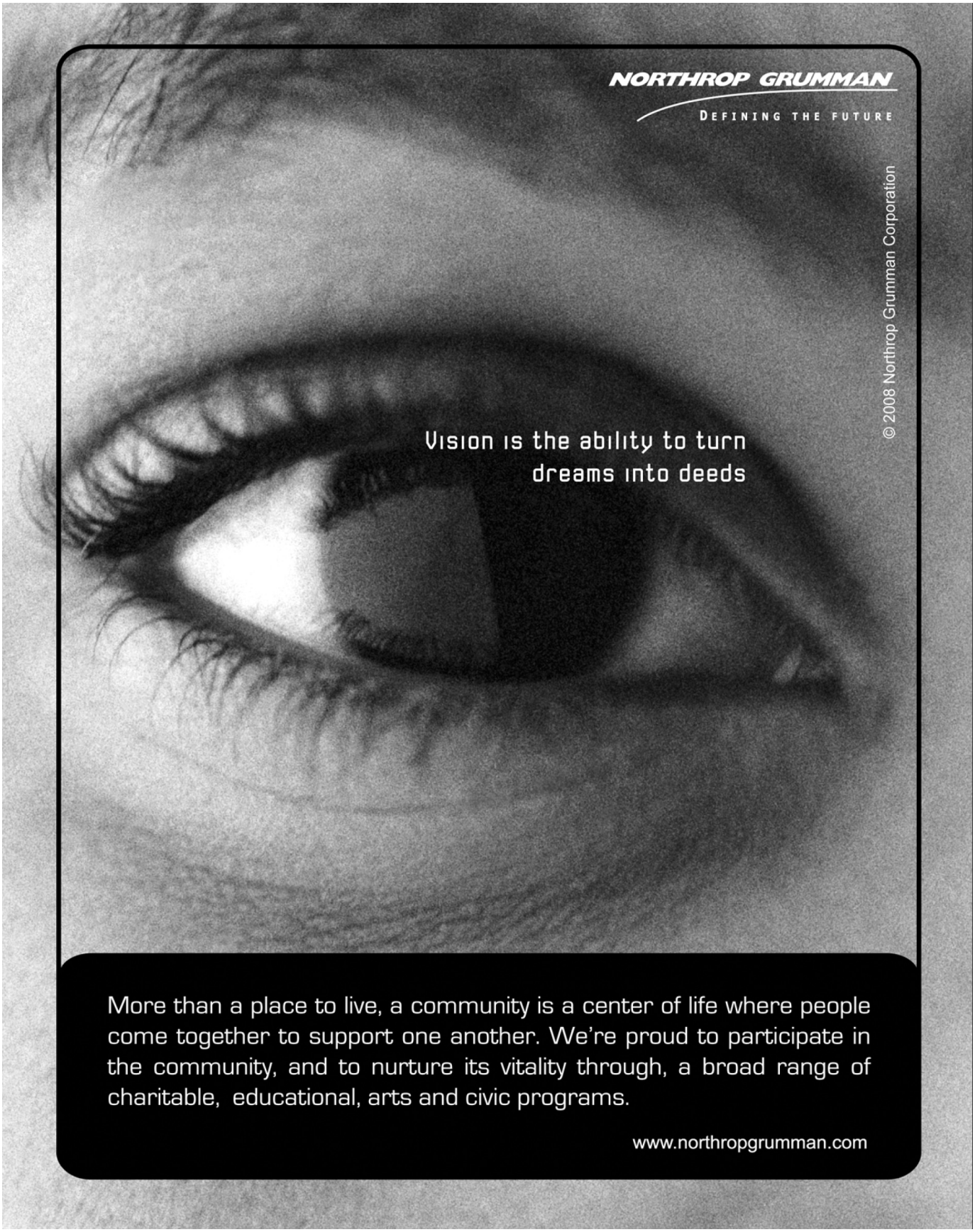
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# The College of William & Mary
# Award Recipients for Excellence in Scholarship

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 10-12 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 all 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 A&S 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**

PAUL MUSSELWHITE
The College of William and Mary, History. Advisor: Dr. James P. Whittenburg
*"What Town's this, Boy?": Virginia's Town Troubles, English Politics, and Aphra Behn's "The Widdow Ranter"*

**INCOGEN, Inc.** (www.incogen.com) provides software and professional services to scientists involved in biomedical, pharmaceutical, and biotechnology research. The company was founded by A&S Graduate Studies Advisory Board emeritus member Maciek Sasinowski (W&M '93 MS Physics, '95 PhD Physics).

**Incogen, Inc. Award for Excellence in Scholarship in the Natural and Computational Sciences**

ERIK SPAHR
The College of William and Mary, Physics. Advisor: Dr. Gunter Luepke
*A New Look at Proton Conduction in Perovskite Oxides*

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

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

KARL MENDOZA
Biology, Advisor: Dr. John Griffin
*Penny For Your Thoughts? How Neuroscience is Influencing Economic Thought: The Information Cascade Game Example*

**William & Mary Honorable Mentions**

DEREK R. MILLER
Anthropology, Advisor: Dr. Frederick Smith
*Breaking the Mold: Sugar Ceramics and the Political Economy of 18th Century St. Eustatius*

FRANK CHA
American Studies, Advisor: Dr. Susan Donaldson
*(Re)Visioning Home: Vietnamese Immigration and the Politics of Race/Place in the Global South*

## Visiting Scholars Award for Excellence in the Humanities and Social Sciences

STEPHANIE CRUMBAUGH
History, Johns Hopkins University, Advisor: Dr. Phil Morgan
*American Indian Enslavement in Colonial New England*

**Visiting Scholars Honorable Mentions**

KEVIN BARRY
History, University of Delaware, Advisor: Dr. John Montano
*The Hebrew and Irish Gaelic Revival Movements: A Comparison*

KEARA GOIN
Anthropology, University of South Carolina, Advisor: Dr. Kimberly Simmons
*Megadiva: Sexualized Images of Women in the Dominican Republic*

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

CHUAN YUE
Computer Science, Advisor: Dr. Haining Wang
*Anti-Phishing in Offense and Defense*

**Honorable Mentions**

ASHLEY R. DECARME
Biology, Advisor: Dr. Eric Engstrom
*Ethylene Production in Plants: Is the ACC Oxidase Enzyme at Work in Selaginella moellendorffii?*

M. LOUISE LAMMONS
Biology, Advisors: Dr. S. Laurie Sanderson and Dr. Randy Chambers
*Mud and Mucus: Feeding Selectivity in a Suspension-feeding Detritivorous Fish*

**Visiting Scholar Honorable Mention**

SAMY EL-TAWAB
Computer Science, Old Dominion University, Advisor: Dr. Stephan Olariu
*Intelligent Road Detection*

# Friday Morning, March 27 Program Schedule

**7:45 AM - 8:30 AM**
REGISTRATION (Second Floor Lobby)

**8:30 AM - 9:30 AM**

| Time | Tidewater A | Tidewater B | James Room | York Room |
|---|---|---|---|---|
| | **Session Chair:** *Dr. Betsy Schroeder* | **Session Chair:** *Dr. Daniel Cristol* | **Session Chair:** *Dr. Weizhen Mao* | **Session Chair:** *Dr. Christina Berndt* |
| 8:30 am | **Karen Smyth** American Studies *College of William & Mary* | **Allyson K. Jackson** Biology *College of William & Mary* | **Chuan Yue** Computer Science *College of William & Mary* | **Stephanie Hasselbacher** Anthropology *College of William & Mary* |
| 8:50 am | **Nicolette Gable** American Studies *College of William & Mary* | **Andrew McGann** Biology *College of William & Mary* | **Steven Gianvecchio** Computer Science *College of William & Mary* | **Angela L. Daniel** Anthropology *College of William & Mary* |
| 9:10 am | **Frank Cha** American Studies *College of William & Mary* | **Caitlin Kight** Applied Science *College of William & Mary* | | |

**9:45 AM - 10:45 AM**

| Time | Tidewater A | Tidewater B | James Room | York Room |
|---|---|---|---|---|
| | **Session Chair:** *Dr. Timothy Barnard* | **Session Chair:** *Dr. Stewart Ware* | **Session Chair:** *Dr. Phil Kearns* | **Session Chair:** *Dr. Frederick Smith* |
| 9:45 am | **Seth Feman** American Studies *College of William & Mary* | **Michele Tisdale** Biological Sciences *Old Dominion University* | **Zhenyu Wu** Computer Science *College of William & Mary* | **Kathleen Mocklin** Anthropology *College of William & Mary* |
| 10:05 am | **Julia Kaziewicz** American Studies *College of William & Mary* | **Lomax Boyd** Biology *College of William & Mary* | **Shahla Nasserasr** Applied Science / Mathematics *College of William & Mary* | **Keara Goin** Anthropology *University of South Carolina* |
| 10:25 am | **Matthew White** American Studies *College of William & Mary* | **Ericka Poppell** Biology *University of Richmond* | **David Goldenberg** Computer Science *College of William & Mary* | **Stephanie Bergman** Anthropology *College of William & Mary* |

**11:00 AM - 11:30 AM**

FEATURED LECTURE IN THE HUMANITIES AND SOCIAL SCIENCES (Commonwealth Auditorium)

**Dr. Scott Nelson**, *Legum Professor of History, The College of William and Mary*

***"What Do Scholars Do All Day?"***

**11:45 AM - 12:45 PM**

LUNCH & WELCOMING REMARKS (Chesapeake A)

**Dr. Dennis M. Manos**, *Vice Provost for Research & Graduate Professional Studies*

**1:00 PM - 1:30 PM**

FEATURED LECTURE IN THE NATURAL AND COMPUTATIONAL SCIENCES (Commonwealth Auditorium)

**Dr. Mark Forsyth**, *Associate Professor of Biology, The College of William and Mary*

***"Perception of the Host Environment by Human Bacterial Pathogens"***

# Friday Afternoon, March 27 Program Schedule

**1:45 PM - 2:45 PM**

| Time | Tidewater A | Tidewater B | James Room | York Room | Chesapeake C |
|---|---|---|---|---|---|
| | **Session Chair:** *Dr. R. Ale Lukaszew* | **Session Chair:** *Dr. Marley Brown* | **Session Chair:** *Dr. John van Rosendale* | **Session Chair:** *Dr. Christopher Del Negro* | **Session Chair:** *Dr. Todd Thrash* |
| 1:45 pm | **Kevin J. Smith** Physics *College of William & Mary* | **Derek R. Miller** Anthropology *College of William & Mary* | **Ruth Lamprecht** Computer Science *College of William & Mary* | **Joanna Lee** Applied Science *College of William & Mary* | **Ann Schlegelmilch** Clinical Psychology *College of William & Mary* |
| 2:05 pm | **Kaida Yang** Applied Science *College of William & Mary* | **Jennifer Ogborne** Anthropology *College of William & Mary* | **Samy El-Tawab** Computer Science *Old Dominion University* | **Jeff Mendenhall** Applied Science *College of William & Mary* | **Michael N. Geuss** Psychology *College of William & Mary* |
| 2:25 pm | **Justin D. Yonker** Physics *Virginia Tech* | **Erika Laanela** Anthropology *College of William & Mary* | **Ningfang Mi** Computer Science *College of William & Mary* | | **Kristin Reardon** Psychology *College of William & Mary* |

**3:00 PM - 4:00 PM**

| Time | Tidewater A | Tidewater B | James Room | York Room |
|---|---|---|---|---|
| | **Session Chair:** *Dr. Janice Zeman* | **Session Chair:** *Dr. Peter Martin* | **Session Chair:** *Mr. Larry McEnerny* | **Session Chair:** *Dr. Gregory D. Smith* |
| 3:00 pm | **Gina Veits** Psychology *College of William & Mary* | **Crystal Bertoncini** Physics *College of William & Mary* | **Caroline C. Morris** History *College of William & Mary* | **Ryan Carpenter** Applied Science *College of William & Mary* |
| 3:20 pm | **Debra Brown** Clinical Psychology *College of William & Mary* | **Cara Campbell** Physics *College of William & Mary* | **Eric J. Richardson** History / American Studies *NCCU / UNC - Chapel Hill* | **Yan Hao** Applied Science *College of William & Mary* |
| 3:40 pm | **Erika Siegel** Psychology *College of William & Mary* | **R. Eric Blue** Biology *College of William & Mary* | **Alan James Harrelson** History *College of Charleston* | **Leonard J. Carinci** Biological Sciences *Old Dominion University* |

**4:15 PM - 5:15 PM**

| Time | Tidewater A | Tidewater B | James Room | York Room | Chesapeake C |
|---|---|---|---|---|---|
| | **Session Chair:** *Dr. Todd Thrash* | **Session Chair:** *Dr. Gunter Luepke* | **Session Chair:** *Dr. Kris Lane* | **Session Chair:** *Prof. Elaine McBeth* | **Session Chair:** *Dr. Patty Zwollo* |
| 4:15 pm | **Gillian P. Freeman** Psychology *College of William & Mary* | **Sucheta Jawalkar** Physics *College of William & Mary* | **Janet M. Stephens** History *Virginia State University* | **Jose Alcaine** Public Policy & Admin. *VCU* | **Raaj Talauliker** Biology *College of William & Mary* |
| 4:35 pm | **Elicia C. Lair** Psychology *College of William & Mary* | **Erik Spahr** Physics *College of William & Mary* | **Peter Jones** History *College of William & Mary* | **Ava Gail Cas** Public Policy *Duke University* | **Bhargava Subhash Kalluri** Biology *Old Dominion University* |
| 4:55 pm | **Andrea Spaeth** Psychology *College of William & Mary* | **Manpreet Kaur** Physics *Virginia Tech* | **J. Michael Powell** History *Virginia State University* | | |

**5:30 PM - 7:00 PM**

EVENING NETWORKING RECEPTION (Chesapeake A)

# Saturday, March 28 Program Schedule

**7:45 AM - 8:30 AM**
REGISTRATION (Second Floor Lobby)

**8:30 AM - 9:30 AM**

| Time | Tidewater A | Tidewater B | James Room | York Room |
|---|---|---|---|---|
| | **Session Chair:** *Dr. John Burton* | **Session Chair:** *Dr. Cynthia Morton* | **Session Chair:** *Dr. Patricia Barry* | **Session Chair:** *Mr. Larry McEnerny* |
| 8:30 am | **Kathryn Conner Bennett** American Studies *College of William & Mary* | **Megan Rook** Biology *College of William & Mary* | **Brett Levanto** Public Policy *College of William & Mary* | **Stephanie Crumbaugh** History *Johns Hopkins University* |
| 8:50 am | **Alan Kennedy-Shaffer** American Studies *College of William & Mary* | **M. Louise Lammons** Biology *College of William & Mary* | **Sergio Prada** Public Policy *Univ. of Maryland - Baltimore* | **Paul Musselwhite** History *College of William & Mary* |
| 9:10 am | **Christian Wilbers** American Studies *College of William & Mary* | **Heidi J. MacLean** Biology *College of William & Mary* | | **Rob Morrison** History *UNC - Wilmington* |

**9:45 AM - 10:45 AM**

| Time | Tidewater A | Tidewater B | James Room | York Room |
|---|---|---|---|---|
| | **Session Chair:** *Dr. Lee Roberts* | **Session Chair:** *Dr. Patty Zwollo* | **Session Chair:** *Dr. Arthur Knight* | **Session Chair:** *Dr. Kathrin Levitan* |
| 9:45 am | **General Interest Lectures (9:45 - 10:45 am)** | **Maggie Barr** Biology *College of William & Mary* | **Amanda Stuckey** English *University of Virginia* | **Angelo Letizia** History *Old Dominion University* |
| 10:05 am | **Jonathan R. Skuza** Physics *College of William & Mary* (9:45 - 10:15 am) | **Wallace Hunter Baldwin** Center for Bioelectrics *Old Dominion University* | **Brian Piper** American Studies *College of William & Mary* | **Kevin Barry** History *University of Delaware* |
| 10:25 am | **Shane Ardo** Chemistry *Johns Hopkins University* (10:15 - 10:45 am) | **Karl Mendoza** Biology *College of William & Mary* | **Ben Anderson** American Studies *College of William & Mary* | **Joshua Hubbard** History *Marshall University* |

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

**1) Emily Beamon** (Psychology) *UNC - Wilmington*
**2) Jeremy Brown** (Psychology) *Old Dominion University*
**3) Dan Caselden** (Information Security Institute) *Johns Hopkins University*
**4) Subashini U. De Silva** (Physics) *Old Dominion University*
**5) Ashley R. DeCarme** (Biology) *College of William & Mary*
**6) Janette Drake** (Physics) *Old Dominion University*
**7) Noble I. Egekwu** (Integrated Sciences & Tech.) *James Madison University*
**8) Kyle Gagnon** (Experimental Psychology) *College of William & Mary*
**9) Lauren Gibbs** (Psychology) *College of William & Mary*
**10) Alexandra Herren** (Psychology) *Radford University*
**11) Joshua Hoskins** (Physics) *College of William & Mary*
**12) Elizabeth Mara Jacobs** (Chemistry) *College of William & Mary*
**13) David Johnston** (Physics) *College of William & Mary*
**14) Daniel Kinka** (Psychology) *University of Richmond*
**15) Sara E. Kreisel** (Biology) *College of William & Mary*
**16) Katie Lawson** (Psychology) *Radford University*
**17) Shannon S. Mahoney** (Anthropology) *College of William & Mary*
**18) Laura A. Maruskin** (Psychology) *College of William & Mary*
**19) Meghan McLain** (Clinical Psychology) *College of William & Mary*
**20) Marie L. Pitts** (Biology) *College of William & Mary*
**21) Neal Polhemus** (History) *College of Charleston*
**22) Marija Raskovic** (Physics) *Old Dominion University*
**23) Andrea Robinson** (Psychology) *College of William & Mary*
**24) Bo Sheng** (Computer Science) *College of William & Mary*
**25) Diana Soteropoulos** (Biology) *College of William & Mary*
**26) Chiu C. Tan** (Computer Science) *College of William & Mary*
**27) Janardan Upadhyay** (Physics) *Old Dominion University*
**28) Erik P. Vargo** (COR) *College of William & Mary*
**29) Haodong Wang** (Computer Science) *College of William & Mary*
**30) Jason Westerbeck** (Biology) *College of William & Mary*
**31) Leah Wilson** (Biology) *College of William & Mary*
**32) Yanli Xiao** (Physics) *College of William & Mary*
**33) Fengyuan Xu** (Computer Science) *College of William & Mary*
**34) Zheng Zhang** (Computer Science) *College of William & Mary*

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

**Dr. S. Laurie Sanderson,** *Dean of Graduate Studies and Research, Arts and Sciences*
**Dr. P. Geoffrey Feiss,** *Provost of the College of William and Mary*
**President W. Taylor Reveley, III,** *President of the College of William and Mary*

## Dr. Scott Nelson

*Legum Professor of History, College of William & Mary*

# What Do Scholars Do All Day?

March 27, 2009
Commonwealth Auditorium
11:00am – 11:30am

**Abstract** - This partly autobiographical discussion will describe what's peculiar about scholars, how they work, and why they're necessary.

**Biography** - Scott Reynolds Nelson is Legum Professor of History at the College of William & Mary. His book *Steel Drivin' Man*, has been widely and warmly reviewed, winning three national awards in 2007 including the National Award for Arts Writing, and the Curti Prize for best book in U.S. social and cultural history. Most recently, Publisher's Weekly, Booklist, and the Chicago Public Library named his children's book, *Ain't Nothing But a Man: My Quest to Find the Real John Henry*, one of the best books of 2008.

**Please Join Us For Lunch and Welcoming Remarks**
**Chesapeake A 11:45am - 12:45pm**

## Dr. Mark Forsyth

*Associate Professor of Biology, College of William & Mary*

# Perception of the Host Environment by Human Bacterial Pathogens

March 27, 2009
Commonwealth Auditorium
1:00pm – 1:30pm

**Abstract** - As is the case for all organisms, bacteria must detect changes in their environment and respond appropriately. Failure to acclimate or adapt to altered conditions places the organisms at risk for elimination. Our lab studies the molecular mechanisms that bacterial pathogens use to sense host environmental changes and their means of adaptation. For the sensory and response processes, bacteria rely heavily on signal transduction pathways consisting of membrane bound sensory histidine kinase proteins coupled with cytoplasmic transcriptional factors, referred to as response regulators. This talk will discuss our recent results on signal transduction in two human pathogens, *Helicobacter pylori* (the etiologic agent of Peptic Ulcer Disease and gastric cancer) and *Bordetella pertussis* (the etiologic agent of Pertussis or Whooping Cough).

**Biography** - Dr. Forsyth joined the faculty of William and Mary in 2000. He received his B.A. in Zoology from the University of Maine in 1982 with graduate work on molecular biology and pathogenesis of *Mycoplasma gallisepticum*. (Ph.D. in Pathobiology with Bacteriology specialization in 1991). He was a Post Doctoral Fellow with Dr. Steven J. Geary at the University of Connecticut studying "the molecular biology of Mycoplasmas" (1991-1995) and with Dr. Timothy L. Cover at Vanderbilt University Medical Center studying "the regulation of virulence gene expression in *Helicobacter pylori" (*1995-1999). Dr. Forsyth was also a Visiting Scientist at the University of California at Santa Barbara with the Molecular, Cellular, and Developmental Biology Department.

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## North Meets South: Fund Raising Events and the Mobility of the Civil Rights Experience

*Presenter:* Ben Anderson
College of William and Mary,
American Studies

During the 1950s and 1960s, many of the civil rights movement's main organizations had national headquarters in the urban North and fund raising was among their primary goals. Due in part to the organizations' periodic financial crises and the high costs of subsidization, fund raising events for the movement came in many forms including tea parties, fashion shows, church gatherings, art exhibitions, movie screenings, theatrical performances, stand-up comedy routines, and musical concerts, catering to as many tastes as possible. The diverse locales for the events and widely divergent ticket prices also helped assure that these same events were accessible to a high number of the cities' residents. Though some events were more successful than others, careers of organization staff members and the progress of the movement often hung in the balance. Like other Americans, residents of the urban North experienced the movement largely through the media as opposed to direct participation. However, in my presentation I argue that the prominence of fund raising events added a unique element to their experience, providing them with opportunities to monetarily contribute to the movement's development and thus envision themselves as activists. While evidence exists to support the notion that benefit attendees occasionally appeared to be more interested in their individual social agendas than that of the movement, the fact that the events were racially integrated by nature made it easier for their attendees to interpret them as what I call "micro utopias" of the movement, proof that at least its peaceful integrationist goals weren't beyond reach and could even be attained in an enjoyable (as opposed to violent) manner. Ultimately, I argue that fund raising events can be understood as helping both the region and its inhabitants transgress their liminality as sympathetic with the movement but not on its frontlines.

## Contextualizing Resistance: Ormond and the Rape Trial Narrative

*Presenter:* Kathryn Conner Bennett
College of William and Mary,
American Studies

I am submitting a completed piece of interdisciplinary research about the history of rape law in the United States up to the 1790s along with an extended literary analysis that examines trial narratives in context. In the competing narratives forwarded by defending and prosecuting attorneys in rape trials throughout the 1790s, two conclusions emerge: women's resistance to rape, defined as crying out and physical struggle, is presupposed and necessary, while men are allowed, even expected, to behave in a sexually aggressive fashion. The defense attorneys consistently argue that the main threshold for proving guilt is consent, but they measure consent in terms of the alleged victim's resistance. Prosecutors agree about the primacy of consent, but they are most interested in the violence and force used by the alleged perpetrator. These assumptions, these competing narratives, are reflected in their contemporary cultural and literary landscapes. The writer and intellectual, Charles Brockden Brown was aware of debates about sexual violence and his novel *Ormond: Or, The Secret Witness* (1799) engages the issue. Brown's heroine, Constantia Dudley, and his villain, Ormond, begin by acting in accordance with extant social messages about the proper expression of and response to sexuality, but both then take their roles to new and destabilizing heights; heights directly suggested by the competing narratives of rape trials. I will consider Ormond in the terms posed by the trial narratives, arguing that previous scholarship fails to contextualize Constantia's extraordinary resistance in the terms used by attorneys to evaluate the victims with whom she has so much in common. The same is true for her assailant, Ormond. Doing so will show that Brown is a speculative novelist, at least in Ormond, and that his inability to resolve the narrative reflects an inability to resolve his society's gender politics.

## (Re)Visioning Home: Vietnamese Immigration and the Politics of Race/ Place in the Global South

*Presenter:* Frank Cha
College of William and Mary,
American Studies


(Re)Visioning Home utilizes contemporary literature as a critical lens to examine how Vietnamese immigration impacts the contemporary American South. The effects of globalization on southern economies, public housing, and immigration policy, and the lack of scholarship on Asian Americans in southern cultural studies represent compelling factors for reconsidering how place and space complicate regional, national, and global identities. I argue that Vietnamese immigrants transform physical spaces in order to counter the racial and ethnic divisions of the Mississippi Delta. These immigrant populations disrupt the traditional black/white racial binary and reconstruct the South as a transnational space. While this presentation is part of a larger project on representations of Asian American identity in contemporary fiction and film set in the American South, I will specifically examine Robert Olen Butler's *A Good Scent from a Strange Mountain*, Mary Gardner's *Boat People* and oral histories of Vietnamese residents in the Delta region. Feeling simultaneously away from and at home, the characters presented in these texts struggle to understand where exactly their place is in their respective communities. Spaces like housing projects and businesses represent physical demarcations of racial and ethnic divisions within the South positioning certain groups as insiders and outsiders. I will analyze how Vietnamese immigrants navigate the economic, religious, and social spaces where individuals vie for power, authority, and acceptance. This presentation will also illustrate the ways in which literature serves as a crucial space to unearth the hidden histories of Asian American populations in the contemporary South.

## Art's Consumer Subjects: Education at the National Gallery of Art

*Presenter:* Seth Feman
College of William and Mary,
American Studies

How should we interpret it when a schoolgirl touring the National Gallery of Art responded to an educator's, "Where do you think Manet painted The Railway?" with, "In jail."? Does it matter she was from DC? the Shaw neighborhood? black? or that this came just before the 1963 March? Did the painting evoke a poignant memory? Or was this recalcitrance meant to liberate her from the Gallery? Does her imagination augment the Gallery's claim that art is universal? Or does it contradict or neutralize it? My presentation explores what happens when viewers find unanticipated meanings in art, despite institutional efforts to train viewers in what and how to see, and how institutions dealt with such unexpected visions. As part of a larger work that relates mid-century race and gender discourses to the ways of seeing normalized by art museums, I join recent interdisciplinary work to argue that art education, as a newly professionalized visual technology, exerted representational power over identity. Early Gallery educators cut their teeth as Popular Front educators, teaching across racial lines and employing art to produce pluralistic "future citizens." Their inventive educational programming used film, TV, and prints to challenge the Gallery's universalizing definition of art. One movie, for example, used puppets to dispel art's timeless aura by describing how successive patrons artificially inflated a painting's value and reinterpreted its meanings. By the early 1950s, Junior League docents had revamped the education department in response to DC school integration. New lectures popularized art by asserting its preciousness and racially conscious lesson plans became "colorblind." By arguing that the public demanded these changes, the Gallery posed its students as consumers, which enlisted a market model to claim democracy's triumph. Yet this new demographic was characterized by an exclusively white, middle-class interiority. Although the Gallery insisted everyone was free to see art in whatever way came naturally, the schoolgirl's evocative quip might not do. Either her view had to be true, or she truly lacked the inborn capacity for art.

## Popular Rebellion: The Bell Jar's Conservative Engagement with Popular Culture

*Presenter:* Nicolette Gable
College of William and Mary,
American Studies

Sylvia Plath famously described The Bell Jar as a "potboiler." Her goal was to write a novel that was similar to the popular fiction and movies of her time, which would play into the market for a specific kind of narrative. This project examines the connections between Plath's work and popular culture and addresses the question of the novel's continuing popularity. Plath packed her novel with intertextual pop culture references to the point that the novel becomes both a parody and an imitation. The Bell Jar is often seen as a statement of rebellion against the conformity of 1950s culture. However, even the movies from that time belie such a repression theory. Esther's struggle is not that of a feminist renegade, but rather a standard script that incorporates rebellion as part of a coming of age that leads to social adjustment. The focus of the novel is on adjustment, on normalization, which it holds up as a hope and a promise at its end. This process of normalization is based on the commodification and cooptation of rebellion that popular culture participated in. In this light, Esther's dissatisfaction with society is neither feminist nor liberating. Rather, her rebellion is framed as the relatively constant and nonthreatening rebellion of youth against authority. Esther's coming of age involves rebellion, especially sexual rebellion, but this rebellion lacks any real revolutionary potential because it is circumscribed in her passage to maturity and it is easily and profitably commodified.

## No Context, No Contest: Editing *The Family of Man* for Mass-Circulating Consumption

*Presenter:* Julia Kaziewicz
College of William and Mary,
American Studies

Edward Steichen's "The Family of Man" exhibition has been a topic of interest for critics, art historians, and cultural theorists since its 1955 premier at the Museum of Modern Art (MoMA). However, a deep investigation of the relationship between Steichen and MoMA and of their role in Cold War international propaganda is still lacking. There has been little written about the mysterious disappearance of the exhibition's only color frame, a photograph of the explosion of the hydrogen bomb at the Bikini islands, from *The Family of Man* book. Though the representation of the h-bomb was intended to show audiences the possibility of global devastation due to the misuse of nuclear weapons, the original image was clearly linked to United States military power and continued experimentation. At a time when the potential of nuclear warfare lay at the nexus of global conflict, the decision to pull the image from the catalogue belies Steichen's, and MoMA's, desire to distance the show from America's recent nuclear history. I want to examine the ideological motivations and goals of the modified exhibition as it travelled around the globe under the administration of the United States Information Agency. Steichen touted the idea that the humanist, universalist theme of "The Family of Man" was intended to heal the rifts of the Cold War through decontexualized sentimental images of people from around the world dealing with the same life situations. This view of the exhibition is complicated by the purposeful removal of the h-bomb print from the catalogue, and by the use of the show as a cultural weapon in the aid of containment. In this paper, I consider how Steichen's fierce patriotism and modernist sensibilities created a subtext to "The Family of Man" that perpetuated the myth of American exceptionalism found at the heart of the Cold War.

## Voting Immigrant: Noncitizen Suffrage in America, 1865-1926

*Presenter:* Alan Kennedy-Shaffer
College of William and Mary,
American Studies

INTRODUCTION & OVERVIEW
Beginning as early as 1704, noncitizens voted in the American colonies, casting ballots in local, state, and federal elections. By the end of the eighteenth century, noncitizens had voted in twelve of the original thirteen states. Noncitizen voting in the United States proliferated rapidly after the Civil War with territorial expansion, the demand for free labor, and the creation of immigrant-based political machines in many large cities. The progressive era, coupled with the advent of World War I, drastically curtailed noncitizen voting due to the resurgence of nativism, the influence of the Ku Klux Klan, and the complicity of reformers driven by concerns about political corruption, slum conditions, and latent xenophobia.

QUESTION
How did political, cultural, and economic forces lead to the rise of noncitizen voting from the 1850's through the 1880's just as other forces led to the decline of noncitizen voting in the early years of the twentieth century?

METHODOLOGY & EXPECTED FINDINGS
The goal of this study is to evaluate immigration and voting patterns of noncitizens from the Civil War era through World War I and to assess how immigrant attitudes toward suffrage aligned with the interests of the machine politicians and how nativist and progressive reforms curtailed both immigration and noncitizen voting. I expect to find evidence that many immigrants viewed suffrage and citizenship as desirable elements of the American polity and exercised the right to vote on par with the rest of the population. At the same time, I expect to find evidence of a backlash from nativists and reformers that curtailed immigration and eliminated noncitizen voting by 1926.

## "I don't deal in relaxation music. I deal in news": Civil Rights and the Blues Photography of Ernest C. Withers

*Presenter:* Brian Piper
College of William and Mary,
American Studies

This presentation will examine closely some of the photographs of Ernest C. Withers, a Memphis, Tennessee photographer who became one of the most prolific documentarians of the Civil Rights Movement. While his photographs of protest action spanning from the 1955 Emmet Till murder trial through the 1968 Memphis Sanitation Workers' Strike remain iconic, I am more interested in Withers' photographs of segregated leisure spaces in the African American community. Withers made an explicit commitment to capture the social life of Black Memphis and amassed a significant catalog of local and national Rhythm and Blues musicians touring through the city. Occasionally, Withers snapped musicians appearing with civil rights leaders, but more often he captured performers at work and the audience at play inside the blues clubs on and off of legendary Beale Street. Tracing the overlaps in Withers' life and work, this presentation illustrates that the sentiments cultivated by the singers, players, dancers, and drinkers in the Blues venues of mid-century Memphis - and thus captured in the spaces and faces of Withers' photographs - are part of the same stream of political subjectivity that made the mainstream Civil Rights Movement possible. This presentation reveals how the creative impulses of popular cultures and leisure time make possible the articulation of memories of racial violence, the enthusiasm for the possibilities of burgeoning activism, the reinforcement of Black social networks, and the same imperative to make those messages public that Withers' photographic practice represents. Ideally, this presentation will be an initial foray in a multi-disciplinary project that will explore how music, image, text, and live bodies in creative space overlapped and functioned as integral elements in the maintenances of political sensibilities that we now recognize as the mainstream of the Civil Rights Movement.

## What's a Nice Mormon Girl Doing Writing About Vampires?: A Look Inside Stephenie Meyer's *Twilight* Series

*Presenter:* Karen Smyth
College of William and Mary,
American Studies

The purpose of my Master's thesis is to examine Stephenie Meyer's four-novel *Twilight* series, a story with themes of grand romance and true love between a teenage human girl and a vampire boy. The popularity of these books can be classified as a phenomenon: fans have created over three hundred websites, the books have spawned a wildly profitable movie franchise, and they have been translated into over twenty languages. *Twilight* conventions have become commonplace, with the largest to take place in Texas in July of 2009. As a member of the Church of Jesus Christ of Latter-Day Saints (LDS, or Mormon), Meyer has woven Mormon values and theology into the novels without making them overtly religious. The virginal love story that is central to the series' plot is also integral to LDS society, and the gender roles within the books follow proscribed roles for men and women within the Mormon Church. I want to discover why the *Twilight* series have become tremendously popular. Is it because of the universality of a Romeo-and-Juliet-esque love story? Or is it because they are chaste novels for teenagers written during an age where sex sells? I will argue that the LDS values within the series increase their popularity although most readers, especially non-LDS, are unaware of these values. Meticulous research of Internet forums, book reviews, interviews with the author, and fan sites will help me understand why the novels are so popular within their targeted audience. Specific study of Mormon *Twilight* fans will highlight how the LDS themes in the books are recognized and received. I will do additional research on vampire fiction, the young-adult genre, romance novels, and Mormonism with a concentration on gender roles to further my understanding of the *Twilight* series and its place in the annals of pop culture.

## Access and Agency in the Photographs of Eudora Welty

*Presenter:* Amanda Stuckey
University of Virginia,
English

Traveling in rural Mississippi while working for the Works Progress Administration in the 1930s, Eudora Welty used a camera to record moments in the lives of the people she met. As she produced these images on her own volition and as, in her words, an "amateur" photographer, another New Deal program, the Farm Security Administration, had the task of photographing similar scenes in the rural southeastern United States to produce images of a nation in depression. The FSA images became typical of photography of the documentary tradition - a tradition from which Welty distanced herself. When asked about her relation to the FSA photographers, Welty viewed her work as inherently different and unprofessional; in various interviews she locates the difference between her photography and FSA work primarily in her intentions. Her photographs, she maintains, were not deliberately or professionally conceived. However, beyond Welty's own words, I believe that her photographs distinguished her work from documentary photographs in the relationship that they reveal between the photographer and photographed subject. Although both Welty and her FSA counterparts were able to access their photographic subjects due to their statuses as white and middle class in the Jim Crow South, I read the distinction between Welty's photographs and those of the documentary tradition as predicated on what Welty's photographs allow her subjects to do within the photo frame. This paper demonstrates the agency that Welty facilitates for her photographic subjects, in particular her African American female subjects. Through close readings of several of Welty's photographs, I show that Welty's subjects do not overtly refuse the access that the photographer's color and status allow her, but instead call attention to it in their confrontation with Welty's lens. Welty's photographs, therefore, differ from those of the documentary tradition because they permit collaboration between photographer and photographed subject.

## Taking Time: Chronocentrism in Contemporary American Culture

*Presenter:* Matthew White
College of William and Mary,
American Studies

Late 20th- and early 21st-century American culture is marked by a profound and deepening chronocentrism, a "temporal exceptionalism" or belief that time and history have reached a culminating point in our contemporary world situation to an unprecedented degree. This profound chronocentrism, unprecedented in modern historical memory, finds its roots in the marked changes in late capitalism ushered in by the third technological revolution of the mid to late 21st century, by the failure of the implosion of capitalism predicted by Lenin, and by the collapse of the bipolar hegemonic order of the Cold War. This presentation will explore the power and meaning of chronocentrism, telling its story through two forms of contemporary American cultural expression -- Protestant apocalypticism and beliefs about UFOs and extraterrestrials. Using the theoretical perspective of writers such as Horkheimer and Adorno, we will see that chronocentric ideology, like ethnocentric ideology, is rooted in the search for power and domination that is integral to the capitalist worldview and ethos, and that it has similarly negative and powerful impact on everything from foreign and domestic policy to generic attitudes toward the environment and sustainability.

## Public Diplomacy - Between Propaganda and Public Relations

*Presenter:* Christian Wilbers
College of William and Mary,
American Studies

Facing the domestic and global conflicts of the 21st century, Western politicians and diplomats have begun to reconsider the ways in which to win “hearts and minds” across the world. U.S. policy-makers, especially, are confronted with a situation which demands a new effective and sophisticated strategy as they see the moral and geopolitical status of the United States deteriorate. Traditionally underfunded, public diplomacy programs have been hard to justify in this context because of their lack of immediate visible results. But in the face of financial and military crises, these programs have gained new ground in their efforts to propose affordable, long-term solutions. During my research on this topic, I have encountered some fascinating examples of how public diplomacy has made a difference in diplomatic efforts to change the course of history. After World War II, for example, U.S. occupational forces effectively promoted democracy in a destroyed Germany by recognizing the peculiarities of its culture, thus leading the country into a future that was by no means predestined. Simultaneously, the aspiration to differentiate Western democracy from Nazi and Soviet totalitarianism promoted a careful treatment of information politics and propaganda. More than fifty years later, some of the lessons learned then are worth being remembered. In my presentation, I want to discuss some of the intricacies of cultural and public diplomacy, especially in the context of public relations and propaganda. Diplomacy is not and never will be about two equal parties sharing information, but about the advancement of one’s interests and the persuasion of others. But as I hope to show, in public diplomacy, knowing and respecting the other party is one of the biggest keys to success.

## The Political Landscape of Vernacular Architecture in Barbados

*Presenter:* Stephanie Bergman
College of William and Mary, Anthropology

In the summer of 2008, in conjunction with an annual archaeological field school, a stone-walled slave house was investigated in the rural parish of St. Peter, in Barbados. Historic evidence is provided which indicates these stone-walled houses were introduced in slave communities, beginning in the late eighteenth and early nineteenth centuries, just before emancipation. No previous research has yielded archaeological data of slave housing on the island, and this presentation provides some insights into the material conditions of the enslaved through an analysis of different architectural forms that coexisted in Barbados from this time period to the immediate decades following emancipation. The introduction of these stone-walled houses suggests that during the later period of slavery on the island, the planter class began to exert more social and political control over enslaved communities. While the archaeological evidence is preliminary, it is comparatively interpreted through other recent studies in the Caribbean to reflect the social and material conditions that began to drastically change in the decades just prior to emancipation. Through this research, specific social, political, and historic forces are explored to understand what may have created this increase in control on slave housing and settlement and how these communities created resilient measures to increase their own autonomy.

## School Days: The Virginia Indian Struggle for a Formal Education

*Presenter:* Angela L. Daniel
College of William and Mary, Anthropology

At the turn of the 20th Century, Virginia Indians were neither U.S. citizens nor state-recognized (as the term is understood today). In 1924, the Racial Integrity Act virtually abolished “Indian” from being a legal category in Virginia. Yet, a handful of Indian schools were maintained and supported by the state until the end of the segregation era. Lacking federal recognition, Virginia Indians were not eligible to attend federal Indian boarding schools. Yet, some Virginia Indians attended out-of-state boarding schools for federally recognized Indians. Archival and oral histories will be researched to determine what restraints and choices Virginia Indian parents had to negotiate in order for their children to obtain a high school diploma. I will seek to answer how Virginia Indians navigated through the sociopolitical terrain during this period to obtain a formal education, and who assisted them in these efforts. The research will engage the theoretical tension between agency and structure. It is anticipated that Virginia Indians responded with creative means to circumvent these structures of inequality. However, it is doubtful that Virginia Indians who overcame the obstacles to education were ever totally free from the affects of these structures of inequality as long as they still exist within mainstream America.

## Megadiva: Sexualized Images of Women in the Dominican Republic


*Presenter:* Keara Goin
University of South Carolina, Anthropology

In this presentation I argue that the emerging Dominican media icon referred to as the megadiva, a representation that reflects exaggerated Dominican notions of beauty and femininity, plays an important role in identity construction. I discuss how this particular representation influences my primary sample group: female communication students at an upper and upper-middle class university in Santiago, Dominican Republic. I argue that as the communication students are being exposed to the megadiva they are uniquely influenced by the representation due to their goals to enter the Dominican media industry. They then are forced to articulate their own identities and future careers through this specific representation. The ethnographic data, combined with an investigation of Dominican media forms, revealed a reciprocal process where the representation of the megadiva acts as a socializing agent that influences standards of Dominican beauty, reinforces Dominican gender ideologies, and contributes to Dominican female identity negotiation through imitation, rejection, and participation.

## Hurdles Facing Indigenous Linguistic Revitalization: Intergenerational Language Transmission as a Goal

*Presenter:* Stephanie Hasselbacher
College of William and Mary, Anthropology

The goals of any particular indigenous language revitalization effort are defined by the communities involved, and can be highly variable. At the core of these efforts, however, exists a shared desire for continued use of the target language. Ultimately, indefinite continued use entails the transmission of the language from one generation to the next, which is a particularly challenging hurdle in a revitalization effort. This presentation outlines some of the conditions, social and at times psychological, that influence intergenerational language transmission. These include flexibility for linguistic innovation, a psychologically safe environment for language learning, community motivation, and community support. Worldwide indigenous communities provide examples of how these factors have positively influenced their respective revitalization efforts, resulting in successful intergenerational transmission of the target language. As these communities grow and change, the act of language transmission allows their language to grow and change with them. In other words, they exemplify linguistic vitality. The argument of this paper is relevant to the field of indigenous studies outside of linguistics and to indigenous communities all over the world who are dealing with questions of linguistic and cultural revitalization because it stresses the importance of community leadership to linguistic and cultural vitality. In summary, the purpose of this presentation is to give a framework to compare the vastly different sociolinguistic situations and solutions on the table, and to address the difficulties of intergenerational language transmission in search of direction for nascent language revitalization efforts.

## "Convoy Them in Safety Thither": The Royal Navy in Late 19th-Century Newfoundland

*Presenter:* Erika Laanela
College of William & Mary, Anthropology

The British frigate HMS Sapphire was sunk in Bay Bulls, Newfoundland, during an engagement with a French squadron in 1696. The ship was part of a convoy system established to defend ships carrying fish, wine, and other commodities in a trade network tying Newfoundland to England, the Iberian Peninsula, and other Atlantic ports. Naval commanders played a role not only in defence, but also in the judicial affairs of the island. The imposition of naval government over the dispersed population of the island was a matter of negotiated authority that depended on reciprocal relationships between naval personnel and civilians of all classes. Analysis of artifacts from the ship provides new insights into the expansion of mercantilism, the interaction of naval and civilian populations, and the internal social organization of a naval vessel.

## Charles' Corner and the Archaeology of African American Life in Post-bellum Virginia

*Presenter:* Shannon S. Mahoney
College of William and Mary, Anthropology

The half-century between the Civil War and World War I was a critical period of cultural, social and economic transition for African Americans in the southern United States. Nevertheless, archaeological sites representing African American life in the late nineteenth and early twentieth century are rarely recognized for their importance. Archaeological testing at Charles' Corner, a post-bellum residential community on the Lower Virginia Peninsula, provides a compelling account of African American landholders during this period. Through this poster, I will relay information retrieved during a month of survey, mapping and excavation at four archaeological sites currently within the bounds of the Yorktown Naval Weapons Station. Ultimately, these data will contribute to an analysis of socioeconomic networks and the process of community building among African Americans within a complex political environment in the decades following Emancipation.

## Breaking the Mold: Sugar Ceramics and the Political Economy of 18th Century St. Eustatius


*Presenter:* Derek R. Miller
College of William and Mary, Anthropology

Redware ceramics made in the Caribbean have long been a fascination for Historical Archaeologists with studies ranging from African "survivals" to informal markets. This study takes these long studied ceramics and looks at them at a regional level. The discovery of a midden on St. Eustatius that contained over 400 sherds of Caribbean redware sugar molds and drips dating to the middle of the 18th century points to the mass production of these ceramics for a market need. As St. Eustatius had few sugar plantations during the 18th century, it is most likely that the plantation owners on the surrounding British and French islands traded for these ceramics. This trade from a Dutch island to the French and English islands of a refined good, sugar molds and drips, demonstrates St. Eustatius' role as analternative and illegal market for French and English planters who wished to circumvent the restrictive monopolies of their mercantile capitalist metropoles.

## Afro-Barbadian Health Care during the Emancipation Era

*Presenter*: Kathleen Mocklin
College of William & Mary, Anthropology

In 1834, British abolitionists celebrated the passage of the Emancipation Act, which brought the old order of the plantation system in the British Caribbean to an end. While the planter class grappled with how to assert their control under a system of free labor, former enslaved communities pondered the meaning of Emancipation and the changes it would bring. The changes in their conditions, mainly concerning health care, is the focus of this thesis. Within historical accounts concerning this transition from slavery to freedom (i.e. Sturge and Harvey: 1837), there is a lack of information about the health conditions of the Afro-Barbadian community. Historical archaeology can be seen as critically engaging with the historical narrative to challenge the documentary record, as well as filling in the documentary gaps and the inadequate documentary interpretations of history. This thesis attempts to develop this general goal by examining the material culture associated with health care from an Afro-Barbadian Emancipation era settlement site at St. Nicholas Abbey sugar estate in the northern parish of St. Peter. Archaeological investigations at the site in 2007 and 2008 by the College of William and Mary uncovered a substantial amount of material associated with health care that has helped shed light on the medical activities of Afro-Barbadians during the post-Emancipation period. Drawing on this archaeological material, I intend to show how the marginalized Afro-Barbadian community, within an unequal labor system, was able to possess agency within the realm of health care. It seeks to provide a better understanding what ailments affected the Afro-Barbadian community's health and what forms of treatment were available. The primary sources concerning medical institutions in Barbados often reflect the racist ideologies of white observers and reveal different attitudes toward medicine and unequal access to medical care in the white and black communities. These narratives also portray Afro-Barbadians as willingly accepting their given stations in an oppressive society without question, and without agency. However, the material culture from St. Nicholas Abbey provides a deeper understanding of health care in this passed community and the agency that Afro-Barbadians did indeed possess in their pursuit of a better means of medical treatment.

**Five Dozen Eggs, Eight Cans of Fruit and a Bottle of Beer: Provisioning the Coloma Gold Mining Town**

*Presenter:* Jennifer Ogborne
College of William & Mary, Anthropology

Highly focused mining boomtowns were not settled to be significant producers of food. Often situated in locations not suited for agriculture, these enterprises relied heavily on local transportation networks to provide both laborers and company management with sustenance. In order to understand how the mechanisms of provision are implemented in this sort of environment, a combination of research themes concentrating on consumption patterns, labor relations, ecology and the social relations amongst community members can be used to explore the mining food rush. The extent of company control, the monopoly of the supply baron, and the choices available to and made by individual laborers all intersect to form a short-lived and occasionally profitable community. Historical and archaeological research at the Coloma gold mining town in western Montana illustrates how provisioning systems in the late 19th and early 20th centuries operated in mineral rush communities.

## The Effect of Ryanodine Receptor Luminal Regulation on Local Ca Release and Depletion Signals in Cardiac Myocytes

*Presenter:* Ryan Carpenter
College of William and Mary,
Applied Science

Ryanodine receptors (RyRs) are calcium-regulated intracellular calcium (Ca) channels located on the sarcoplasmic reticulum (SR) membrane of cardiac myocytes. RyRs are activated by moderate increases in cytosolic Ca that may occur via Ca influx through voltage-gated L-type Ca channels or spontaneous opening of RyRs. Because open RyRs allow Ca release from the SR into the cytosol, this process of 'calcium-induced calcium release' is regenerative. In ventricular cardiac myocytes, RyRs are organized into 'Ca release sites' composed of clusters of 50-250 channels. The cooperative gating of RyRs at isolated release sites and the resulting localized Ca elevations and depletion signals are known as 'Ca sparks' and 'Ca blinks,' respectively. Recent experimental evidence suggests that cytosolic Ca regulation of RyRs is complemented by Ca regulation occurring within the SR lumen and, furthermore, this luminal regulation occurs indirectly via the luminal Ca binding protein calsequestrin. I will present a mathematical model of spontaneous and triggered Ca sparks that includes a representation of calsequestrin-mediated luminal regulation of individual RyRs, the cooperative gating of RyRs that results from their co-localization, and the dynamics of cytosolic and luminal Ca concentration changes in the restricted domains associated with the Ca release site. This hybrid stochastic model combines (1) ordinary differential equations for the dynamics of local Ca and (2) a release site model consisting of a compositionally defined discrete-state continuous-time Markov chain. In this model, cooperative gating is a consequence of transition rates that are dependent upon cytosolic and luminal Ca concentrations and the concentrations of free and bound calsequestrin. Simulations of triggered and spontaneous Ca sparks are analyzed to determine if luminal Ca-dependent control mechanisms can account for specific experimentally observed characteristics of local Ca release and depletion signals in cardiac myocytes.

## Reduction of Calcium Release Site Models via Fast-slow Analysis

*Presenter:* Yan Hao
College of William and Mary,
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Mathematical models of calcium release sites derived from Markov chain models of intracellular calcium channels exhibit collective gating reminiscent of the experimentally observed phenomenon of stochastic calcium excitability (i.e., calcium puffs and sparks). Calcium release site models are stochastic automata networks that involve many functional transitions, that is, the transition probabilities of each channel depend on the local calcium concentration and thus the state of the other channels. In order to overcome the state-space explosion that occurs in compositionally defined calcium release site models, we have implemented and validated several procedures that will in an automated fashion reduce compositionally defined calcium release site models through fast/slow analysis. After categorizing rate constants in the single channel model as either fast or slow, groups of states in the expanded release site model that are connected by fast transitions are agglomerated, and transition rates between reduced states are chosen consistent with the conditional probability distribution among states within each group. For release site models with several channels, these conditional probability distributions can be numerically calculated without approximation, allowing validation of fast/slow reduction in this context of coupled calcium-regulated channels. For physiologically realistic release sites composed of many channels, the conditional probability distributions can be approximated without the construction of the full model by assuming rapid mixing of states connected by fast transitions. Alternatively, an iterative aggregation/disaggregation method can be employed to obtain a reduced calcium release site model in a memory-efficient fashion.

## Sound Propagation in Human Habitats: Implications for Avian Communication

*Presenter:* Caitlin Kight
*Co-author*: John Swaddle
College of William and Mary,
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Habitat modification is one of the many ways in which humans negatively impact wildlife. Changes in habitat structure may deprive species of, among other things, foraging, nesting, and roosting sites. Subtle negative impacts may exist even for adaptable species that are able to coexist in close proximity with humans. For instance, human landscapes often include less, and more widely spaced, vegetation, and more impervious surface cover (ISC). These structural changes are likely to affect the propagation of vocalizations that are used, for instance, for territory defense, mate attraction, and predator alarms. Here, I explore the relationship between human habitat modifications, sound propagation, and avian vocalizations. During the summers of 2007 and 2008, I measured attenuation and reverberation of pure tones played at sites located across an anthropogenic disturbance gradient. At each site, I also measured the pitch and amplitude of ambient noise. I employed geographic information systems (GIS) technology to measure a variety of habitat features. Next, I collected recordings from male eastern bluebirds (*Sialia sialis),* a species that lives year-round across a human disturbance gradient. I quantified several structural and temporal parameters of each male's song. Finally, I used a generalized linear model to explore whether, and how, anthropogenic habitat modifications impact sound propagation, and whether a breeding bird species alters its songs in order to compensate for these site-specific differences in sound space. Understanding these relationships will allow us to make management decisions to minimize levels of acoustic interference. Furthermore, we can begin to explore the potential evolutionary implications of changing the acoustic environment of an avian species.

## The Role of Synaptic Transmission in Rhythm Generation: Calcium Transients in the Soma and Proximal Dendrite of Respiratory PreBötzinger Complex Neurons

*Presenter:* Joanna Lee
*Co-authors:* J.C. Rekling, J.A. Hayes, C.A. Del Negro
College of William and Mary,
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The respiratory central pattern generator (CPG) network contained in the preBötzinger Complex (preBötC) emits spontaneous inspiratory motor rhythms in neonatal mice in vitro. We have previously shown that a calcium-activated nonspecific cationic current (ICAN) is a predominant burst-generating current in respiratory preBötC neurons. One hypothesized rhythmogenic mechanism posits that synaptic input evokes $Ca^{2+}$ changes that activate ICAN, producing rhythmic drive potentials accompanied by vigorous spiking during the inspiratory burst. Necessary predictions of this hypothesis include that (1) $Ca^{2+}$ changes in the soma should occur in the absence of spiking and (2) when somatic spiking is present, dendritic $Ca^{2+}$ influx should precede it. Here, we show the results of whole-cell recordings with and without QX-314 in the patch solution to block sodium channels. Fluorescence was monitored via Oregon Green BAPTA-2, a low-affinity $Ca^{2+}$ indicator dye, which we excited with an infra-red multi-photon laser and measured using non-descanned detectors on a laser-scanning microscope. In the presence of QX-314, we found $Ca^{2+}$ transients in both soma and proximal dendrite (as far as ~100 um from the soma) associated with somatic inspiratory drive potentials. When cells were recorded in the absence of QX-314, dendritic $Ca^{2+}$ rises could be recorded which definitively began before the onset of spiking. Furthermore, preliminary immunohistochemical studies indicate the presence of the $Ca^{2+}$-activated cationic TRPM4 channels on these same dendrites, indicating a possible mechanism underlying ICAN. These data are consistent with the idea that $Ca^{2+}$ transients in preBötC neurons arise due to endogenous synaptic network activity and may in turn provide for the activation of ICAN, which thence drives inspiratory bursts and spiking.

## Respiratory Rhythm Generation in Silico is Facilitated by a Spatial Separation Suggested in vitro

*Presenter:* Jeff Mendenhall
*Co-authors:* J.A. Hayes, C.A. Del Negro
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Breathing can normally be taken for granted thanks in part to the tireless activity of a small network of neurons in the pre-Bötzinger Complex (preBötC). We have created a mathematical model of preBötC neurons based on experimental data. The soma compartment of the model contains fast sodium current (INaF), delayed-rectifier (IKDr), and other currents important for high-frequency spike generation. The dendritic compartment of the model contains Ca2+ dynamics, the calcium-activated non-specific cation current (ICAN) and other currents that aid in the formation of a burst-envelope that transiently depolarizes the soma to promote high-frequency spikes. The model demonstrates how this separation of mechanisms facilitates calcium-induced calcium-release (CICR) and ICAN, which both play critical roles in rhythmogenesis. We then simulate a network of model neurons and confirm that the clustered topology believed to characterize the preBötC network supports a range of network-frequencies similar to that observed in vitro.

## TP2 Completion Problem

*Presenter:* Shahla Nasserasr
*Co-author:* Charles Johnson
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Applied Science

A partial matrix is one in which some entries are specified and the remaining unspecified entries are free to be chosen. Such a matrix is called partial TP2 if all 1-by-1 and 2-by-2 specified minors are positive. Each choice of values for the unspecified entries gives a completion of the partial matrix. If there is a completion in which the result is TP2, then the matrix is called TP2 completable. We consider the question of which partial TP2 matrices have a TP2 completion and, in particular, which patterns for the specified entries ensure that a partial TP2 matrix has a TP2 completion.

## Optical Studies of CdS and $VO_2$ Thin Films

*Presenter:* Kaida Yang
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College of William and Mary,
Applied Science

Optical properties of thin films are of interest in a number of applications, particularly in optical communications. In some cases it is of interest to explore the modification of some film property with light such that a "smart" device can be implemented. For example, CdS films have been used in optical transmission switches [1]. A very interesting material is $VO_2$ which exhibits a metal-insulator transition at moderate temperature opening up the possibility of its use for similar applications. Here we present our preliminary results on the optical response of CdS films and we compare these with those of $VO_2$ films under laser illumination.

[1] A. Erlacher, H. Miller, and B. Ullrich, J. Appl. Phys. 95, 2927 (2004).

## Medium-Induced Variability in Membrane Integrity after Exposure to High Voltage, Ultra-Short Electric Pulses

*Presenter:* Wallace Hunter Baldwin
*Co-Authors:* B.W. Gregory, C.J. Osgood, K.H. Schoenbach, J.F. Kolb
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Nano-second pulsed electric fields or nsPEFs have demonstrated the ability to induce various cellular responses, such as induction of apoptosis [1,2]. The response depends on duration, amplitude, and repetitive application of the electrical field. Permeabilization of the plasma membrane with these electrical fields may be the primary trigger mechanism for the downstream effects and ultimately influence cell viability [1-8]. We investigated the extent of membrane permeabilization in Jurkat T-lymphocytes and Panc-1 pancreatic cancer cells by P.I. uptake and determined how exposure medium affected results. We found up to a ten-fold increase in permeabilization of the plasma membrane depending on the exposure medium. Viability measurements were made using Calcein-AM and were found to be similarly influenced. Keywords: nsPEF, Jurkat cells, Panc-1 cells, Osmolality, Electroporation.

## Analyzing the Developmental, Activation, and Proliferation States of B Cells in the Rainbow Trout through Flow Cytometry

*Presenter:* Maggie Barr
*Co-Author:* Katrina Mott
College of William & Mary, Biology

Rainbow trout provide an important animal model to study. While mammals utilize bone marrow and lymph nodes as immune organs, trout lack these tissues and utilize the kidney, spleen, and blood as immune organs. The developmental, activation, and proliferation stages of trout B cells and the location of these processes within the immune tissues are not well defined. Expression patterns of B cell markers Pax5, XbpI, RAG1, total IgM, secreted IgM, and EdU incorporation are used to investigate the B cell stages. In mammals, RAG1 expression is seen in pro- and pre-B cells and Pax5 is expressed in pre-B cells through plasmablasts. XbpI is induced in activated B cells and expressed through the plasma cell stage. Warrs expression is seen in pre-B cells through plasma cells, secreted IgM is seen in plasmablasts and plasma cells, and EdU is a proliferation marker seen in pre-B cells and plasmablasts. Trout immune cells were LPS-activated in culture and analyzed by flow cytometry with fluorescently labeled antibodies, specific to each marker. Preliminary data suggest that each of the immune organs contains a plasmablast (Pax5+/XbpI+/total IgM+/EdU+) population either prior to, or upon LPS activation in culture. Most plasmablasts are present at day 4 in the spleen and day 2 in blood, while the kidney contains relatively high frequencies immediately after isolation that decrease upon culturing. This study supports the concept that flow cytometric analysis can be used to determine the location and differentiation state of B cells within the immune organs of the rainbow trout. A large portion of the commercial trout population is raised in fisheries, where juvenile trout are susceptible to harmful infections and diseases. Understanding the timing and location of B cell development, activation, and proliferation in the trout will aid in the development of vaccines for juvenile trout.

## In vivo Detection and Characterization of Mammary Tumors in Murine Models

*Presenter:* R. Eric Blue
College of William & Mary, Biology

Substantial progress has occurred in the use of new imaging technologies that allow investigators to follow mammary tumor development in vivo and noninvasively with high resolution and sensitivity. We have developed a small animal imaging system consisting of a position-sensitive gamma camera that can detect low levels of 125I-labeled ligands in real time with significant sensitivity and resolution. We have applied the detector system to understanding the progression of mammary tumors by imaging the dynamic uptake of Na125I through the sodium iodide symporter (NIS) in mouse mammary tumor virus (MMTV) models. These experiments have demonstrated not only the sensitivity and the efficacy of the detector but also the following: (1) gamma camera images of Na125I uptake correlate precisely with NIS protein based on whole-mount immunohistochemistry; (2) Na125I is potentially a very promising radiotracer for detecting nonpalpable tumors at the earliest stages of development (as small as 3 mm); (3) tumors display profound heterogeneity both temporally and spatially in uptake of iodine; (4) tumors fall into three groups based upon distribution of signal center-to-edge, multi-spot, and ring and pattern correlates with tumor size and age with smaller tumors falling into the first category; (5) tumors show no relationship between the speed of tumor development and the initial size or pattern of the tumor; (6) patterns of uptake (and loss) are dynamic, suggesting different characteristics of cells within the tumor, with regions of greatest change being those with first evidence of uptake; and (7) other nontumor tissues, in particular other mammary glands, show differences in pattern of uptake when a tumor is present. Taken together, these results suggest that radioiodide imaging is a promising in vivo method for monitoring the changes associated with tumor development such as changes of tumor size, pattern, and aspects of gene-specific metabolism over both short and long durations.

## Evolutionary Analysis of Gene Regulation During Development

*Presenter:* Lomax Boyd
*Co-authors:* Rebecca Lowdon, Conor Sipe, Margaret Saha
College of William & Mary, Biology

Changes in gene expression during development have been shown to underlie dramatic morphological changes during evolution. While genes can be regulated at a variety of levels, evidence suggests that most genes are regulated at the transcriptional level. Therefore, evolution may act on genetic variation within promoters, regions that direct transcriptional activity. The relationship, however, between sequence variation within promoters and transcriptional output remains undefined. In order to understand how gene regulation can serve as a potent source of evolutionary change during development, models in molecular evolution were used to characterize the relationship between sequence variation and regulation of the neurotransmitter-determining gene GAD67 within the central nervous system (CNS) of *Xenopus laevis,* an African clawed frog. GAD67 is the rate limiting enzyme primarily responsible for the acquisition of the inhibitory GABAergic neurotransmitter phenotype. The expression pattern of GAD67 in the CNS has been shown to be highly similar in all vertebrates. However, even among closely related African clawed frogs, there is no detectable sequence similarity in the promoter region of GAD67. Transgenic frogs were used to locate the retina-specific promoter region 500 base pairs upstream of the GAD67 translational start site. Genetic variation at this locus was investigated through DNA sequencing of individuals collected from a natural population in Cape Point Natural Reserve, South Africa and several closely related species. The polymorphism frequency spectrum, a method of measuring genetic variation, was assessed under several models of molecular evolution, including Tajima's D, Fu and Li's D, and Fay and Wu's H test statistics. These statistics will be applied in sliding window frame that moves continually and contiguously along the promoter sequence. Our hypothesis is that transcription factor binding sites within the retina promoter region will be under purifying selection in comparison to the intervening DNA.

## Normal Human Osteoblast Proliferation in Culture Following a Nanosecond Pulsed Electric Field

*Presenter:* Leonard J. Carinci
Old Dominion University, Biological Sciences

Osteoblasts are mononucleate bone-forming cells responsible for the deposition of new bone. Application of mechanical stress on bone reveals its ability to produce and release electric potentials across the cell membrane called piezoelectricity. The electric potentials produced in response to mechanical stress may have a direct correlation on osseous cells and the signaling pathways that regulate proliferation. Nanosecond pulsed electric fields (nsPEFs) are high intensity, ultrashort pulses which have the ability to maintain the integrity of the cell membrane by allowing electroporation to be avoided. By delivering nsPEFs for a chosen duration while maintaining the viability of the cell, this research was focused on measuring the subcellular effects these electric pulses had on enhancing osteoblast proliferation rates in culture. This study applied 8 pulses (0.5 Hz) of a 25 kV/cm or 35 kV/cm electric field strength for a 60 nanosecond duration to determine the change in mitotic activity of osteoblasts. The use of flow cytometry along with a specialized cell tracing dye allowed computerized analysis of cell proliferation rates over a seven day post-pulse period. The results indicate a significant difference between treatment groups and control in regards to the percentage of cells divided in the original sample (25 kV/cm: $p \leq .011$) (35 kV/cm: $p \leq .002$). As the electric field was increased, the percentage of osteoblast division decreased. The experimental results will allow future researchers to fine tune pulse duration and intensity when studying the cell signaling mechanisms involved in osteoblast proliferation rates.

## Ethylene Production in Plants: Is the ACC Oxidase Enzyme at Work in *Selaginella moellendorffii?*


*Presenter:* Ashley R. DeCarme
College of William & Mary, Biology

Ethylene is a plant hormone that plays important roles in ripening, senescence, and stress responses. Although recent research has attempted to show that basal plant lineages do not produce ethylene using the same pathway as seed plants - a pathway that involves the enzyme ACC oxidase (ACO) in its final step - conclusive evidence is lacking, and potentially critical genomic analysis of basal plants has not, until now, been possible. From preliminary genomic data, we believe that ACO is used in the same capacity in basal and seed plant lineages. Our research will investigate the presence and function of the ACO gene in a recently sequenced basal plant, the lycophyte *Selaginella moellendorffii*. The first step will consist of identifying potential ACO genes (DNA sequences lacking functional confirmation) in *S. moellendorffii's* genome by comparing the genome to ACO genes with confirmed function from other plants. Those *S. moellendorffii* genes that are shown by a computer-generated phylogenetic tree to be most closely related to confirmed ACO genes will subsequently be tested to ensure that they are in fact translated to make proteins in the plant. Finally, we will incorporate the genes into a mutant form of *Arabidopsis thaliana* lacking functional ACO genes to test that the protein created from the *S. moellendorffii* gene is in fact ACO - if this is the case, the mutant plant will appear to have been repaired. If a gene structurally and functionally similar to confirmed ACC oxidase genes is found in *S. moellendorffii*, it is more than likely that this lycophyte and some, if not all, other basal plants use the same ethylene synthesis pathway as seed plants. As work is completed in related lineages such as the mosses and ferns, it will be possible to identify the evolutionary point(s) of origin of ACC oxidase and its reliant pathway in plants. Any alternative pathways found may prove useful in agricultural research.

## Cloning and Expression of an Anthrax Spore Protein in both Prokaryotic and Eukaryotic Cell Systems, and its Use in the Development of a Thermopile-based Biosensor

*Presenter:* Noble I. Egekwu
James Madison University,
Integrated Sciences and Technology

A gene coding for the BclA (Bacillus collagen-like anthracis) protein was cloned into prokaryotic and eukaryotic cloning/expression vectors. Cloning was determined to be successful by DNA mapping (restriction enzyme analysis) and sequencing. The mature bclA gene was transformed into competent E. coli cells, while both immature (signal sequence + gene) and mature forms were transfected into insect (Sf9) cells. While the protein was expressed in bacteria and insect cells - after induction of transformed E. coli, and transiently in Sf9 cells - successful secretion of a glycosylated form of the protein from insect cells has not been determined. The expressed protein in both cell types was characterized by SDS-PAGE analysis, by both Coomassie Blue staining (for BclA extracted from bacteria and affinity column-purified) and by Western Blotting (for the protein synthesized in both cell types). Chemical denaturants used to extract proteins from induced E. coli cells and from cell debris pellets from cleared lysate preparations of the protein in its native configuration, as well as the customary thermal treatment of the cleared lysates in sample buffer prior to SDS-PAGE electrophoresis, indicate 1) the presence of the BclA in multimeric form is favored over the protein monomer, and 2) a significant amount of the synthesized protein remains insoluble in preparations in which chemical denaturants were not used during protein extraction and purification. Purified BclA from lysates of E. coli, and antibodies prepared against both the affinity tag used for purification and against intact anthrax spores, currently are being tested for use in a prototype biosensor system designed to measure the heat of reaction of antigen-antibody binding.

## Survival in a Created Landscape: Radio-tracking Fledgling Bluebirds on Golf Courses

*Presenter:* Allyson K. Jackson
College of William & Mary, Biology

As more natural land is developed, wildlife must either adapt to urbanization, be pushed into marginal habitats, or perish. Golf courses, while manicured and artificial, could be an oasis of green in an increasingly paved landscape, but little is known about how this created habitat affects the birds that settle there. Many birds, including the once declining Eastern bluebird (*Sialia sialis),* may be attracted to this replacement habitat for foraging and breeding. Though adult bluebirds appear to raise successful nests on golf courses, little is known about what happens to their nestlings once they leave the nest. This study looks at the survival and habitat use of fledgling bluebirds during their first few months out of the nest. In 2008, eastern bluebird fledglings (n=71) were tracked using radio telemetry from when they left the nest until mortality occurred or their transmitter battery failed. Birds that fledged from nests on golf courses had significantly higher initial mortality rates (t=2.24, p=0.029), with fledglings on golf courses exhibiting 24.3% mortality in the first 10 days postfledging, compared to only 5.9% mortality during the same time for reference fledglings. Many of the early golf course mortalities were due to depredation by hawks, suggesting that the open, manicured environment makes it easier for hawks to catch weakly flying, young bluebirds. Because young fledglings are constrained to the habitat around the nest box, these early mortalities may be correlated to specific habitat types (i.e. low canopy cover or low brush density). By understanding what aspect of the habitat is particularly risky for young bluebirds, using GIS-based spatial analysis, we can make recommendations to golf courses and other recreational areas for easy changes (i.e. nest box placement) that can greatly increase avian juvenile survival.

## Role of Multi-walled Carbon Nano Tubes in Electrical Conductivity of Balanced Salt Solutions and Cell Culture Media

*Presenter:* Bhargava Subhash Kalluri
*Co-authors:* C.J. Osgood, Tarek Abdel-Fattah, Hani Al-Sayed Ali, Juergen Kolb
Old Dominion University, Biology

Nanosecond pulse electric fields (nsPEFs) have demonstrated tremendous potential in medical applications, such as the treatment of cancer. By combining the exposure with potential synergistic agents, for example nanoparticles, we anticipate to enhance the efficacy of nsPEFs-therapies even further. Multi-walled carbon nano tubes (MWCNTs), mainly because of their extremely high inherent electrical conductance, may promote a more uniform field distribution during the application of nsPEFs. Hence, we hypothesize that adding MWCNTs will increase the overall electrical conductivity of cell suspensions and tissue samples in otherwise poorly conducting materials. To our knowledge, the conductance of MWCNTs in solutions that are commonly used in cell suspensions has not been investigated and may be of importance as the use of MWCNTs in biological systems is gaining interest. Our present work is focused on measuring the electrical conductance of Dulbecco's modified eagle's (DMEM) media, Roswell Park Memorial Institute (RPMI) 160, Hank's buffered salt solution (HBSS) and phosphate buffered solution (PBS), with MWCNTs and without MWCNTs. With the future objective of achieving homogeneous electric field distributions by adding MWCNTs in mind, MWCNTs are suspended in a surfactant (0.002% Tween80) by ultra sonicator. Various concentrations (10%, 25%, 50% and 75%) of MWCNTs are added to all the above mentioned samples and electrical conductance is measure by a Delsa Nano Submicron Particle Size and Zeta Potential Particle Analyzer. We anticipate that there will be an increase in electrical conductivity in the presence of MWCNTs.

## Assessing the Functional Status of Created Wetlands in Eastern Virginia via a Developmental Trajectory

*Presenter:* Sara E. Kreisel
College of William and Mary, Biology

Creation of wetlands has been used since the 1980s as a tool for the environmental mitigation of natural wetlands lost to development. Increasingly, wetlands are constructed in non-wetland habitats to satisfy the "no net loss" policy established during the G.H.W. Bush administration. Although the policy in practice attempts to compensate for wetland acreage lost to development, replacement of wetland function may lag considerably. To measure this suspected lag in created wetland function, I am determining the functional equivalency of created, non-tidal forested wetlands relative to natural wetland standards. Results from a 2003 study of ten created wetlands in Eastern Virginia indicated wetland function was far from that observed in natural wetlands. This study re-sampled nine of those same wetlands five years later (2008) to determine whether the functional gap between created and natural wetlands decreases with age. Wetland function will be assessed using soil and vegetation metrics. Soil cores to 15 cm, collected from the nine created wetlands, were analyzed for bulk density, porosity, organic matter, carbon content, and extractable nutrients. Plant surveys were completed using $1m^2$ quadrat sampling, and analyzed for the presence of hydrophytic vegetation, species richness, and diversity. Specimens were collected for the W&M herbarium. I will compare my results with the 2003 survey to determine the trajectory of created wetland function (changes over time) relative to the functional endpoint (results of data from natural wetlands). I expect to show that accumulation of soil organic matter and carbon will be increasing in the created wetlands over time, thereby increasing soil productivity. Also, successional changes toward more hydrophytic vegetation, with representation by more woody species, are expected. Results of this study will aid in the review of federal wetlands policy that to date has relied on the untested assumption that created, non-tidal forested wetlands eventually will attain the functional equivalency of wetlands lost to development.

## Mud and Mucus: Feeding Selectivity in a Suspension-feeding Detritivorous Fish


*Presenter:* M. Louise Lammons
College of William & Mary, Biology

Aquatic detritivores, organisms that feed on dead and decaying organic matter, are likely to be limited in size by the relatively low nutrient content of their diet. While there is evidence that detritivorous fish select for food particles which are high in nutrient content, the mechanisms of such selectivity are unclear. The purpose of this study is to quantify feeding selectivity based on nutrient content in the gizzard shad (*Dorosoma cepedianum),* a detritivorous fish species native to Virginia waters. Since the detritus they consume is often composed of small particles that are not sensed and engulfed individually, these suspension-feeding fish are not visually choosing to engulf certain particles. Since Carbon, Nitrogen and Phosphorus are essential to many biological processes including growth, these elements were used to represent nutrient content. By comparing the nutrient content of suspended food particles available to gizzard shad in controlled laboratory experiments versus the nutrient content of ingested food in the gut, I am able to quantify the selective abilities of this fish. Since previous studies that have presented evidence for nutrient-based feeding selectivity in detritivorous fish did not account for the possibility that mucus may contribute to the nutrients quantified in fish guts, another objective of this study is to determine whether mucus secretions associated with the interior of the mouth and gut of gizzard shad account for a significant portion of the nutrients quantified in the ingested food. I have compared the nutrient content of available food, gut contents, and mucus, and have found that mucus does contribute significantly to gut nutrient content. Since fish like gizzard shad are an integral part of the community dynamics and nutrient cycling in aquatic systems, quantifying selectivity in these fish may increase understanding of the ways they function within their ecosystems.

## Cued Up: Fitness Effects of Seasonally Mismatched Environmental Cues

*Presenter:* Heidi J. MacLean
College of William and Mary, Biology

Organisms are more than just the product of the transcription of DNA. The environment in which they live plays a major role in shaping form and function. Phenotypic plasticity is the capacity to alter traits as a result of exposure to different environmental factors such as temperature and day length. Environment-dependent phenotypic expression can be a short-term reversible adjustment that can assist in a seasonal acclimation or it can be a long-term irreversible adjustment that can assist in niche construction. Plasticity underlies an organism's ability to acclimate to seasonal changes by shifting thermal tolerance and performance through physiological responses to environmental cues. When these cues are accurate predictors of seasonal changes, then the associated physiological adjustments may increase the fitness of individuals within the population. I use a two-by-two factorial experiment with seasonally matched and mismatched photoperiods and temperatures to quantify effects on fitness and morphology in six latitudinally distinct subpopulations of *Drosophila subobscura.* One-day old embryos from the six stock sub-populations were placed in four experimental conditions; seasonally matched long-day 23°C, and short-day at 15°C and seasonally mismatched long-day at 15°C and short-day at 23°C. I assessed fitness of each treatment group by estimating the intrinsic rate of increase in the population using a serial transfer methodology. By independently manipulating temperature and photoperiods, my study is one of the first to examine the physiological responses of individuals within and between populations in response to multiple seasonal cues. I find that photoperiod plays a significant role in seasonal acclimation. Shifts in seasonal phenology at higher latitudes in response to climate warming may cause maladaptive changes due to inappropriate photocueing of thermotolerance.

## Winter Ecology of the Rare and Declining Rusty Blackbird

*Presenter:* Andrew McGann
College of William & Mary, Biology

The Rusty Blackbird (*Euphagus carolinus)* population has declined by 90% in the last five decades. Accordingly, this once abundant species has gained the attention of conservationists. Still, the reasons for the decline remain unknown. The Rusty Blackbird is an omnivorous, wetland-dependent and migratory species in the blackbird family. It breeds across the boreal forest of Canada and Alaska and winters in the southeastern United States. I will investigate the population biology and foraging ecology of Rusty Blackbirds wintering in the Williamsburg area using marked and radio-tagged individuals. The following three questions will be pursued: (1) What is the population structure (sex ratio and age ratio) of Rusty Blackbirds wintering around the Williamsburg area? (2) Do Rusty Blackbirds exhibit intersexual segregation of foraging habitat? (3) Do male and female Rusty Blackbirds eat different diets? Rusty Blackbirds will be captured at foraging sites and marked with leg bands. A subsample will be fitted with radio transmitters and tracked to identify foraging habitats and to find the cryptic sites where the birds roost together for the night. At roost sites, more birds will be captured, marked, and recaptured in order to sample the demography of the local population. Foraging ecology will be assessed by drawing blood from captured birds and comparing the nitrogen and carbon stable isotope signatures of males and females, which should quantitatively indicate the relative trophic levels of birds' diets. Birds that feed higher in the food chain will have a higher ratio of heavy to light isotopes, and thus will be distinguishable from those that feed lower in the food chain. The results of this study will contribute to the slim body of knowledge of Rusty Blackbird demography, habitat requirements, and winter ecology. These results will help managers and conservationists facilitate the recovery of the Rusty Blackbird population.

## Penny For Your Thoughts? How Neuroscience is Influencing Economic Thought: The Information Cascade Game Example


*Presenter:* Karl Mendoza
*Co-authors:* Lisa Anderson, John Griffin
College of William & Mary, Biology

Neuroeconomics is a nascent, interdisciplinary field that explains the biological basis of economic behavior. Proponents of neuroeconomics believe that the brain holds the key to understanding human economic behavior. They argue that the brain evolved as an engine optimized for resource scrounging. Thus, resource management and allocation is a fundamental characteristic of the brain, and consequently, behavior. A subfield of economics, experimental economics attempts to simulate and manipulate economic conditions in the laboratory. Despite its relative inception, experimental economics has provided many insights that would otherwise be difficult to obtain in the "real world". Coupling it with recent advances in neuroscientific understanding and methodology allows informed exploration of the hinterland between economics and neuroscience. In the current study, we aim to explore the neural mechanisms behind social conformity. The purpose of this experiment is to find a link between sympathetic activation of the nervous system and the decision-making process during an information cascade game. A significant majority of neuroeconomic studies involve brain-scanning equipment, such as PET or functional MRI scans. However, operation of these machines requires specialized training and is often quite expensive. As a consequence, studies involving scanning machines report relatively low numbers of participants. Furthermore, current brain-scanning technology does not allow for high-throughput, real-time, multiple-subject (6 or more) setups required for population-based studies. In this study, we use widely available and mobile neurophysiological tools to measure galvanic skin response (GSR), electroencephalic signals (EEG), heart rate, blood pressure, and other biomarkers. We report a significant level of activation during the decision-making process due to arousal, and propose a possible pathway for future fMRI investigation. Since information cascades affect many economic phenomena (e.g. bubbles, job searches, bank runs, stock market behavior, voting, consumer fads, etc.), learning the neural basis for such behavior can help economists develop more accurate econometric models, and help non-economists understand the individual basis for such economic phenomena.

## Reproductive Success of Eastern Bluebirds on Golf Courses: Habitat Effects across Multiple Spatial Scales

*Presenter:* Marie L. Pitts
College of William & Mary, Biology

It is controversial whether golf courses can serve as quality habitat for species of conservation interest. Previous studies have focused on which bird species are present on golf courses, but without knowing the reproductive success of a population, it is impossible to accurately determine a habitat's conservation value. Two potentially important habitat features to consider when evaluating golf courses are land cover (the proportion and distribution of different habitat types) and pesticide use. There is great variation in land cover patterns among modern golf courses, and little is known about the effects of pesticides on bird breeding success. In addition, there is evidence that the spatial scale, or size of the study area, can affect the relationship between habitat features and reproductive parameters. Thus, it is helpful to address multiple spatial scales simultaneously when exploring how habitat relates to reproduction. I plan to investigate whether patterns of land cover and pesticide use explain variation in the reproductive success of the eastern bluebird (*Sialia sialis,* a species of recent conservation interest) on several golf courses in southeast Virginia. Using GIS and aerial images of golf courses and their surrounding landscapes, I will map out land cover and golf course pesticide intensity. The number of surviving young per nestbox will serve as the primary measure of reproductive success. These data will be analyzed at multiple spatial scales in order to determine which scale is most influential in determining reproductive success. The results will have conservation implications for future studies addressing habitat effects on other species, and provide golf course planners with guidelines on arranging and managing golf courses in a way that optimizes bluebird reproductive success.

## Microbial Symbionts and Sponge Heterotrophy; Morphological and Molecular Aspects of Sponge: Symbiont Integration

*Presenter:* Ericka Poppell
*Co-authors:* Malcolm Hill, April Hill, Carolyn Marks
University of Richmond, Biology

The ecological and evolutionary relationship between sponges and their symbiotic microflora remains poorly understood. Some sponge species harbor extraordinarily dense populations of microbes (high microbial abundance(HMA) sponges), while other species maintain bacterial populations at very low levels(low microbial abundance sponges (LMA)). To explore aspects of these symbioses, we examined sponge feeding structures and microbial community composition for HMA and LMA sponges from the Florida Keys. Focus was placed on species that appear to employ different feeding strategies based on pumping rates and isotopic signatures. Choanocyte chamber morphology and density was characterized using scanning electron microscopy from freeze-fractured tissue. In addition, microbial communities were compared between HMA sponges that have significantly different isotopic signatures, and thus appear to feed at different levels of the food web. Of particular interest were species in the genus Agelas. Denaturing Gradient Gel Electrophoresis and quantitative PCR were used to examine taxonomic differences among the bacterial communities present in these sponges. Our results provided insights into the role that symbionts play in shaping the trophic ecology of these sponges. Evolutionary consequences of these associations will also be discussed.

## Effect of Bycatch Reduction Devices on the Diamondback Terrapin and Blue Crab Catches in Crab Pots

*Presenter:* Megan Rook
*Co-author:* Bret Bronner
College of William & Mary, Biology

Bycatch and mortality of non-target species in fisheries is a well documented conservation concern. This study examines a potential mechanism for reducing bycatch of diamondback terrapins in blue crab pots. Previous studies have tested the effectiveness of Bycatch Reduction Devices (BRDs) in eliminating the incidental take of terrapins as well as the ramifications of BRDs on crab catch. Results of these studies vary from state to state and no research had been done in Virginia. Ten pairs of pots were placed at two sites each and fished once a week for four weeks. Each pair consisted of a pot with a BRD and a pot without a BRD. Number, size, and sex of terrapins, and number, sex, and condition of crabs in each pot were recorded. Our preliminary results indicate that BRDs are effective in excluding all but the smallest terrapins from entering crab pots and may actually enhance the crab catch.

## Effects of Sublethal Mercury Levels on European Starlings (*Sturnus vulgaris)* Body Composition, Feathers, and Flight Performance

*Presenter:* Diana Soteropoulous
College of William & Mary, Biology

Anthropogenic activities greatly increase the amount of mercury in the environment, and studies worldwide examine mercury bioaccumulation in aquatic ecosystems. However, recent research indicates high mercury concentrations in terrestrial species. Many toxicology reports utilize avian species as bioindicators because of non-lethal sampling techniques of blood and feathers. Since birds excrete mercury into feathers during molt, I plan to study how mercury affects feather quality and flight performance in a passerine species, the European starling (*Sturnus vulgaris),* while monitoring general body composition. I hypothesize that starlings with higher mercury doses will have decreased body mass and pectoralis muscle mass than birds with lower mercury doses. I plan to investigate several plumage characteristics' responses to mercury, including feather quality (abrasion resistance), fluctuating asymmetry in flight feathers, and molt. Changes in feather quality, flight apparatus symmetry, and decreased flight muscle mass may affect flight performance, so I will test take-off angle and velocity in this ground feeding bird since these flight parameters impact survival. I will test eighty birds in four experimental groups (control, low, medium, and high mercury concentration). Methylmercury will be administered through diet and monitored through biweekly blood samples. Starling body mass and pectoralis muscle will be recorded weekly. I will measure flight feather length after molt to determine symmetry and collect flight feathers to analyze feather quality by counting the number of broken barbules. This broad scale study of mercury's effects on avian systems and tissues, using the starling as a prototypical passerine, will provide relevant information for interpreting this contaminant's effects on other passerines.

## Alternative Splicing of Pax5 in B Lymphocytes of Rainbow Trout (*Oncorhynchus mykiss)*

*Presenter:* Raaj Talauliker
College of William and Mary, Biology

Alternative splicing is a mechanism by which a gene can give rise to multiple gene products. Alternatively spliced isoforms may have unique functions and play important roles in cellular development, differentiation and apoptosis. This project addresses alternative splicing of the paired box gene Pax5 in rainbow trout. Pax5 is a master regulator of B cell development and regulates a host of genes involved in different stages of maturation and activation. In mice and humans, Pax5 is known to be alternatively spliced and functional studies of the resulting isoforms reveal significant differences in their DNA binding and trans-activation potential. Trout provide an interesting research model since B cell genesis occurs in the anterior kidney, as opposed to the bone marrow as in mammals. Trout immune tissues, namely the anterior and posterior kidney, spleen and blood, were used to obtain mRNA and generate cDNA. Nested polymerase chain reactions (PCR) were used to screen cDNA for alternatively spliced Pax5 transcripts. Five alternatively spliced isoforms were detected with deletions in exon 2, 8, 9 and (partial) 8 and 10. Using quantitative real-time PCR and DNA primers specific for above exon deletions, the expression of each isoform was calculated relative to full length Pax5. This is done for both freshly isolated trout B cells and activated B cell cultures that have been stimulated with lipopolysaccharide (LPS) for 1-7 days. Some of these deletions resemble alternatively spliced transcripts reported in mice and humans, while others are unique to trout. Functional studies of these isoforms may reveal the role of alternatively spliced Pax5 products in the B cell program and trout B cell development. This research is supported by grants from the NIH and Arts & Sciences graduate research, College of William & Mary.

## Using Nuclear DNA Markers to Verify or Refute Evidence for a New Species of Woolly Mammoth

*Presenter:* Michele Tisdale
Old Dominion University, Biological Sciences

African elephants, Asian elephants and mammoths comprise the family Elephantidae. Historically thought to comprise a single species, Mammuthus, the extinct genus of Elephantidae, is now believed to be comprised of two separate taxa. “Clade I” mammoths are thought to have separated from “Clade II” woolly mammoths 1.7 million years ago. Clade II mammoths, believed to have gone extinct over 30,000 years ago, long before Clade I, differ in their mitochondrial DNA sequences from Clade I mammoths, suggesting the possibility of two species of woolly mammoth in the Late Pleistocene. Using nuclear genetic markers, clades I and II of the wooly mammoth will be studied to provide stronger evidence for or against the hypothesis that two separate clades roamed northern Asia during the Late Pleistocene. Modern molecular studies have led to uncertainty and to new questions regarding the systematics and molecular phylogeny for all three genera of Elephantidae. This study examines the systematic and molecular phylogeny of woolly mammoths using nuclear markers. By using nuclear DNA markers in woolly mammoths, we hope to verify or refute the evidence for a new species. Woolly mammoth classification will be determined by sequencing single-copy nuclear genes in woolly mammoths of different ages that are assigned to Clade I and Clade II mtDNA haplogroups. Importantly, as Clade II mammoths were only found in Northern Asia, it will be important to sequence mammoths of similar age (> 30,000 years old) from other regions to determine if the Clade II merely represents an extinct haplotype rather than a distinct species. Preliminary experiments have already been successful in extracting four nuclear sequences in addition to a cytochrome b fragment from both Clade I and II mammoths. Results of nuclear DNA will either support or refute a deep genetic separation between two distinctive species initially based on mtDNA.

## DNA Damage and the Pore: Does the SUMO-targeted Ubiquitin Ligase Subunit Hex3 Reside in Proximity to Nuclear Pore Complexes in Budding Yeast

*Presenter:* Jason Westerbeck
College of William & Mary, Biology

The budding yeast proteins Hex3 and Slx8 comprise the two subunits of a SUMO-targeted Ubiquitin Ligase (STUbL). In vitro, the Hex3/Slx8 STUbL complex targets sumoylated proteins to modify them with ubiquitin. Hex3 is the targeting subunit of the Hex3/Slx8 complex, while Slx8 performs the ubiquitin ligase function. We and others have shown that Hex3 and Slx8 interact with dsDNA breaks and found that yellow fluorescent protein (YFP)-tagged Hex3 forms distinct foci in the nuclei of live yeast cells. However, the precise location of Hex3 foci in the nuclei of living cells is not known. The goal of this research is to confirm a recent observation that the STUbL Hex3/Slx8 complex may interact with double stranded DNA breaks that reside in close proximity to nuclear pore complexes. In order to test this hypothesis, we generated a nup133Δ NUP49-CFP strain. In this strain, deletion of NUP133, a nucleoporin with a role in the even distribution of nuclear pore complexes, results in clusters of the CFP tagged nucleoporin Nup49. Subsequently, the nup133Δ NUP49-CFP strain was transformed with a construct expressing Hex3-YFP. The ultimate goal of these studies is to determine if in live cells Hex3-YFP foci can overlap with clustered Nup49-CFP nucleoporins. Colocalization of Hex3 and Nup49 could suggest that STUbLs may interact with nucleoporins and dsDNA breaks in the vicinity of nuclear pore complexes. We present data of our colocalization studies and discuss the implications of our findings.

## Optimal Mate Guarding: Cost-benefit Tradeoffs in the Australian Zebra Finch

*Presenter:* Leah Wilson
College of William & Mary, Biology

Although most birds are socially monogamous, extra-pair offspring (EPO) are common in 90% of all avian species. Mate guarding has been proposed as an important behavior in limiting extra-pair paternity (EPP). Implicit within the functional explanations for mate guarding, there exists a tradeoff between time spent mate guarding and time spent engaging in extra-pair copulations (EPCs). Mate guarding is beneficial to the degree that it allows both males and females to control the paternity of their brood, but the behavior is costly in that it decreases the opportunity for EPC solicitation and participation. It is assumed that mate guarding behavior is flexible and optimized to minimize costs and maximize benefits, but tradeoffs have not been explicitly tested experimentally. By manipulating the perceived opportunity for EPCs, I will investigate the cost-benefit tradeoffs of mate guarding for breeding pairs of the Australian Zebra Finch (*Taeniopygia guttata).* I will expose breeding pairs to varying numbers of extra-pair individuals of different sex and relative attractiveness. Quantifying the changes in mate guarding behavior will allow for a definitive assessment of two important tradeoffs; 1) for males, the tradeoff between protecting within-pair paternity and soliciting EPCs, and 2) for females, the tradeoff between avoiding forced EPCs and attaining desired EPCs. I hypothesize that males will mate guard less when there is a greater opportunity for EPCs and that females will participate in mate guarding less when presented with more desirable extra-pair males. Exploring the cost-benefit tradeoffs of mate guarding will allow for a greater understanding of the ecological factors that structure and limit EPP.

## Prospects for a Carbon-Neutral Society: Renewable Energy Technologies and the Factors that Limit their Implementation

*Presenter:* Shane Ardo
Johns Hopkins University, Chemistry

Global climate change is a serious threat to the sustainability of life on Earth. Frightening is the historical correlation between the atmospheric carbon dioxide ($CO_2$) concentration and average East Antarctic temperature given that the current amount of atmospheric $CO_2$ is greater than that at any time during the past three-quarters-of-a-million years! Slowing, stopping, and reversing the rate of growth in atmospheric $CO_2$ concentration should be a worldwide priority. There are two non-mutually exclusive means of achieving this goal; both require that renewable energy sources and/or carbon-neutral cycles be implemented. (1) Decreasing the rate of fossil fuel combustion, which will be explored by presenting a. Pros and cons of exploiting zero-carbon-emitting, renewable-energy sources b. Recent advances in technologies that convert solar, wind, oceanic, geothermal, and hydro power into usable power i. The feasibility of large-scale upconversion to long-term, worldwide solutions based on the economic benchmark of cost per kilowatt-hour ii. Means of storing energy obtainable from intermittent sources - as electrical, physical, and (bio)electrochemical potential energy - to be utilized as fuels (2) Capturing and storing $CO_2$ indefinitely, accomplished by a. Carbon-neutral cycles where $CO_2$ is captured either directly from hydrocarbon-based emissions prior to their escape into the atmosphere or from the current atmosphere b. Biomass production and carbon sequestration representing bioelectrochemical and physical storage techniques, respectively. Particular attention will be paid to direct solar electrosynthetic and genetically bioengineered technologies. Both are synthetic means of mimicking natural photosynthesis and could represent simultaneous solutions to both (1) and (2) above. Audiences with varying backgrounds should be able to comprehend the universal messages: (A) individuals need to curb their power usage; (B) interdisciplinary research efforts aimed at studying photoelectrosynthetic technologies are of utmost importance towards achieving (1) and/or (2) and maintaining the sustainability of life on Earth.

## Contamination of Virginia Fish by Anti-bacterials and Fragrance Compounds

*Presenter:* Elizabeth Mara Jacobs
College of William & Mary, Chemistry

Personal care products, such as antibacterial agents and fragrances, are an increasing concern in the environment. Some show high toxicity to some specific organisms or bioaccumulate in tissues of wildlife. Examples include the widely used bactericide triclosan (TCS), its degradate methyltriclosan (MTCS), as well as the fragrance compounds galaxolide (HHCB) and tonalide (AHTN). A method was developed to identify and quantify these in Virginia freshwater fish. Three matrices of increasing difficulty (target compound-amended NaSO4, amended fish fillet composite reference material and fillets from fish from multiple species and locations with field-incurred contaminants) were analyzed. Samples were dried, isotopically-labeled surrogate standards were added and then subjected to enhanced solvent extraction. Gel permeation chromatography (GPC) was used to remove high molecular weight lipids from these extracts. The final clean-up step was silica gel liquid chromatography. Gas chromatography in tandem with electron ionization mass spectrometry (GC/MS) was used to determine analyte levels in the purified extracts. Good recoveries of the target analytes were obtained from the amended NaSO4 and fish fillet composite reference materials. Both HHCB and MTCS were detected in fish samples with field-incurred burdens. However, no specific trends among fish species, lipid content, or sample location were observed. This may relate to the extremely high lipid contents of some of the fish, which interfered with the GC/MS analysis. Options for further cleanup are under evaluation.

## Giving Students the Cold Boot

*Presenter:* Dan Caselden
*Co-Author*: Jorge Vasconcelos
Johns Hopkins University, Information Security Institute

Random Access Memory (RAM) is a fundamental component in computing systems that serves as short-term data storage for most programs. RAM is considered "volatile" because it needs a source of electrical power to retain data. Our research explores the phenomenon of data remanence in volatile memory within embedded systems. In 2001, Peter Gutmann (University of Auckland) explored data retention in temporary storage [2]. He noticed both short-term data retention and long-term data burn-in, and a correlation with temperature. In 2008, researchers at Princeton University introduced a method to recover encryption keys from RAM [1]. They cooled the memory dramatically, and moved it into another system that read its contents. Much of the data didn't change during the transfer, which allowed them to reconstruct the keys. In our project, we applied such methods to the Atmel AT90USBkey embedded device. We first demonstrated that the microcontroller was capable of reading and writing to memory, and evaluating bit patterns in within. We then showed how severe cold causes RAM to retain data through power loss. We confirmed that this technique is a viable threat to embedded systems and deserves analysis for appropriate countermeasures. However, further research is still needed to replicate long-term data burn-in effects. This experience provided materials that we used to develop an accessible laboratory exercise, in which students first replicate our tests for observing data remanence, then attempt to prevent data recovery by sensing temperature changes and destroying RAM contents.

[1] Halderman, J. Alex, et al., "Lest We Remember: Cold Boot Attacks on Encryption Keys." 17th USENIX Security Symposium, San Jose, CA, August 2008. [2] Gutmann, Peter., "Data Remanence in Semiconductor Devices." 10th USENIX Security Symposium, Washington, D.C. August 2001.

## Intelligent Road Detection


*Presenter:* Samy El-Tawab
Old Dominion University, Computer Science

Our idea is to take advantage of the spread of the cat's eyes on the road by adding sensing capability (sound detectors, vibration detectors and metal detectors) with embedded processors. We prove that these three sensing features will provide a more accurate detection for vehicles and their speed using an aggregation function. The main goal is to improve road safety by providing notifying messages to drivers about different road conditions. Our target is to design a smart, low-cost system. First, we place our nodes randomly/uniformly on the road, then we choose some leaders to collect and provide the data to a more powerful system that can spread messages using different services. In our system, we design optimal values for placement of nodes, synchronization and communication timing between nodes. For power consumptions, our system will take advantage of the idea of taking light and converting it to power, which has been implemented on some roads in the UK, or using a varying sleeping/waking up mode for nodes. We can reach a power consumption savings that lives for at least one year. Our model gives an intelligent road system that can detect the occurrence of a vehicle with a high probability and can also inform other vehicles with different events.

## Measurement and Classification of Humans and Bots in Internet Chat

*Presenter:* Steven Gianvecchio
*Co-authors:* Mengjun Xie, Zhenyu Wu, Haining Wang
College of William and Mary, Computer Science

The abuse of chat services by automated programs, known as chat bots, poses a serious threat to Internet users. Chat bots target popular chat networks to distribute spam and malware. In this presentation, we first conduct a series of measurements on a large commercial chat network. Our measurements capture a total of 14 different types of chat bots ranging from simple to advanced. Moreover, we observe that human behavior is more complex than bot behavior. Based on the measurement study, we propose a classification system to accurately distinguish chat bots from human users. The proposed classification system consists of two components: (1) an entropy-based classifier and (2) a machine-learning-based classifier. The two classifiers complement each other in chat bot detection. The entropy-based classifier is more accurate to detect unknown chat bots, whereas the machine-learning-based classifier is faster to detect known chat bots. Our experimental evaluation shows that the proposed classification system is highly effective in differentiating bots from humans.

## The Strong HB Problem and Applications

*Presenter:* David Goldenberg
*Co-author:* Moses Liskov
College of William and Mary, Computer Science

The HB problem first introduced by Blum and Hopper has been the basis for extremely lightweight authentication protocols for RFID tags. In this presentation we introduce a variant of this problem which we call the strong HB problem. We analyze the strong HB problem and give some arguments that support its hardness. We then use the strong HB assumption in two applications which may be of independent interest. First, while the HB problem has been the basis of several lightweight protocols for RFID authentication, none of these protocols have proofs of security against fully adaptive man-in-the-middle attacks. We improve on the HB# protocol using the strong HB assumption. Our protocol is one round less than HB#, with similar efficiency otherwise, and can be proven secure in the full model. In addition, we present the first construction of a related-key secure, efficient, nonce based MAC in the standard model.

## Finding Reflection Symmetry in Spatial Models

*Presenter:* Ruth Lamprecht
College of William & Mary,
Computer Science

A model-based evaluation of a system's design often considers to what degree components need to be available multiple times in order to reach a desired level of availability, reliability or dependability. Multiple components of the same kind then lead to models with regular structures. In stochastic models, especially Markovian models, such regularities are used to establish lumpability results that help achieve a significant state space reduction and alleviate the effects of the infamous state space explosion problem. We extend the approach of Obal, McQuinn, and Sanders to also incorporate symmetries that require shared variables to commute. From working with Markovian models that take spatial aspects into account, we realized that certain symmetries a compositional model had could not be adequately expressed within the existing work of Obal *et al.* Our extension allows us to express and subsequently exploit more symmetries present in a model to obtain a reduced, lumped CTMC. The work of Obal et al. is for a composition of models based on sharing state variables. We propose to take into account if a submodel has shared variables that commute, i.e., a permutation of values among two shared variables does not lead to a different behavior. This exploits the fact that values can commute; however, the formal environment is that of a formalism with shared variables and the focus is more on obtaining an automated way to extract relevant information from a given compositional model and apply an automated symmetry detection scheme based on graph automorphisms to automate the overall approach. Our goal is to obtain a fully automated approach that is incorporated in the multi-paradigm, multi-solution framework Mobius that takes full advantage of symmetries present in a composed model to obtain and solve a reduced, lumped CTMC of a dependability model.

## Burstiness in Multi-Tier Applications: Symptoms, Causes, and New Models

*Presenter:* Ningfang Mi
*Co-authors:* Giuliano Casale, Ludmila Cherkasova, Evgenia Smirni
College of William and Mary,
Computer Science

Workload flows in enterprise systems that use the multi-tier paradigm are often characterized as bursty, i.e., exhibit a form of temporal dependence. Burstiness often results in dramatic degradation of the perceived user performance, which is extremely difficult to capture with existing capacity planning models. The main reason behind this deficiency of traditional capacity planning models is that the user perceived performance is the result of the complex interaction of a very complex workload with a very complex system. In this presentation, we propose a simple and effective methodology for detecting burstiness symptoms in multi-tier systems rather than identifying the low-level exact cause of burstiness as traditional models would require. We provide an effective way to incorporate this information into a surprisingly simple and effective modeling methodology. This new modeling methodology is based on the index of dispersion of the service process at a server, which is inferred by observing the number of completions within the concatenated busy periods of that server. The index of dispersion together with other measurements that reflect the "estimated" mean and the 95th percentile of service times are used to derive a Markov-modulated process that captures well burstiness and variability of the true service process, despite inevitable inaccuracies that result from inexact and limited measurements. Detailed experimentation on a TPC-W testbed where all measurements are obtained by HP (Mercury) Diagnostics, a commercially available tool, shows that the proposed technique offers a simple yet powerful solution to the difficult problem of inferring accurate descriptors of the service time process from coarse measurements of a given system. Experimental and model prediction results are in excellent agreement and argue strongly for the effectiveness of the proposed methodology under both bursty and non-bursty workloads.

### Timing based Rogue AP Detection

*Presenter:* Bo Sheng
*Co-authors:* Hao Han, Chiu C. Tan, Qun Li, Sanglu Lu
College of William and Mary,
Computer Science

IEEE 802.11 based wireless local area networks, or WLANs, have grown in popularity in recent years. As people's expectations of ubiquitous wireless availability increases, the security of such networks becomes more important. The problem of rogue access points has emerged as an important security problem in WLANs. A rogue access point, or rogue AP, is an access point that is not deployed by the WLAN administrator but by a malicious adversary. The goal of a rogue AP is to masquerade as a legitimate AP in order to lure unsuspecting users to connect to it. In this poster, we propose a timing based approach towards detecting Rogue APs that can be implemented using off-the-shelf software.

### High Speed RFID Performance

*Presenter:* Chiu C. Tan
*Co-author:* Qun Li
College of William & Mary,
Computer Science

Radio Frequency Identification (RFID) technology has already been found in a diverse set of applications ranging from inventory management to anti-counterfeiting protection. RFID technology is expected to continue to grow and diffuse into our everyday lives. While an increasing number of applications use RFID in their design, there remains a lack of understanding of how mobility affects RFID performance in these applications. Unlike static RFID experiments, mobile RFID studies require more expensive equipment that are unavailable to most researchers. In this poster, we conduct machine-aided experiments to study the effects of mobility on RFID.

## Toward Optimal Transport Networks

*Presenter:* Erik P. Vargo
College of William & Mary,
Computer Science,
Computational Operations Research

While traditional physics-based mathematical models (e.g., ordinary or partial differential equations) can serve as good predictors of physical phenomena, some complex systems do not lend themselves easily to such modeling. In particular, the dynamics, enormous scale and complexity of air transportation networks make it difficult to capture their behavior in a predictive model. On the other hand, rule-based or agent-based simulations alone cannot serve as robust predictive models, which are needed to enable the active design of complex adaptive systems, such as transportation networks. The objective of our work is to provide an initial research tool that will allow for the flexible interplay of discrete-event simulation models and continuous flow models ultimately meant to yield model components for the rigorous and active design and optimization of transport networks. In particular, we are interested in extracting tunable design and control variables and deriving formal local and global objective and constraint functions that will allow us to formulate and solve transport network design problems from first principles. Due to the expected threefold increase in U.S. air travel demand in the near future, we focused our initial efforts on the air transportation problem. We developed the Airport Network Simulation Program (ANSP) as a platform to experimentally gauge the effectiveness of heuristical optimization techniques. Tabu search procedures were used to “rewire” the 1990 U.S. airport network to achieve heuristically optimal (i.e., maximization, minimization) values of global assortativity --- the propensity of high degree nodes to connect to high degree nodes --- and synchronizability. Early results indicate that the best performance is obtained by maximizing network synchronizability. Here performance is measured by a network’s ability to avoid congestion. Most recently, we have applied a subgraph extraction algorithm to the 1990 network with the goal of incorporating a local optimization subroutine into our algorithm.

## Extending Search in the Cyberspace to the Physical World

*Presenter:* Haodong Wang
*Co-authors:* Chiu C. Tan, Bo Sheng
College of William and Mary,
Computer Science

The inspiration of this project came from the observation that people have very different experiences while searching in the physical world and searching in the cyberspace. Searching in Internet, by using search engines like Google, is easy because Google already stores the information somewhere in the network. Searching in the physical world, however, is quite difficult. Not only is the information of objects (or things) isolated from the cyberspace, the data collection and management is non-trivial due to the high volume data size and volatile nature of real live things. In this work, we build an information retrieval system for distributed embedded systems. We envision that textual information will be stored in sensors more predominantly, and searching through textual terms will be popular in future sensor network applications. We show the design of Snoogle, a prototype system for information retrieval, which is based on a hierarchical searching structure composed of KeyIP, IP, and sensors. Snoogle aims to reduce the communication costs by using compression schemes (e.g., Bloom filter) for information indexing, and provide security and privacy enhancement to sensitive information. The basic idea of the Snoogle search system is also suitable for the search tools, like Google Desktop, for the local storage in an individual embedded device. Given the very limited hardware resources, conventional search algorithms cannot be used. We present Microsearch as the local search engine for small devices. Akin to a desktop search engine, Microsearch indexes the information inside a small device, and accurately resolves user queries. We adopt information retrieval techniques for query resolution, and propose a space efficient algorithm to perform top-k query on limited hardware resources. We further present a theoretical model of Microsearch to better understand the trade-offs in system design parameters. We have implemented both Snoogle and Microsearch on commodity hardware for evaluation. We demonstrate the feasibility of both systems by showing the low system response time, low communication overhead and high accuracy of searching results.

## Mimimorphism: A New Approach to Binary Code Obfuscation

*Presenter:* Zhenyu Wu
*Co-authors:* Steven Gianvecchio, Mengjun Xie, Haining Wang
College of William & Mary,

Binary obfuscation plays an essential role in evading malware static analysis and detection. The widely used code obfuscation techniques, such as polymorphism and metamorphism, focus on evading syntax based detection. However, statistical anomaly tests and semantic analysis techniques have been developed to thwart their evasion attempts. More recent binary obfuscation techniques are divided in their purposes in attacking either statistic or semantic approach, but not both. In this presentation, we introduce mimimorphism, a novel binary obfuscation technique with the potential of evading both statistic and semantic detections. Mimimorphic malware uses instruction-syntax-aware high-order mimic functions to transform its binaries into executable mimicry that exhibit high similarity to benign programs in terms of statistical properties and semantic characteristics. We implement a prototype of the mimimorphic engine on the Intel x86 platform, and evaluate its capability of evading statistical anomaly detection and semantic analysis detection techniques. Our experimental results demonstrate that the mimicry executables are indistinguishable from benign programs with respect to statistical anomaly detection and semantic analysis detection test scores.

## Designing a Better Access Point Association Protocol

*Presenter:* Fengyuan Xu
*Co-author:* Chiu C. Tan
College of William & Mary,
Computer Science

This poster considers the Access Point (AP) Association problem. We give theoretical analysis for the performance of the AP association protocols and show that the previously proposed protocols are less ideal in terms of performance. We propose a protocol that delivers a very good theoretically provable competitive ratio. The protocol is implemented in Click module and wireless card driver, which takes advantage of the IEEE 802.11 protocol for lightweight implementation. In summary, our theoretical study and performance evaluation, based on simulation and real implementation demonstrate that our proposed protocol is highly practical. We believe a good performance metric for AP association is to achieve the maximized minimal throughput for all clients. Under this performance metric, this poster aims to answer the fundamental questions behind the AP association problem: what can we claim with regard to the performance for this selfish association with the AP delivering the client with the best bandwidth protocol? And can we design a better protocol for AP association? We will show the worst-case performance for the existed protocol by theoretical analysis and show a better protocol that achieves a satisfactory worst-case performance. This algorithm is an online algorithm that makes use of the current load information on the nearby APs and determines which AP a client should connect to. Instead of selecting the AP with the least load or the AP with the strongest signal strength, a client will associate to the AP so that the L_p norm of the loads on all APs is minimized. We show that under a general scenario, the online algorithm gives an almost constant competitive ratio. The evaluation is conducted in simulation. More interestingly, the protocols have been implemented in the wireless card driver by hacking into the Linux kernel. Not only the proposed protocol is theoretically intriguing, the simple implementation with practical consideration is far more valuable. In other words, combined with the theoretical analysis, the protocol uses very light-weight probing to gather AP information in order to make association decisions. It is a less-intrusive way of AP association protocol. In summary, the contributions of this paper are three-fold: (1) We have theoretically examined the selfish AP association protocol and shown its performance degradation under various conditions. Even though people have started this line of work through simulation or experiments, there is no theoretical study in terms of AP association performance. More precisely, we show that selecting AP with the strongest signal gives a poor performance, the selfish greedy user protocol that tries to maximize a user its own throughput has a high convergence time and poor performance in terms of maximizing the minimal throughput over all users. (2) We have designed an online algorithm for AP association based on L_p norm of the loads on all APs and demonstrated that the competitive ratio (i.e., the worst performance possible) is almost constant. (3) We have implemented our protocol in a wireless card driver under Linux kernel. We propose practical and light-weight estimation and protocol design in a real system setting.

## Anti-Phishing in Offense and Defense


*Presenter:* Chuan Yue
*Co-author:* Haining Wang
College of William & Mary,
Computer Science

As one of the most common Internet frauds, phishing has caused serious damages to Internet users ranging from denied account access to substantial financial loss. Many anti-phishing mechanisms currently focus on helping users verify whether a web site is genuine. However, usability studies have demonstrated that prevention-based approaches alone fail to effectively suppress phishing attacks and protect Internet users from revealing their credentials to phishing sites. In this presentation, instead of preventing human users from biting the bait, we propose a new approach to protect against phishing attacks with bogus bites. We develop BogusBiter, a unique client-side anti-phishing tool, which transparently feeds a relatively large number of bogus credentials into a suspected phishing site. BogusBiter conceals a victim's real credential among bogus credentials, and moreover, it enables a legitimate web site to identify stolen credentials in a timely manner. Leveraging the power of client-side automatic phishing detection techniques, BogusBiter is complementary to existing preventive anti-phishing approaches. We implement BogusBiter as an extension to the Firefox 2 web browser, and evaluate its efficacy through real experiments on both phishing and legitimate web sites.

## KPCToolbox: Best Recipes Toward Automation of Workload Fitting

*Presenter:* Zheng Zhang
College of William & Mary,
Computer Science

Markovian models provide a convenient way of evaluating the performance of network traffic since their queueing analysis enjoys established theoretical results and efficient solution algorithms. Although unable to directly generate traffic with long-range dependent (LRD) behavior, Markovian models can approximate accurately LRD traffic in several ways, e.g., by superposition of flows with short-range dependent (SRD) behavior over many time scales. This is known to be sufficient for the evaluation of real systems since the performance effects of LRD traffic becomes nil beyond a finite number of time scales. There are two main obstacles to the Markovian analysis. One of them is model parameterization, which often requires describing the interaction of several tens or hundreds of states. Even for basic Markov Modulated Poisson processes or phase-type renewal processes, few results exist for their exact parameterization and they are restricted to models of two or three states only. The second challenging issue is the model order selection to determine the number of states to be used in the underlying Markov process. To the best of our knowledge, no criteria have been proposed in previous work for determining the size of the Markov model for workload fitting. We tackle the above issues by developing characterization and fitting method for Markovian Arrival Processes (MAPs), a class of Markovian models developed that encompasses MMPP and PH processes as special cases. We start from the characterization results of inter-arrival time processes of a MAP and design an accurate fitting algorithm called Kronecker Product Composition (KPC) for network traffic. The novelty of KPC is that the method is able for the first time to impose moments or autocorrelation of any order to the resulting MAP, while existing methods are mostly limited to first and second-order statistical descriptors that are often insufficient for accurate queueing prediction.

## The Hebrew and Irish Gaelic Revival Movements: A Comparison


*Presenter:* Kevin Barry
University of Delaware, History

This presentation is a comparison of the attempts to revive Hebrew and Irish Gaelic in the late nineteenth and early twentieth century. In particular, it focuses on the struggle of the Hebrew and Irish Gaelic revival movements to place the language they championed in higher level education in Palestine and Ireland respectively. The presentation argues that the difference in nature of both campaigns and the demands they made explains in part why the Hebrew revival movement largely succeeded in making Hebrew the dominant language amongst Jews in Palestine, while the Irish Gaelic revival movement failed in attempting to make Irish Gaelic the dominant language in Ireland. The presentation also compares the political and linguistic environment that existed in both countries as well as the education system put in place by British authorities in Ireland and Ottoman authorities in Palestine. The relative success of Hebrew compared to Irish Gaelic is explained due to a number of factors. The presence of English as the dominant political, economic and cultural language of Ireland made any Gaelic revival difficult, while the polyglot environment in Palestine allowed Hebrew to flourish. The British government maintained a tight control over education in Ireland, while the Ottoman government largely left the education of Jewish children to Jewish philanthropic organizations. Finally Irish Gaelic supporters sought to have the language taught as a subject in high schools, while Hebrew supporters used Hebrew as the language of instruction in school, first with younger classes, and then for all students. The research was conducted primarily through newspaper archives, printed journals and government records. The findings of this research have implications for those who are interested in studying language revival in other contexts as well as those involved in creating language revival policies.

## American Indian Enslavement in Colonial New England


*Presenter:* Stephanie Crumbaugh
Johns Hopkins University, History

As English settlements spread in New England, relations between their inhabitants and the indigenous populations grew more entwined. This presentation examines the rise and fall of the enslavement of New England Indians and the institutionalization of Indian slavery in the region. Scholars have largely overlooked the history of the English enslavement of American Indians and the trade in Indian slaves. Much of the scholarship that addresses slavery's beginnings in British America ignores Indian enslavement entirely, or treats the enslavement of Indians as a stepping stone on the colonial path to large-scale African slavery. Though it did not exist on the same scale as African slavery, Indian slavery deeply impacted colonial-Indian relations, as well as native and English communities. Many Indians taken as slaves were women and children, which would have had profound effects on the reproductive capabilities and age distributions in native populations. In colonial communities, arguments surrounding the ethics of enslaving Indians led some colonists to question their religious mission, believing that enslaving Indians was admitting colonial inability to convert the natives to Christianity. Early practices of enslaving Indians contributed to notions of race and the institution of slavery, and also affected the ways in which colonists, and later Americans, established and perceived Indian-White relations. Though the enslavement of New England natives began with kidnapping and the enslavement of war captives, over time New England settlers expanded the use of native laborers, enslaving Indians convicted of crimes, offering the profits from the sale of captive Indians to encourage men to fight their native neighbors, exporting innocent women and children to labor as slaves in foreign lands, and taxing Indian slaves to pay for the costs of the colony. This presentation addresses the origins and evolution of Indian slavery as an institution in New England.

## A Valuable Tradition: Andrew Lytle and Mel Bradford's Understanding of the Southern Past

*Presenter:* Alan James Harrelson
College of Charleston, History

For the twentieth century scholars of the South who professed attachment and sympathy with a southern conservative tradition, that tradition stemmed from a particular understanding of the southern past that both contradicts and confirms historiography of the South. Sometimes, the historiography does not consider it at all. Through the writings of Andrew Lytle and Mel Bradford, two of the more influential, accomplished, and prolific essayists of southern conservative thought, one may gain insight into how southern conservatives of the twentieth century understood the southern past, its virtues, its lessons for subsequent generations, and how this interpretation compares with the works of professional historians. Lytle and Bradford understood the southern past and the southern experience of defeat as a story of resistance towards ideas, regimes, and external forces that threatened the traditional culture and identity of the South as it existed within the broader context of an older European or Western heritage; for them, the southern conservative tradition existed as a result of this constant resistance in defense of the older, inherited civilization of the South, a civilization they sought to boldly defend against what they considered modern disorder. Bradford and Lytle understood Confederate defeat to be the focal point of the southern past based upon their understanding of the South as a society that inherited virtues worth conserving. Both, as active academicians, considered themselves twentieth century heirs of this southern tradition of virtue. Their works were devoted to showing that the South in ideal and to a considerable extent in reality reflected English country society of the seventeenth and eighteenth centuries. Ultimately, the overwhelming pull/push influence of that valuable tradition was for the South a more effective arbiter of events than the more speculative and theoretical notions of wealth and progress.

## Chinese Revolution and the Second Sino-Japanese War: The Role of Japan in Communist Victory

*Presenter:* Joshua Hubbard
Marshall University, History

As a key part of World War II, the Second Sino-Japanese War (1937-1945) was one of the largest and longest conflicts in Asia during the twentieth century. What was the impact of the war on political developments in China, especially on the power struggles between the two major political parties? How did it change the direction of twentieth century Chinese history? Primary texts written by communist leaders repeatedly noted their early resistance to Japanese aggression, suggesting that the Chinese Communist Party (CCP) attempted to use Japanese invasion to build up popular support. Writings by Chiang Kai-shek and correspondence between American diplomats highlighted that the Nationalists were forced to retreat to the southwest, while the communists were able to organize rural based movements practicing guerilla warfare in central and eastern China behind Japanese lines. The diaries of Westerners living in China during the war indicated that the Japanese invasion forced the Nationalists to turn their military focus away from eliminating communist insurgents, thus allowing the CCP to recover from the anti-communist campaigns of the 1930s. I would like to argue that the conflict had a particularly significant effect on political developments on the Chinese mainland. I intend to highlight that the invasion of the Japanese in 1937 and the ensuing war was the most important determinant and contributing factor to the communist victory in the Chinese Civil War and the creation of the People's Republic of China. The war provided Mao Zedong the opportunity to mobilize support from the peasantry, isolated Chiang Kai-shek from his urban power base along the eastern coast, and allowed the Chinese Communist Party to recuperate from the Long March.

## Teaching Integration, Integrating Teachers: Pedagogical Changes in Western Virginia Schools During the Long 1960s

*Presenter:* Peter Jones
College of William and Mary, History

In the historiography of school desegregation, there has been much focus on the legal and political campaigns that led to the Brown Decision and followed its attempts at enforcement in the states. When looking at changes in education itself, researchers have often focused on student outcomes before and after integration. Yet desegregation and integration had far ranging effects on another segment of the educational population, teachers. With huge demographic shifts occurring in urban areas and changes in pedagogical training, city school systems and their faculty were under enormous pressure from school boards and administrators. They had to react to different methodologies, be quietly supportive of school board policies (whether segregationist or integrationist), and often deal with unplanned moves themselves. The change in teaching as a result of integration deserves study because it can explain how desegregation affected the classrooms in which students learned. Roanoke provides a unique case study because of its political outcomes: little violence, obeying legal guidelines (albeit slowly), and the election of an African American mayor. Yet problems occurred under the surface in Roanoke. The city dragged its feet as much as it could in school integration. It took almost 20 years before the courts considered it in compliance with federal law. In a town which preferred quiet, passive resistance, the movement of teachers within schools and out of the school system can illustrate many of the frictions occurring in classrooms during integration. The stories of teachers themselves, about their interactions with students, parents, and administrators provides additional context from a profession discouraged from talking to the media (for fear of losing their jobs). By explaining the experience of integration for school teachers, this paper hopes to shed light on an understudied aspect of integration which can inform how desegregation broadly affected education in the long 1960s.

## The Battle for History: Schopenhauer and the Eclipse of Hegelianism

*Presenter:* Angelo Letizia
Old Dominion University, History

The French Revolutionary era of 1789-1815 irrevocably changed European society. While this revolutionary era engendered great change, it also brought forth a number of violent and disturbing events, such as the Reign of Terror and the Napoleonic Wars. Many tried to assess the overall meaning and purpose of these changes. Some, like the German thinker F.H. Jacobi, sought refuge in faith. He believed only faith in God could give meaning, and all else was dangerous to the traditional order. He gave modernity an “ultimatum” of faith or nihilism, the belief in absolutely nothing. Many took up this challenge. This presentation will examine two conflicted answers to Jacobi’s ultimatum by examining the theories of two German philosophers of the early nineteenth century; Georg Wilhelm Friedrich and Arthur Schopenhauer. Jacobi’s retreat to traditional faith was repugnant to Hegel and Schopenhauer because thy felt faith was outdated. Hegel opted for teleology, or purposeful progression. For Hegel, Robespierre and Napoleon were necessary evils because all historical events were stages in the development of freedom, which was more times than not hard and painful. The French Revolution was the final stage in this development. Conversely, Schopenhauer embraced nihilism. He believed the recent events like the violence of the Terror were simply proof of the absurdity of existence. The French Revolution affected Jacobi, Hegel and Schopenhauer each in a different way. While their ideas were by no means a representation of all theories in Germany at the time, their ideas do represent the reactions and effects that the revolution produced in many during the early nineteenth century. Thus they can be studied as a partial sample of early post-revolutionary thought in Germany. In addition, their ideas can also be viewed as early attempts to interpret the emerging modern epoch.

## Years of Contrasts: WRVA, Desegregation, and Massive Resistance in Virginia

*Presenter:* Caroline C. Morris
College of William and Mary,
History

During the 1950s and 1960s, the majority of Virginia's public forums for discussion of desegregation and massive resistance - newspapers, speeches, and rallies - was dominated by white Southerners. White Southerners were divided in their response to Brown, but mainstream Virginia media usually depicted anti-segregation activists as "agitators," "radicals," and even communist conspirators. And while the narrative generally (though not always) stopped just short of explicitly advocating U.S. Senator Harry Byrd's "massive resistance" to the ruling, white commentators suggested that people should more or less voluntarily abandon segregationist practices at their own pace. If that pace proved to be a standstill, they argued, so be it; the federal government had no legal right to intervene. When non-southern journalists accused white Virginians of using gradualism as a flimsy pretext for the indefinite perpetuation of systemic prejudice, white journalists from Virginia reacted violently against "Northern media bias," and argued that no discussion about civil rights could be fair as long as the conversation excluded the "Southern perspective." Radio station WRVA, broadcasting at 50,000 watts, regularly reached into the homes of thousands of people in Virginia and elsewhere. At the highest levels, the men and women who worked for the station openly opposed desegregation, but the radio station did not conform to the dominant pro-segregation narrative. Because of WRVA's long-standing commitment to acting as "a faithful public servant," working "for the promotion of the general welfare," station officials felt compelled to offer competing perspectives of desegregation, despite personal opinion. They turned the microphones over to Southerners of all races, and WRVA's microphones became a place for a more nuanced discussion of citizenship and civil rights than Virginians could find in most other local media.

## Divided Loyalties: American Catholics, American Protestants, and the Spanish Civil War

*Presenter:* Rob Morrison
University of North Carolina at Wilmington,
History

The presentation I am submitting focuses on American Catholic and Protestant responses to the Spanish Civil War during the late 1930s. The Spanish conflict exposed severe tensions between Catholic and Protestant groups in the United States. Reports of anticlerical violence committed by Republican forces appalled American Catholics. Descriptions of burned churches and slaughtered clergymen fed the growing paranoia that a communist conspiracy bent on the annihilation of the Church was responsible for the tragic events in Spain. American Protestants feared that General Francisco Franco's rebellion represented another dangerous totalitarian movement: global fascism. They expressed outrage at the overthrow of the popularly elected Spanish government by Franco's militarist insurgency. Both groups utilized similar rhetoric to justify their perspective on the issue. Each side accused the other of supporting oppressive totalitarian ideologies while simultaneously championing the virtue of the side they represented. Religion was another aspect of this competition. Catholics accused Protestants of abandoning Christianity by supporting the Spanish Republic, and Protestants blamed the outbreak of violence on the corruption of the Catholic hierarchy in Spain. Finally, both sides of the debate claimed that they represented the cause of liberty and democracy. They each utilized strong patriotic rhetoric to showcase themselves as the true proponents of the American way of life. An examination of Catholic periodicals like America and Commonweal and Protestant journals like The Christian Century shows how these arguments transformed over the course of the Spanish conflict. The use of symbolic terminology showcases the similar tactics employed by both sides. Although voices of opposition existed within both communities, the majority of Catholics and Protestants in the United States engaged in a heated rhetorical campaign over the tragic events in the Spanish Civil War. This presentation also shows how domestic pressure groups shaped American foreign policy throughout the twentieth century. Faced with mounting pressure from New Deal Catholics, the Roosevelt administration settled on a neutral position towards the Spanish Civil War, despite an overwhelming majority of Americans that supported aid to the Republic.

## "What Town's this, Boy?": Virginia's Town Troubles, English Politics, and Aphra Behn's *The Widdow Ranter*


*Presenter:* Paul Musselwhite
College of William and Mary, History

This presentation will address the intersections between Virginia's late-seventeenth-century debate over town development and the discontent being fermented in English towns preceding the Glorious Revolution. These two forces come into focus in *The Widdow Ranter* (1690), one of the final works of the Restoration writer Aphra Behn. Set in Virginia the play deals loosely with the events of Bacon's Rebellion, which had shaken the colony ten years earlier. Scholars have argued that it is primarily concerned with exploring ideas of honour and natural leadership using the colonial setting as a literary tool. However, one of the factual aspects of the revolt that looms large in Behn's retelling, and one which undoubtedly attracted her attention to the tale's dramatic potential, is the rebels' torching of Jamestown, Virginia's only town. She connects the fate of Jamestown with the incompetent magistrates presiding over its courts. This connection is part of Behn's wider exploration of the link between towns and the representation of legitimate authority, which runs throughout the play. In considering this issue Behn speaks not only to her Tory opinions about overbearing aldermen in English towns but also to a lengthy debate within Virginia's colonial society about the need for a viable capital and the power it offered to the governor who presided there. This presentation will chronicle the connections *The Widdow Ranter* makes between contested authority in England's troublesome boroughs and Virginia's debate over the need for towns.

## Natural Disasters and Disastrous Politics: Rebuilding Charleston's Fortifications 1752 - 1756

*Presenter:* Neal Polhemus
College of Charleston, History

When a powerful hurricane struck Charleston in September 1752, the Commons House and Governor James Glen were embroiled in a battle over the authority to build and repair the city's fortifications. The timing of the natural disaster and the destruction it caused to the province raised public awareness about the poor state of the city's defenses. The Board of Trade reaffirmed Glen's original instructions to reestablish his royal prerogative provoking a clash with the Commons House and its reluctance to forfeit the power it had attained. As relations between England and France deteriorated, the prospect of a seaborne attack required a reassessment of the fortifications in an effort to place the city in a more defensible condition. Was there a faction in the Commons House which directed the power struggle against Governor Glen's royal prerogative? Who led the movement to rebuild and repair the city's fortifications? How did the city acquire funding, labor, and resources to repair the fortifications? What were the inherent problems that engineer William Gerard De Brahm faced? This paper will address these issues as well as discuss the pattern that developed from the power struggle between the Commons House and Governor Glen to repair the city's destroyed fortifications and its context in the politics of pre-Revolutionary South Carolina. This paper is based on an extensive study of the Journals of the Commons House of Assembly and the Journals of Upper House, as well as an unpublished manuscript journal of the commission of fortifications at the South Carolina Department of Archives, the manuscript collections at the South Carolina Historical Society, including the Cochran Family Papers and St. Michael's Church Records, the James Glen Papers at the South Caroliniana Library, the Special Collections of the College of Charleston and the *South Carolina Gazette*.

## Beyond Freedom Schools: Education's Role in Preparing Leaders

*Presenter:* J. Michael Powell
Virginia State University, History

In the summer of 1964, Freedom Schools opened in Mississippi. Part of Freedom Summer, a project of the Southern Civil Rights Movement, these schools worked with a purpose to enable the development of leaders in their respective communities which were predominately African American. The freedom schools' curricula were centered on making education about the student in such a way that education connected to the student's own experience. In addition, the Freedom Schools' purpose was also making the student responsible for his or her own learning. It is important to notice that the Freedom Schools of 1964 were a volunteer effort on the part of the teachers as well as the students, making those students that participated, part of making their own destiny. Education can be a tool that prepares students to become "full citizens". Secondary schools have the chance and the duty to help enlighten a student's mind of the possibilities that await them in the world. Often schools, especially public schools, develop programs that will prepare students to take a test, but not engage students in the importance of taking that test. Education should not be segregated. As Fannie Lou Hamer said we must be "sick an' tar'd of being sick an' tar'd " of education that is not equal to all students and that does not prepare all students to find leadership in their own lives. Areas across America have justified such inequality through economic divisions, as they did before the 1960s with racial divisions. The legacy of the Freedom Schools must continue through schools, which will equalize education and prepare social change agents that are knowledgeable and equipped to lead and live in this nation.

## Deconstructing Southern Ethnicity: Minority Confederate Mobilization and Racial Affiliation

*Presenter:* Eric J. Richardson
North Carolina Central University:
University of North Carolina at Chapel Hill,
History: American Studies

The research addresses two fundamental questions, "How does a rural agrarian community communicate across the color line and why would they risk life and limb to pursue inter-racial cooperation in the face of Jim Crow restrictions against such behavior." Since labor value theory holds that the entire society benefits from any work, disruptions to the agricultural economy caused by hegemonic repressive actions necessarily impacts farm production and hurts everyone. Using records from thirty counties in North Carolina, South Carolina, and Virginia, this comparative case study uses the evolution of the various Confederate veteran relief acts to examine the common wartime experiences. The methodology for the study will incorporate an interdisciplinary approach that includes ethnohistory, literature, ethnomusicology and comparative linguistics. Primary sources come from Confederate mobilization in the subject states, which lead to the advent of Soldier's Relief Boards during the war, and the commutations and pensions of the 1880s and 1890s. The choice of the pensions as an organizing conception occurs because their enactment represented the first time in American history that the states instituted a socialist based program of poor relief regardless of race. The major results discovered from this inquiry confirm the conclusions of Melvin Patrick Ely's I*srael on the Appomattox* regarding the consistent treatment of former Free Black communities after Reconstruction. Through the rural nature of counties examined, the destruction of the institution of slavery comes into sharp focus, answering a long standing call for scholarship on the institution's demise from Emory Thomas in "Confederate Nation." The ethnographic view of these political divisions includes the third race of the antebellum Free Person of Color communities – known today as Native American - further undermining the dichotomy of Jim Crow. Of greatest importance, the payment of pensions to non-whites makes the white narrative of wartime loss an artificial construction.

**"A Journey of Freedom: The 1961 Freedom Rides Contribution to the Civil Rights Movement"**

*Presenter:* Janet M. Stephens
Virginia State University, History

Desegregating the nation's schools was one of the first major victories in the Civil Rights Movement. But there would be many more battles in the struggle for racial equality for African Americans. The desegregation of public transportation became a pivotal point in the civil rights struggle. My research uses existing scholarship and an interview with Congressman John Lewis, one the original freedom riders, to display how the media attention that the Freedom Rides of 1961 received, took the Civil Rights Movement to the national front. The momentum from the earlier victories in the movement such as Morgan v. Virginia, Brown v. the Board of Education and the Montgomery Bus Boycott seemed to have waned. However, the Freedom Rides revived the Civil Rights Movement. With a new tactic known as the 'Freedom Rides', CORE begin training thirteen activists in nonviolent direct action. The Freedom Rides of 1961 facilitated the media attention and momentum that the Civil Rights Movement needed. The Freedom Rides literally took the movement off of college campuses, from middle and large urban centers into the small towns and rural communities. Although the Freedom Riders faced criticism from Southern white liberals and moderates for alienating potential allies and endangering hard-earned progress that the Civil Rights Movement had already achieved, the Freedom Riders helped to shift the movement. They saw support in greater numbers as the movement was no longer limited to the South but soon spread across the nation.

## Pattern Classification Techniques for Dental Ultrasound

*Presenter:* Crystal Bertoncini
College of William and Mary, Physics

Periodontal disease, commonly known as gum disease, affects millions of people. The current method of detecting periodontal pocket depth is painful, invasive, and inaccurate. As an alternative to manual probing, an ultrasonographic periodontal probe is being developed to use ultrasound (US) echo waveforms to measure periodontal pocket depth, which is the main measure of periodontal disease. Wavelet transforms and pattern classification techniques are used in artificial intelligence routines that can automatically detect pocket depth. The main pattern classification technique used here, called a binary classification algorithm, compares test objects with only two possible pocket depth measurements at a time and relies on dimensionality reduction for the final determination. A combination of different wavelets and pattern classification maps improves the precision of the artificial intelligence. The method correctly identifies up to 90% of the US probe measurements within the manual probe's tolerance.

## Automated Ultrasonic Medical Monitoring

*Presenter:* Cara Campbell
College of William and Mary, Physics

Ultrasound is a safe, non-invasive and non-ionizing technique that can be used in various medical applications to improve patient quality of life. In this presentation we discuss the current status of ultrasound -based medical projects. The relationship between increased embolic load to the brain and neurocognitive deficits are well documented, and are a concern in high-altitude flight, deep water diving, and open heart surgery. Arterial line filters are now used to stop emboli in extracorporeal circuits from passing back into the bloodstream. However, small emboli and sometimes large emboli pass through these filters, especially when the filters are overloaded. Acoustic radiation force can be used to push emboli out of the blood flow path. We are currently developing simulations to accurately model acoustic radiation force on spherical emboli in a viscous fluid. These models will be used to help establish an experimental technique for efficient emboli removal. Urinary incontinence affects approximately 25 million adults in the United States, and is often a key factor in the level of independence available to the elderly and to mentally handicapped individuals. We are developing a wearable ultrasound device that can measure bladder fullness and alert the wearer or caretaker of the need to void. In particular, we are creating signal processing methods that detect bladder distention via optimized real-time algorithms. This system does not create an image from the ultrasound signal, but rather, the waveform echo signal is processed to represent a level of bladder fullness.

## Analysis of Electronic Damping of Microphonics in Superconducting Cavities

*Presenter:* Subashini U. De Silva
*Co-author:* Jean Delayen
Old Dominion University, Physics

Current particle accelerators used in high energy physics research uses superconducting radio frequency (rf) cavities, where the particles gain energy by the interaction with the cavity field. The stabilization of the cavity field amplitude and phase is important in achieving the required acceleration of the particles. In low current applications, the superconducting cavities have a high susceptibility to microphonics. The effects of microphonics induced by external vibrations and pressure fluctuations cause a fluctuation in the cavity resonance frequency hence in the cavity field amplitude and phase. Due to the narrow bandwidth of the cavities, the amount of rf power required to stabilize the phase and amplitude of the cavity field is dictated by the amount of microphonics that need to be compensated. The mechanical damping methods have been already studied in stabilizing the cavity field. Further the electronic damping of microphonics is investigated as a method to reduce the level of microphonics and of the amount of rf power required. The current work presents a detailed analysis of electronic damping and of the residual cavity field amplitude and phase errors due to the fluctuations of cavity frequency and beam current.

## Ar/$H_2$/Air Supersonic Flowing Microwave Discharges

*Presenter:* Janette Drake
Old Dominion University, Physics

We performed a detailed characterization of a microwave cavity discharge in the supersonic flow of Ar/$H_2$/Air mixtures [1]. The supersonic flow was generated using a Mach 2 convergent-divergent nozzle upstream of the discharge region. Gases were premixed in the stagnation chamber at room temperature by adding up to 10% hydrogen and up to 45% air to pure argon. A cylindrical cavity was used to sustain a discharge in the mixtures in the pressure range of 100-600 Pa. Optical emission spectroscopy was used to observe the effects of hydrogen and air admixtures to plasma parameters and populations of excited species.

[1] D. J. Drake, S. Popovic, L. Vuskovic, J. Appl. Phys. **104**, 063305 (2008). This work is supported by NASA Langley Research Center and NASA Marshall Space Flight Center.

## Qweak VME Multiplexing

*Presenter:* Joshua Hoskins
College of William and Mary, Physics

Although the Standard Model of Particle Physics has been extremely successful in describing the fundamental interaction of nature it also has many shortcomings and therefore is unlikely to be complete. Experimentally the search for a more fundamental understanding of nature comes in two forms: building more energetic accelerators such as the LHC at CERN, and making more precise measurements that test the current Standard Model. Precision tests, like the ones performed at Jefferson Lab, play a crucial role in the understanding the structure of the electroweak interactions and continues to be an outstanding test of the Electroweak Standard Model. The upcoming precision experiment, Qweak at Jefferson Lab, will provide a measurement of the proton's weak charge $Q_W(p)=1-4\sin^2\theta_W$ to ≤0.3% accuracy by studying the parity violation in electron-proton scattering at low momentum transfer. During the experiment scattered electrons will pass through our drift chambers where their ionization trail will produce an event signal. In order to read out and store these event our group at William and Mary in conjunction with Jefferson Lab Electronics group, have been building and testing a VME Multiplexing system. This multiplexing system will allow us to determine both the position and drift time of the track. I will explain how the multiplexing scheme will read in the LVDS signals from the chambers, convert it to an ECL format and using a clever delay scheme encode the signals from all 560 wires per drift chamber into a 64 channel time to digital converter (F1TDC) greatly reducing the resources needed to record our event data.

## Probing Proton Spin Structure using a High Energy Electron Beam

*Presenter:* Sucheta Jawalkar
College of William and Mary, Physics

The origin of the proton spin is not completely understood. The spin of the quarks in the proton contribute to only about 30%. The rest of the spin must come from the gluons and the orbital angular momentum of the partons (quarks and gluons). Transverse-momentum-dependent parton distribution functions ( TMD PDFs), which can be measured in semi-inclusive deep-inelastic scattering experiments, play a crucial role in the study of quark orbital angular momentum. We look specifically at single-spin asymmetries in azimuthal distributions of final-state particles such as the pion to access TMDs. Our experiment uses the 6 GeV electron beam at Jefferson Lab, the CEBAF Large Acceptance Spectrometer and a longitudinally polarized NH3 target. It is scheduled to run early in Spring 2009. I will discuss existing measurements, the current experimental design, and the expected results from this new measurement.

## Full-Wave Simulations in Phase Space

*Presenter:* David Johnston
College of William and Mary, Physics

Traditionally, modeling of hot plasmas, in particular plasmas inside a tokamak reactor, is done using, so -called, full-wave methods. In this technique, the evolution of the electric and magnetic fields and the plasma is directly calculated using numerical methods. Since plasma systems are inherently complex these calculations require large computer resources as well as long time periods relative to the time scale of the experiment. This means that these simulations cannot be run in “real-time” with the experiment. A different approach, the one we are investigating, is to look at the physical system in phase space, where, instead of the space being defined by position and time (configuration space), the space is defined by position and wave-vector, both of which have time as a parameter. The advantage here is that problems the full-wave calculations run into in configuration space simply do not occur in phase space. The underlying reason for this can be explained using group theory, in particular the Heisenberg-Weyl group. Some results have been obtained using ray tracing methods in phase space, and the hope is that using full-wave methods in phase space will produce similar results. This would then allow for the possibility of simulations in “real-time” with the experiments.

## Organic Solar Cells for Lightweight, Flexible, Portable, Renewable Power

*Presenter:* Manpreet Kaur
Virginia Tech, Physics

Solar cells (photovoltaics) currently provide <0.1% of the world's power (87% comes from fossil fuels.) The primary reason for this has been that photovoltaics provide power at 2.5X the cost per kiloWatt hour (kWh) compared power from fossil fuels. One recent, very promising approach to photovoltaic power is plastic solar cells. Polymer solar cells have a number of potential advantages inherent to plastics such as low cost (due to large scale roll-to-roll processing), light weight, and flexibility. This allows the possibility of solar cells that can be rolled up and carried in a backpack, for example, for portable power in civilian or military applications. Polymer solar cells generally consist of a combination of a semiconducting polymer with a fullerene ("buckyball" molecule such as $C_{60}$). A series of experiments have been performed to study organic photovoltaic devices consisting of concentration gradients of poly (3-octylthiophene) (P3OT) and [6,6]-phenyl-C61 butyric acid methyl ester (PCBM). The devices were fabricated by thermally-induced interdiffusion of consecutively spin-cast layers of P3OT and PCBM from solvents of chloroform and pyridine, respectively. The device performance was evaluated as a function of the layer thicknesses, interdiffusion temperature, and interdiffusion time. A maximum power conversion efficiency of 1.0% under AM1.5 simulated solar spectrum was obtained for 70 nm P3OT thickness, 45 nm PCBM thickness, and interdiffusion at 150 °C for 20 minutes. Auger spectroscopy depth profiling measurements indicated that the optimal devices consist of concentration gradients of P3OT and PCBM extending across the entire film in opposite directions. Ongoing studies on P3HT/PCBM concentration gradient devices will also be reported.

## Plasma Etching of Cu in $Ar/Cl_2$ Microwave Discharge

*Presenter:* Marija Raskovic
*Co-authors:* K. Brannick, S. Popovic, L. Vuskovic
Old Dominion University, Physics

Copper, because of its physical properties and relative affordability, is generating much new interest in microelectronics processing and thin film applications. Cu substrate can be used for depositing superconducting material thin films, such as Nb or $Nb_3Sn$, lowering the cost of cavity production for linear particle accelerators based on the superconducting radiofrequency technology [1]. To achieve good adhesion and geometry of deposited thin film, Cu substrate surface must be clean and smooth. To avoid contamination and mechanical damage by environmental agents, the best would be to prepare Cu surface in the same apparatus thin film deposition is performed, i.e. using plasma processing techniques. For this approach main difficulty presents low volatility of Cu halides. Standard plasma etching radio-frequent (RF) discharge apparatus does not achieve temperature necessary for evaporation of CuCl, the most volatile Cu halide. Therefore our approach was to use microwave glow discharge [2], characterized with higher electron and radical density as well as higher substrate temperature comparing to RF discharge system, to achieve desirable etching rates and surface properties. Etching rates on the order of 300 nm/min were reached using only 3 %Vol $Cl_2$ reactive gas in $Ar/Cl_2$ mixture. Formation of CuCl during plasma etching process was monitored using emission spectroscopy techniques. Composition and morphology of Cu surface before and after exposure to $Ar/Cl_2$ discharge was investigated using scanning electron microscope. Oxide clean surface achieved during plasma etching process is very promising and will serve as starting point for Cu substrate preparation technique before thin film deposition.

[1] A-M. Valente-Feliciano, et al., “Energetic Condensation & Thin Films Project at JLAB”, 3rd International Workshop on Thin films and New Ideas for pushing the limits of RF Superconductivity, Newport News, July 22-25, 2008. [2] M. Rašković, *et al.*, Journal of Vacuum Science and Technology A (accepted 2009).

## Magnetic Data Storage: A Look Back & To the Future

*Presenter:* Jonathan R. Skuza
*Co-authors:* C. Clavero, K. Yang, R. A. Lukaszew
College of William and Mary, Physics

From the inception of IBM’s first hard disk drive in 1956, the IBM 350, to the most current hard disk drive available, Seagate’s Barracuda 7200, it is evident that magnetic data storage technology has changed the world. In a mere fifty years, a single hard disk drive has gone from 100 kB on a 24” disk (250 bytes per square inch) to 750 Gb on a 3.5” disk (165 Gb per square inch), which amounts to a ~ 660 million fold increase in storage capacity. This phenomenal increase has been possible due to the discovery of giant magnetoresistance (GMR) by Albert Fert and Peter Grunberg, who were awarded the 2007 Nobel Prize in Physics. In this presentation the evolution of magnetic data storage technology will be discussed, with focus on currently researched materials and technologies, such as the so-called $L1_0$ ordered alloys (e.g. FePt) for perpendicular recording media. Recent research to further the understanding of how these $L1_0$ ordered alloys form will be presented, in hopes that such knowledge can be used to tailor devices for the next generation of magnetic data storage media.

## Magnetic Damping in Single-Crystalline Ni/MgO(001) studied by the Time-Resolved Magneto-Optical Kerr Effect (TR-MOKE)

*Presenter:* Kevin J. Smith
College of William and Mary, Physics

Spintronic devices combine the quantum-mechanical magnetic and electric properties of the electron to store and transfer information. However, magnetic damping must be better understood to realize the full potential of this exciting new technology. The TR-MOKE technique utilizes ultrafast pump-probe laser spectroscopy to investigate magnetization dynamics on the picosecond timescale. These time-domain measurements nicely complement traditional frequency-sensitive techniques such as ferromagnetic resonance (FMR) and Brillouin light scattering (BLS). A description of the technique, and its application to the investigation of uniform spin precession on single-crystalline Ni/MgO(001) of various thicknesses from t = 10 nm to t = 60 nm is presented. Experiments indicate that the damping in this system is coupled to the magneto-crystalline anisotropy, and increases in geometries for which the external field is applied out of the plane of the sample. These results are discussed in terms of various models of extrinsic and intrinsic damping mechanisms.

## A New Look at Proton Conduction in Perovskite Oxides


*Presenter:* Erik Spahr
*Co-author:* Gunter Luepke
College of William and Mary, Physics

The migration of hydrogen ions, or protons, is the underlying mechanism behind the key technologies of hydrogen production, storage, and energy conversion. For example, in a fuel cell, a proton-conducting electrolyte permits the migration of hydrogen ions and forces the electrons to drive an electrical load such as a motor. Such proton conducting Solid Oxide Fuel Cells ($[H^+]$SOFCs) are a clean alternative energy source with efficiencies as high as 60% but suffer drawbacks from high operational temperatures. We study the microscopic dynamics of protons in crystalline oxides by means of time-resolved laser spectroscopy. When protons move through an oxide material they can either hop between oxide ions or quantum mechanically tunnel through a double well potential energy barrier. Observation of the vibrational lifetimes of proton-oxygen groups in the perovskite oxide Potassium Tantalate ($KTaO_3$) - a common proton conductor - has led to new insight regarding the proton tunneling rates in such oxides. We present evidence that simple resonant infrared illumination of such proton conductors can increase the tunneling rate - a key component of conduction - by seven orders of magnitude. This finding could potentially lead to fuel cell designs with increased proton conductivity, which would allow a lower operational temperature, a wider choice of materials, longer cell life, and improved device reliability.

## Mechanism of Niobium Etching in Ar/Cl2 Microwave Discharge

*Presenter:* Janardan Upadhyay
*Co-authors:* M. Raskovic, S. Popovic, L. Vuskovic
Old Dominion University, Physics

Superconducting radio frequency (SRF) technology has become crucial for the linear particle accelerators. The RF performance of the SRF cavities is always smaller than theoretical limit due to impurities and mechanical damages on the inner surface of the cavity. The RF performance of these cavities can be improved by surface preparation techniques such as buffered chemical polishing (BCP), high pressure pure water rinsing, baking in the vacuum, etc. In our laboratory at Old Dominion University, we are investigating plasma etching as an alternative technique to BCP, for surface preparation of bulk niobium cavities that is eco friendly, provides better process control and lowers the cost. We used a microwave glow discharge in $Ar/Cl_2$ mixture to remove impurities and mechanical damages from the surface of bulk Nb samples. The high etching rate, in the order of 1 mm/min was obtained using a less than 3% vol concentration of $Cl_2$ gas. The etching rate dependence on discharge parameters such input power density, pressure and chlorine concentration was determined. Simultaneously plasma emission actinometry was used to estimate the absolute densities of Cl, $Cl^+$ and $Cl_2$ in the variable plasma conditions. These results combined with results of discharge diagnostics, were used to determine the plasma etching mechanism. The future work would be to apply plasma etching to a (SRF) cavity and measure its RF performance.

## A Study of Minority-ion Gyroresonance Crossing using Wave Packets

*Presenter:* Yanli Xiao
*Co-authors:* E.R. Tracy, A.N. Kaufman
College of William and Mary, Physics

Mode conversion can occur in non-uniform plasma when two waves of different character are locally resonant. Jaun et al. have recently developed a numerical ray-tracing algorithm for realistic tokamak models that accounts for the ray splitting that occurs at conversions [1,2]. We compare the results of ray-based and full-wave methods for the problem of mode conversion in nonuniform plasma. The case studied uses the model developed by Ye and Kaufman [3] to treat a magnetosonic wave crossing a cold minority-ion gyroresonance layer. We launch a wave packet in the magnetosonic channel and follow its evolution, in order to study the effects of its crossing the layer. This allows us to observe the emission of the reflected wave packet after a time delay (the linear 'ion-cyclotron echo'), as well as to directly observe the evolution of the minority-ion current density. From the full-wave output, we compute the energy density as a function of position and time, and compare it to the ray-based predictions.

[1] A. Jaun, E.R. Tracy and A.N. Kaufman, Plasma Phys. Control. Fusion **49**, 43-67 (2007). [2] E.R. Tracy, A.N. Kaufman and A. Jaun, Phys. Plasmas **8** (2007) 082102 [3] H. Ye and A. N. Kaufman, Phys. Rev. Lett. **60** (1988) 1642. Supported by the NSF-DOE Partnership in Basic Plasma Physics and the DOE OFES.

## Contribution of the Dissociation of Molecular Nitrogen to Nitric Oxide in the Lower Thermosphere

*Presenter:* Justin D. Yonker
*Co-author:* Scott M. Bailey
Virginia Tech, Physics

With the advent of the Space Age, sounding rocket and satellite observations have enabled detailed studies of Earth's upper atmosphere. Among the first scientific results was the discovery that the nitric oxide (NO) density in the thermosphere (altitude>90 km) is up to 3 orders of magnitude larger than expected [Barth, 1964]. Although a minor species, NO has since been shown to play major roles in many atmospheric processes including regulation of the thermospheric thermal budget through its fundamental band at 5.3 microns, termination of the charge-exchange reactions in the ionospheric D and E-regions (90-150 km), and, when transported to the middle atmosphere, catalytic destruction of ozone. This talk will provide a brief overview of our current understanding of NO production and loss in the lower thermosphere (90-170 km). The focus will then shift to the different roles played by excited and ground-state atomic nitrogen in NO formation. Results from a photochemical model including vertical transport are compared with equatorial observations of NO fluorescence at local noon from the Student Nitric Oxide Explorer (SNOE) satellite to establish that while much of the chemistry driving NO formation appears well-constrained, a key remaining uncertainty is in the dissociation rate of molecular nitrogen ($N_2$). By incorporating recent, rotational-level specific, laboratory measurements of the relevant $N_2$ electron-impact and photoabsorption cross-sections, it is shown that these uncertainties are reduced. With the anticipated 2009 launch of NASA's Solar Dynamics Observatory/Extreme Ultraviolet Variability Experiment (SDO-EVE), high-resolution, real-time measurements of the solar irradiance driving thermospheric $N_2$ dissociation will be available, thus further refining our ability to predict the thermospheric NO density.

## Assessing the Sexual Double Standard: A Comparison Study across Age Groups

*Presenter:* Emily Beamon
University of North Carolina at Wilmington, Psychology

Over the past twenty years, the existence of the sexual double standard has been questioned. Data collected on the topic have been inconclusive. Often research has shown either little to no evidence supporting its existence and males and females have been evaluated similarly based on similar sexual actions and encounters (Sprecher, 1989; Sprecher, Regan, McKinney, Maxwell, Wazienski, 1997; Gentry, 1998). There have been, however, studies that have shown a significant difference in how males and females were perceived and assessed when placed in the same sexually promiscuous context (Sheeran, Spears, Abraham, Abrams, 1996; Aubrey, 2004; Milhausen & Herold, 1999). A majority of the research done on the sexual double standard has involved college students' evaluations of a target, with little to no research conducted on attitudes about the sexual double standard amongst older individuals. For this reason, I conducted a study looking at how age correlates with the perceptions of the sexual double standard. Approximately 165 participants, ranging in age from 18-61, were asked to read a vignette about a male or female target and then asked to evaluate one target (either the male or female) based on specific characteristics. Participants were placed into two groups: individuals between the ages of 18-24 were categorized as typical -aged college student, while participants over 25 were grouped separately. The vignette depicted a scenario in which a male and female target engaged in an unplanned consensual sexual encounter. Participants were asked to rate the male or female target based on subscales of Perception of Sexual Knowledge, Perception of Sexual Experience, Perception of Commitment to Partner, and Perception of Kindness. Results indicated that there was a significant interaction between the gender of the target, and age group of the participant on Perceptions of Sexual Experience. No other evidence of the sexual double standard was uncovered.

## Emotion Regulation and Externalizing/ Internalizing Behavior in a High-Risk Population of Children

*Presenter:* Debra Brown
College of William and Mary, Virginia Consortium Program in Clinical Psychology

Emotion regulation is implicated in most forms of psychopathology including externalizing and internalizing disorders. Behaviors related to these disorders are the primary motivators in parents who seek psychological services for their children. However, the research regarding the association between emotion regulation and externalizing and internalizing behavior is predominantly conducted with Caucasian, middle-class populations. In an effort to counter this research inequity, the relationship between emotion regulation and externalizing and internalizing behavior is examined in a sample of 3rd, 4th, and 5th graders from a high-risk population of children, many living below poverty level, in a high-crime neighborhood. Given the paucity of literature pertaining to this population, data gained from this research is expected to make a valuable contribution to understanding the relationship of emotion regulation and externalizing and internalizing behavior in high-risk populations of children. Regulation of anger, sadness, and worry was examined along the dimensions of inhibition, dysregulation, and coping through child and parent-report. Data are currently being collected and entered. Multiple regression analyses will be used to predict internalizing and externalizing behaviors from emotion regulation variables. Differences in gender will also be examined. Overall, it is expected that increased levels of inhibition will be associated with increased internalizing behaviors, increased dysregulation will be related to increased externalizing behaviors, and decreased levels of coping will be related to both externalizing and internalizing behaviors. Differences are expected in the types of behavior exhibited based on the sex of children who report less sophisticated levels of emotion regulation, with parents and teachers reporting more externalizing behaviors for boys and more internalizing behaviors for girls. Subsequent discussion will emphasize the similarities and differences among the emotion regulation data reported for other populations and the population of interest in this study.

## Social-Cognitive Biases in Simulated Airline Luggage Screening

*Presenter:* Jeremy Brown
*Co-author:* Poornima Madhavan
Old Dominion University, Psychology

The proposed study will examine the role that social-cognitive biases play in decision making processes during airline luggage screening. Participants (n = 96) will perform a computer simulated task where they will detect hidden weapons in 200 x-ray images of passenger luggage. Participants will see each luggage image for either two seconds (high time pressure) or six seconds (low time pressure). In addition, on each trial, participants will observe the pictures of the "passenger" to whom the luggage purportedly belongs. The "pre-anchor group" will answer questions about the passenger before the luggage image appears, the "post-anchor" group will answer questions after the luggage appears, and the "no-anchor group" will answer no questions. Participants will choose to either pass or stop the luggage, and rate their confidence in their decision. We hypothesize that under high time pressure, participants will rely more on their judgment of the passenger to make their decisions as a heuristic replacement for visually scanning the bag under less time. Conversely, under low time pressure, participants will base their decisions on a detailed examination of the x-ray image itself rather than on the passenger. Likewise, the pre-anchor and post-anchor groups will base their decisions more on the passenger (since their attention will be drawn to the passenger via questions) relative to the no-anchor group. We also expect differences in performance as a function of the gender and race of the passenger, with male passengers' luggage being stopped more than females, and Asians' luggage being stopped more than White and Black passengers'.

## Can Humor Benefit Health in Retirement?

*Presenter:* Gillian P. Freeman
*Co-author:* W. Larry Ventis
College of William and Mary, Psychology

Successful adaptation to retirement involves coping with extensive life changes (Hayslip, Beyerlein, & Nichols, 1997; Sharpley, 1997). For many people, the retirement transition is a period of instability (Marshall, Clarke, & Ballantyne, 2001). Humor as a coping mechanism has been found to be negatively correlated with both perceived stress and daily hassles during retirement (Freeman & Ventis, in submission). Our current aim is to examine the extent to which humor moderates the relationship between retirement stress, including hassles and health. Two hundred sixty-five retirees over the age of 55 years were recruited to participate via the W&M Alumni Association. Participants responded on-line, completing the RAND 36-Item Health Survey which taps into eight health concepts: general health, physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to emotional problems, energy/fatigue, social functioning, and emotional well-being. The Humor Styles Questionnaire (HSQ) measured individual differences in four styles of humor along dimensions presumed to be either adaptive (Affiliative and Self-enhancing) or maladaptive (Aggressive and Self-defeating) (Martin, *et al.,* 2003). Stress was measured using the Self Perceived Stress in Retirement Scale and The Hassles Scale. Initial analyses revealed significant correlations between humor styles, stress, and health. The stress moderating effect of humor was examined via regression analyses. These interaction results suggest that the adaptiveness of humor styles depends on the level (low or high) of stress or hassles one perceives. For example, under low stress/hassles, reported experience of pain was low and unrelated to the level of Aggressive humor. However, contrary to its label as maladaptive, when hassles and stress were high, participants who reported high levels of Aggressive humor reported less pain than participants who reported low levels of Aggressive humor. Similar clarifying interactions were obtained for other humor styles as well.

## Effects Of Gender On Race Categorization: An Electrophysiological Study

*Presenter:* Kyle Gagnon
*Co-author:* Cheryl Dickter
College of William and Mary,
Experimental Psychology

During person perception, social perceivers quickly and effortlessly categorize individuals by race and gender (Brewer, 1988; Fiske, 1998). Previous research has investigated the time course of the categorization process, utilizing several different methods, including electroencephalography (EEG) and reaction time (RT). One study showed that while participants categorized target faces by gender, they showed evidence of explicitly attending to the task-relevant dimension of gender but EEG and RT data also showed evidence that they were implicitly attending to the task-irrelevant dimension of race (Dickter & Bartholow, 2007). The current study will make use of behavioral and psychophysiological measures to examine explicit and implicit attentional processes as social perceivers categorize targets by race. Participants will view a series of pictures of individuals, while categorizing the pictures by race. Additional pictures will simultaneously surround the target picture and will vary by race and gender. While participants complete the task, EEG will be measured from various scalp locations. The participants' ability to categorize by race will be measured behaviorally with reaction times. Thus, the current study will provide psychophysiological measures of attention as well as behavioral measures of categorization during the person perception process. It is expected that the EEG results will indicate that participants are implicitly attending to gender even when gender is a task-irrelevant dimension. Behaviorally, the reaction times are hypothesized to be slower when the gender or the race of the surrounding pictures is incongruent with that of the target picture, and slowest when both race and gender are incongruent. In addition, the race of the participant is expected to affect the early attentional processes of the EEG. In sum, the current study will provide a better understanding of social categorization during the person perception process as it relates to the dimensions of race and gender.

## The Influence of Mirrors on Perceiving One's Body Size

*Presenter:* Michael N. Geuss
College of William and Mary,
Psychology

Previous research has shown that manipulating the action capabilities of observers alters their perceived affordances for passage (Higuchi, Takada, Matsuura, & Imanaka, 2004; Wagman & Malek, 2007). Little research has manipulated the environment, instead of the observer, to assess whether changes to the environment can alter the perception of affordances and of the environment itself. In a series of studies, we manipulated the environment by placing a reflective surface (a mirror) behind an aperture, for which participants were asked to judge the width and whether or not they could pass through. Experiment 1 revealed that the presence of a mirror, which distorted the size of the aperture, elicited larger perceptual estimates and a greater willingness to pass through than the absence of a mirror. Experiment 2 demonstrated that the effects found in Experiment 1 were the result of the specific location of the mirror (behind the aperture) and not simply due to a mirror being present in the environment. Experiment 3 investigated the distorting effects of the mirror by varying the distance to the mirror at which the aperture was placed. Experiment 3 revealed that when the aperture was closer to the mirror, participants made larger estimates of aperture width and were more likely to indicate passage than at further distances from the mirror. Results suggest that participants weighted the distorted visual information reflected by the mirror more heavily than visual information about the actual aperture width. This distortion influenced both their judgment about whether they could pass through the aperture and their perception of the size of the aperture.

## Risk Experiences, Family Dynamics, and Maladjustments of Children with Incarcerated Parents

*Presenter:* Lauren Gibbs
*Co-author:* Danielle H. Dallaire
College of William and Mary, Psychology

According to a recent Department of Justice Statistics report, 2.3% of American children are affected by parental incarceration (Glaze & Maruschak, 2008). Parental incarceration affects 3.5 times more children than the number of children affected by autism spectrum disorders, and 10 times more children are affected by parental incarceration than by juvenile diabetes (The Centers for Disease Control, 2008). Children with incarcerated parents show high levels of anxiety, depression, and aggressive behaviors (Murray & Farrington, 2008; Myers, Smarsh, Amlund-Hagen, & Kennon, 1999). In comparison to peers whose parents are not incarcerated, children with incarcerated parents are more likely to drop out of school (Trice & Brewster, 2005) and be incarcerated as adults (Murray & Farrington, 2005). These maladaptive behaviors may place these children at greater risk for engaging in behaviors that may be associated with criminal behavior. Parental incarceration is a growing public problem with serious ramifications for our society, particularly given the intergenerational occurrence of incarceration. What has not been examined is why children with incarcerated parents are at increased risk for problematic behaviors and maladjustment. Does the experience of parental incarceration affect children's behaviors more than their experience of socio-demographic risk factors and familial process variables? Children and families dealing with parental incarceration experience numerous stressful life events including poverty, substance abuse, mental illness and abusive familial relationships (Arditti & Few, 2006); the challenge is to better understand how parental incarceration uniquely impacts children's development. The current study examines the effects of parental incarceration on children who also experience other risk factors, such as living in a single-parent household or a poor neighborhood. Differences in risk experiences, family dynamics, and adjustments between children who have not been exposed to parental incarceration and those who have will be examined. Results will be discussed from an ecological perspective.

## Childhood Maltreatment, Poly-victimization, Psychological Distress in College Males

*Presenter:* Alexandra Herren
*Co-author:* Janiele Hamden, Ann N. Elliott
Radford University, Psychology

This correlational study examines the relationships among poly-victimization (i.e., high cumulative levels of victimization), six aggregate categories of childhood victimization (property crime, physical assault, peer/sibling, witnessed/indirect, sexual, child maltreatment), and psychological distress in approximately 300 male undergraduate students attending a southeastern U.S. university. Using hierarchical regression, this study first examines the relative contributions of poly-victimization and individual categories of childhood victimization in predicting psychological distress. Second, the study examines whether poly-victimization contributes any unique variance, beyond that accounted for by the combination of all six aggregate categories. Preliminary regression analyses reveal that a) poly-victimization accounts for a significant proportion of variability in scores for psychological distress, beyond that accounted for by any of the six categories of childhood victimization alone, and b) the categories of childhood victimization contribute little to no variability beyond that accounted for by poly-victimization. Furthermore, poly-victimization accounts for a significant proportion of variability in psychological distress, beyond that already accounted for by the simultaneous entry of all six categories as predictor variables. Findings emphasize the importance for clinicians and researchers to comprehensively assess multiple categories of childhood victimization and poly-victimization when evaluating a client's psychological adjustment.

## The Effect of Shared Dimensionality on Object Recall

*Presenter:* Daniel Kinka
*Co-author:* M.R. Grovola, C. Bukach
University of Richmond, Psychology

Patients with category-specific visual agnosia for biological objects (CSVA) exhibit a disproportionate difficulty recognizing objects from biological categories. This vulnerability is due (in part) to the fact that exemplars of biological categories tend to be visually and conceptually more similar to one another and therefore require the recall and integration of more diagnostic features. Similarity can be thought of as the distance between objects in a "psychological space," where the axes are defined by each diagnostic feature. Over and above confusions based on proximity in psychological space, CSVA patient ELM confused objects that shared values on structural diagnostic dimensions (e.g., tapering, pinching), when memory was involved (Arguin *et al.,* 1996). The purpose of the current study is to examine the effect of shared dimensions on normal perception and recall, while controlling for psychological distance. We created two sets of novel geometric forms that vary on number of shared dimensions. Similar to patient ELM, we found no effect of shared dimensions in a perceptual matching task, but a significant effect of shared dimensionality on a location recall task. Recall accuracy was poorer for object sets with more shared diagnostic features (M = 0.44) than those with less (M = 0.55), independent of psychological distance. Currently we are examining the impact of shared structural features in long-term memory of color recall and expect to find a similar effect of shared dimensions.

## An Interviewer's Influence on Political Candidate Evaluations

*Presenter:* Elicia C. Lair
*Co-author*: John B. Nezlek
College of William and Mary, Psychology

Although many believe the media is a biased source, audiences can also insert biases into the information they evaluate. For instance, gender stereotypes and partisan group effects may influence perceptions of politicians. To examine such effects, participants listened to an interview that concerned non-partisan issues and evaluated political candidates whose party affiliations they did not know. Interviewers were either hostile, neutral, or friendly, whereas the politician's responses were identical across conditions. The interviews were split between male and female interviewers and male and female politicians. To examine partisan group effects, participants were grouped into "Party Similarity" categories according to each individual's party affiliation and the party affiliation each had selected for the politician. Generally, participants evaluated candidates in the hostile interview as the least desirable and evaluated candidates in the friendly interview as the most desirable. As expected, female politicians were seen as less qualified but more likeable than males. There were interactions between interviewer behavior and party similarity, with greater group effects found in the hostile condition. For example, politicians who are interviewed by friendly interviewers are evaluated as more desirable than those interviewed by hostile interviewers. Similarity of party affiliation between candidate and audience is particularly important for hostile interviews, where the effects of a hostile interviewer only served to heighten support for a same-party candidate, but had the most damaging effect on opposite-party candidate evaluations. A follow up study was conducted, which varied the partisan affiliations of both the politician and the interviewer within hostile, neutral, and friendly interviews. The goal of the current study is to examine the affective reactions of the audience, which might serve to explain candidate evaluations, especially with regard to party similarity.

## The Relationship among Job Suitability and Attainability, Agency, and Women's Penalization of Successful Women in Masculine Occupations

*Presenter:* Katie Lawson
Radford University, Psychology

Both men and women penalize female workers in masculine occupations (e.g. rate the worker high in interpersonal hostility) (e.g. Parks-Stamm, Heilman, & Hearns, 2008). Research suggests that women, not men, penalize successful women to avoid an upward social comparison, and that women's perceived job attainability influences social comparison (Parks-Stamm *et al.,* 2008). Job suitability (a closely related construct to attainability) is related to self-reported agency (Bosak & Sczesny, 2008). Therefore, for women, it was predicted that self-reported agency indirectly influences the penalization of a successful woman in a masculine occupation through job suitability and attainability. For men, the same results are not predicted. College students read a job description of a masculine occupation, completed measures evaluating agency, job suitability and attainability, and evaluated the interpersonal hostility of a successful woman in the occupation. Two separate orders were used to control for order effects. Preliminary analyses indicated that women who rated the successful woman first reported the masculine job to be significantly less attainable than women who rated the woman after self-reports. Therefore, separate analyses on attainability were conducted for women. A significant negative correlation between agency and interpersonal hostility was found only for women who completed self-ratings first. Therefore, mediational analyses were only conducted for this group. For job attainability, the data reached all three requirements for mediation proposed by Baron and Kenny (1986). Agency is a significant predictor of job attainability and interpersonal hostility. Job attainability is also a significant predictor of interpersonal hostility. After controlling for attainability, agency was no longer a significant predictor of interpersonal hostility. A Sobel test neared significance (p=.09), suggesting possible mediation. However, job suitability failed to meet the requirements for mediation. Results provide further support that social comparison may play a role in women's, not men's, penalization of successful women in masculine occupations.

## The Influence of Inspiration on Well-being

*Presenter:* Laura A. Maruskin
College of William and Mary, Psychology

Does inspiration lead to well-being? Past research on the antecedents of well-being has often focused on agentic factors, such as extraversion and the experience of control over outcomes. However, many experiences that individuals appear to find most fulfilling involve not only agency or activity, but also receptivity or passivity (e.g., creative insights and spiritual epiphanies). Inspiration is posited to be a critical ingredient in such experiences. Inspiration is characterized by (1) an awareness of new or better possibilities, (2) ascription of responsibility to someone or something beyond the self, and (3) motivation to actualize one's vision. Two studies examined the influence of inspiration on well-being. In Study 1 (N = 220), a three-month, cross-lagged longitudinal study, participants completed measures of trait inspiration and well-being (positive affect, life satisfaction, vitality, and self-actualization). Results indicated that trait inspiration predicted increases in well-being, even when social desirability biases, Big 5 personality traits, and initial levels of well-being were controlled. Study 2 further explored the link between inspiration and well-being by considering inspiration in the context of personal goals. Participants (N = 139) completed measures of trait inspiration, personal goals inspiration, and well-being across a three-month period. Results were consistent with those of Study 1, and indicated that both trait inspiration and personal goal inspiration predicted increases in well-being. These studies suggest that inspiration may play a causal role in the promotion of well-being. Additional research is needed to provide further evidence of causality and to document mediating processes.

## The Effects of Trait Rumination and Distraction on Cardiovascular Recovery from Anger Recall in Healthy Women

*Presenter:* Meghan McLain
*Co-authors:* Serina A. Neumann, John J. Sollers III
College of William and Mary, Virginia Consortium Program in Clinical Psychology

Cardiovascular reactivity and recovery following an emotional stressor may play a crucial role in mediating the relation between psychosocial factors and cardiovascular disease (CVD). Hostility has been found to be associated with trait rumination (TR), a tendency to focus attention on negative thoughts and emotions and be prone to feelings of revenge, but is not adequately captured in current measures of hostility. Hence, in the current study, we posited that TR, indexed by the Dissipation-Rumination Scale, may have an independent effect of increasing cardiovascular reactivity and prolonging cardiovascular recovery from angry events above and beyond hostility, as measured by the Cook-Medley Hostility Scale, which may help further explain the relation between anger and CVD. We also hypothesized that distraction may be beneficial to cardiovascular recovery from anger, particularly for ruminators. Diastolic and systolic blood pressure (DBP; SBP), heart rate (HR), high and low frequency heart rate variability (HF; LF), preejection period (PEP), stroke volume index (SI), cardiac index (CI) and total peripheral resistance index (TPRI) were collected from 80 healthy women (ages 18-30) during a 15-min baseline, a 3-min anger recall, and a 10-min recovery period. Half of the participants were randomly assigned to a distraction condition during recovery. Hierarchical regressions, controlling for hostility scores, revealed that TR was predictive of increased SI ($p<.03$) during the anger-recall task. TR also predicted slower post-task recovery for HR ($p<.007$) and SI ($p<.001$). As expected, an interaction between TR and distraction was found to predict SI ($p<.01$) and CI ($p<.04$), such that those with high TR experienced a greater benefit from distraction than individuals low in TR and high in TR in the no distraction condition. Thus, TR appears to increase cardiac reactivity and prolong recovery from anger, independent of hostility, which may partly explain the relation between stress responses and risk for CVD. These findings also suggest that distraction may be a useful intervention to reduce the physiological impact of TR.

## Human Motor System Incorporates Knowledge of the Physical World in Future-oriented Actions

*Presenter:* Kristin Reardon
College of William and Mary, Psychology

Humans seem to anticipate the future state of the physical environment and integrate this information when preparing motor responses. Researchers have suggested that the human motor system may incorporate the knowledge of physical principles (e.g., gravitational acceleration) and this knowledge may be reflected in early muscle activation indicated by anticipatory muscle tensing (AMT). AMT is engaged when catching a falling object, tensing the muscles involved in an upcoming action to offset the impact of an object and allow a successful interception. The present study analyzes AMT using electromyography (EMG) during a series of five ball catching tasks. Three of these conditions were chosen to establish the time course of the muscle activation (eyes open impact, eyes open stop, and eyes closed impact). In the impact conditions, participants caught a ball dropped from a fixed height (.83 m), while visual input varied. In the stop condition, the falling ball abruptly stopped 11 cm above the catching hand. Results suggest that human motor control is calculated up to several hundred milliseconds into the future, as demonstrated by continued muscle activation in the stop condition. The additional two conditions (platform, verbal stop) address the extent of knowledge use in executing motor responses. In the platform condition, a platform blocked the ball from reaching the participant's hand, and in the verbal stop condition participants were verbally informed that the ball would not make contact with their hand. Preliminary results suggest that both forms of knowledge (solidity and advanced warning) are incorporated in executing motor responses to falling objects, with both conditions exhibiting a diminished muscle response in comparison to the eyes open stop condition. Taken together, these results provide further evidence for the anticipatory nature of human motor control and imply the sophisticated use of physical principles to coordinate future-oriented responses.

## Effects of M1 Receptor Blockade on Performance in an Attention-demanding Task

*Presenter:* Andrea Robinson
*Co-author:* Joshua Burk
College of William and Mary, Psychology

Previous studies have shown that muscarinic receptor blockade decreases signal detection in a sustained attention task that requires discrimination of visual signals from trials with no signal presentation. However, the exact role of specific muscarinic receptor subtypes in attentional performance remains unclear. The present experiments examine the effects of blocking M1 receptors on attentional performance in rats. Rats were trained in a two-lever sustained attention task that required discrimination of visual signals (500, 100, 25 ms) from "blank" trials when no signal was presented. After reaching stable performance levels, guide cannula were surgically implanted into either the right or left ventricle. All animals received infusions of the M1 receptor antagonist, pirenzepine (0, 10, 30, and 60µg) prior to attentional performance. Pirenzepine decreased accuracy of signal detection but did not affect detection of trials with no signal presentation and did not affect the number of trials in which rats failed to emit a lever press ("omissions"). The lack of effects of pirenzepine on trials with no signal presentation or on omissions suggests that the effects of pirenzepine on signal detection cannot be attributed to an inability to respond based upon the rules of the task or to gross disruptions of motoric functioning or motivation. In an ongoing experiment, the attentional demands of the task are manipulated by flashing a houselight or decreasing the inter-trial interval. Dicyclomine, another M1 receptor antagonist, is systemically administered (0, 0.625, 1.25, 2.5, and 5 mg/kg) prior to the task. Preliminary results indicate that M1 receptor blockade decreases signal detection and more substantially disrupts performance when attentional demands are increased. The present results suggest that M1 receptors are critically involved in signal detection in this sustained attention task.

## Experience and Regulation of Positive Emotions as Predictors of Anxiety and Depression in Adolescents and Children

*Presenter:* Ann Schlegelmilch
College of William and Mary,
Virginia Consortium Program in Clinical Psychology

The high rate of comorbidity between anxiety and depression has raised questions as to whether they should be conceptualized as two distinct disorders or as a unitary construct. Clark and Watson's tripartite model (1991) of anxiety and depression purports that these disorders are both characterized by the presence of negative affect, but that they can be differentiated by two factors: positive affect (PA) and physiological hyperarousal (PH). The model suggests that low PA is unique to the experience of depression and PH is specific to anxiety. Research has generally supported the model's application to youth, although there are reports that it may better fit the experience of older than younger children. Studies exploring how positive emotions influence psychopathology are sparse and thus little is known about how specific positive emotions or various facets of positive emotions (i.e., intensity, frequency, and management) may be related to anxiety and depression in children. The current study seeks to further explore the application of the tripartite model with 162 elementary and 148 middle school children by examining the relationship between different positive emotions (pride, interest, joy) and specific facets (frequency, intensity, inhibition, control) and symptoms of anxiety and depression. Data will be analyzed using confirmatory factor analysis followed by structural equation modeling. It is hypothesized that: a) frequency of happiness/joy will be negatively associated with symptoms of depression, but not anxiety; b) inhibition of happiness will be positively related to depressive symptomatology, but not to symptoms of anxiety; c) frequency of interest/excitement will be positively related to anxiety symptomatology, but not depression. As intensity of positive emotions have not been examined previously in relation to symptoms of anxiety and depression, analyses involving these variables will be exploratory in nature. Similarly, no research is available regarding the relationship between the experience and management of pride and anxiety and depression.

## Things That Go Bump in the Night: An Effect of Fear on Auditory and Olfactory Perception

*Presenter:* Erika Siegel
College of William and Mary, Psychology

Previous research has demonstrated that changes in emotional state, particularly fear, can actually change the way we see the world; making heights look higher and slants look steeper. Scant research to date, however, has investigated the relationship between fear and other types of sensory perception, like audition or olfaction. The current research investigated this relationship in two studies: an auditory experiment and an olfactory experiment. In both experiments, participants were randomly assigned to either a fear or neutral/control condition. In the fear condition, participants were instructed to write about a frightening experience in their past. In the neutral condition, participants wrote about what they do to get ready in the morning. Participants in the auditory experiment then listened to a series of tones and rated the loudness and duration of the tones. Participants in the olfactory experiment smelled a series of odors and rated the intensity and pleasantness of the odors. In both experiments, we found significant differences between the ratings of the participants who were afraid and those who were not. In the auditory experiment, participants in the fear condition rated the tones as louder than participants in the neutral condition. In the olfactory experiment, participants in the fear condition rated the smells as significantly more pleasant than participants in the neutral condition. Interestingly, in both experiments fear changed participants' ratings on one dimension and not the other; no significant differences were demonstrated for duration ratings in the auditory experiment or intensity ratings in the olfactory experiment. This indicates that fear does not appear to bias participants' responses indiscriminately. Rather, at least preliminarily, these data suggest that fear qualitatively changes participants' sensory perception. Further, this change is evidenced across many sensory modalities; indicating that emotional state may completely change the way we perceive the world around us.

## Relationships between Vegetarianism, Personality and Eating Pathology

*Presenter:* Andrea Spaeth
*Co-author:* Catherine Forestell
College of William and Mary, Psychology

Since the 1980's, interest in new-wave vegetarianism has become increasingly popular; more individuals are making a specific rational choice to restrict meat from their diet. Although research about vegetarians is relatively sparse, most research in this area has focused on the possible connection between vegetarianism and eating pathology. The results from previous research are inconclusive; with some studies showing a strong positive relationship between vegetarianism and the prevalence of eating pathology, and other studies showing no significant relationship. There are three main purposes of the current study. The first purpose is mainly exploratory and aims to increase our understanding of who vegetarians are (e.g. age they decide to become a vegetarian, what type of vegetarian they are, and most popular reasons for becoming a vegetarian, what kind of personalities do they have). The second purpose is to examine how approach-avoidance temperament affects the motives for becoming a vegetarian. It is hypothesized that individuals with a strong approach temperament will go about vegetarianism differently than individuals with a strong avoidance temperament. Individuals with a strong approach temperament may view vegetarianism as a lifestyle and become a vegetarian in order to maintain good health, promote animal rights and support environmental protection; these individuals approach the benefits of vegetarianism. Conversely, individuals with a strong avoidance temperament may view vegetarianism as a diet and become a vegetarian in order to regulate weight or to avoid the disgust experienced with eating flesh; these individuals avoid the negative consequences of eating meat. The third purpose is to elucidate the relationship between vegetarianism and eating pathology by taking individual differences (specifically, approach-avoidance temperament) into account. It is hypothesized that the increased prevalence of eating pathology will only be related to vegetarianism for individuals high in avoidance temperament.

## The Link Between Emotion Regulation and Peer- Rated Aggression: Do Social Cognitions Play a Mediating Role?

*Presenter:* Gina Veits
*Co-authors:* Janice Zeman, Tamra Krohe, Ellen Anderson,
College of William and Mary, Psychology

Studies have found that poor emotion regulation skills are associated with negative outcomes including social maladjustment, academic difficulties (Casey, 1996; Garber, Braafladt, & Zeman, 1991), and most forms of childhood psychopathology. There appear to be specific patterns of emotion deficits associated with internalizing and externalizing problems (Cicchetti, Ackerman, & Izard, 1995; Zeman, Shipman, & Suveg, 2002). Although the links between emotion regulation and symptomatology have been documented, missing from the literature is an examination of how children's social cognitions influence their emotion regulation decisions and how both of these variables may influence aggression. The goal of this study is to investigate the relationships among children's social cognitions, emotion regulation decisions, and peer-reported physical aggression. 310 children (161 boys, 100% Caucasian) participated from the 4th and 5th grades in public schools in a working class, small urban area. Children were interviewed using the Affect Regulation Interview (Zeman & Shipman, 1996). Using six vignettes that depict anger and sadness-evoking events, children were asked whether they would show or not show their feelings to their close friend using a 4-point scale (1 = definitely would show, 4 = definitely would not show). Three questions assessing social cognitions (i.e., expectations of negative consequences, ridicule, and support) were used with a similar 4-point scale (1 = definitely believes, 4 = definitely does not believe). To assess externalizing behavior problems, children participated in a sociometric assessment because peers are thought to be the most valid reporters of peer aggression. Using a 5-point Likert scale (1 = not at all, 5 = a whole lot), children were asked to indicate which of their classmates were mean, started fights, got mad easily, and which ones hit, pushed, or kicked. Data are currently being entered and analyses will be conducted in January.

## Policy Incubators: Universities as Public Policy Agents

*Presenter:* Jose Alcaine
Virginia Commonwealth University,
Public Policy & Administration

Universities' and colleges' missions to educate students, conduct scholarly research and disseminate knowledge affect in a direct way the communities they serve. Furthermore, graduates of these institutions then carry on knowledge and ideas learned at these institutions with them into society. This is certainly the case at institutions of higher learning in the United States. Universities and colleges have always played an important role in the localities in which they operate but in addition to their core missions, universities also play an important role as institutional public policy agents. Universities can shape policy agendas and advocate policy issues in their communities. My research focus is on how universities as institutions affect public policy on an ongoing basis in areas such as urban rehabilitation, employment, economic development, indigent care, legal defense and healthcare. I propose to study Universities in Virginia located in urban areas, specifically, to find out how and why universities affect public policy and legislation and try to determine how effective these universities are as public policy agents. I plan to analyze data from local and state government databases as well as other secondary data to try to determine whether universities play a role in influencing local policies as public agents and try to determine why and how they use this influence. Possible implications of my research may be that universities are public policy incubators and agents that play an ongoing role in local policy enactment. Also, universities may prove to be influential and unofficial actors in making public policy.

## Schooling Consequences of Tsunami and the Role of International Assistance: Evidence from Indonesia

*Presenter:* Ava Gail Cas
*Co-author:* Elizabeth Frankenberg
Duke University, Public Policy

Humanitarian crises, whether natural or manmade, have potentially devastating impacts for children. The 2004 Indian Ocean tsunami was one of the most destructive disasters in human history. This presentation sets out to answer two key research questions with respect to the tsunami and its implications for the children in two provinces in Indonesia: Aceh, which bore the brunt of the damage, and neighboring North Sumatra, which suffered far less. First, we examine whether the 2004 Indian Ocean tsunami has negatively affected the schooling outcomes of children. Second, we investigate the allocation of international assistance and whether it has helped to mitigate the negative consequences on schooling outcomes. We use a unique dataset collected as part of the Study of the Tsunami Aftermath and Recovery (STAR), which is a multi-wave longitudinal study that is population representative. Exploiting the variation in damage intensity across communities brought about by this naturally unanticipated shock, we run logistic and OLS regressions to examine the impact of tsunami on a range of schooling outcomes such as the probability of missing school and number of weeks out of school. We also use this method to determine the role played by international assistance such as temporary schools and funds for rebuilding schools in mitigating the negative schooling consequences. Our preliminary results show that children in tsunami-damaged communities have worse schooling outcomes than those in non-damaged communities. Extensively damaged areas were more likely to receive international assistance and children in these areas were more likely to receive scholarships. These results have important implications. First, disasters undoubtedly have extensive economic, physical and even psychological costs which may have affected the schooling outcomes of children. Second, our research suggests the importance of the designing comprehensive aid programs to help children in disaster-damaged communities get back to normal schooling.

## Changing Tactics the Drug War: A Policy Analysis of Demand vs. Supply Side Approaches to Curtailing American Drug Use

*Presenter:* Brett Levanto
College of William and Mary, Public Policy

The Office of National Drug Control Policy reported that the United States will spend over $14 billion fighting the "drug war" at home and abroad in FY2009. Some sources have estimated that state and federal government spending on anti-drug policy exceeds $600 per second. With such high direct spending combined with the prohibitive social costs associated with the use of illicit drugs, it is imperative to ensure that drug control policy generates the most efficient long term reduction in American drug dependency. The purpose of this presentation is to investigate the effectiveness of current drug control policy and to weigh the merits of Supply vs. Demand focused strategies in combating drug proliferation. The presentation will utilize research from the Office of National Drug Control Policy and related governmental agencies, as well as academic and popular sources that address drug control issues. This research will be combined with a theoretical analysis of the economic effect of varying demand elasticity on equilibrium in the drug market and a cost/benefit analysis of legalization/regulation over the continuation of current policy. Finally, it will make comparisons between illegal narcotics and other controlled, though legal, substances such as cigarettes and alcohol. Among dependent drug users, the demand for illegal substances will be relatively inelastic. Therefore, efforts to curtail usage through disruptions in supply - a staple current drug enforcement policy - are ineffective: a minimal reduction in equilibrium quantity combined with significant price increases. Drug control policy that shifts primary focus to demand issues - education, rehabilitation, etc. - will more effectively contain the problem. Reported successes with younger users, along with the rapidly declining usage of legal, controlled substances such as cigarettes (which have been subject to intense educational campaigns) indicate that a deliberate approach to weakening demand can mitigate the long-term need for costly and often dangerous supply interdiction policies.

## Trauma Center Effects on Return to Work Outcomes

*Presenter:* Sergio Prada
University of Maryland, Baltimore County, Public Policy

Recent studies show Level-1 trauma center (as compared with hospitals without a L1 trauma center) effectiveness in saving lives and physical functioning, important questions remain as to the effect of trauma centers on other nonfatal outcomes. In particular, this study explores whether trauma center care has effects on return to work (RtW) for those who were working before the injury. The study naturally builds on the previous work by Mackenzie and colleagues (2006, 2008) and on the rich dataset collected by the National Study on Costs and Outcomes of Trauma (NSCOT). RtW outcomes are evaluated at 3 and 12 months after injury. The analysis will be one of multivariate type. Covariates included in the NSCOT dataset and other sources available (American Hospitals Association, Census, etc.) for this analysis cover different dimensions and determinants of the recovery process, such as: (i) individual level characteristics; (ii) injury descriptors; (iii) medical and vocational rehabilitation; (iv) acute disability phase; (v) individual task level physical and psychosocial job characteristics; (vi) Organizational level employer factors; (vii) employer-or-insurer-based disability prevention and (viii) societal level social policy. The main methodological issue in this research is one of selection bias. In order to draw causal inferences and thus be able to attribute causal effects of treatment at Trauma Centers it is necessary to understand why some patients go to trauma centers, and others do not, and then incorporate that information (their systematic differences) into the statistical analysis. I use and compare the results of two widely used methods to remove selection bias: matching/ propensity-based and instrumental variables methods. A preliminary analysis at 3 months suggests similar results regardless of the method used. However at 12 months conclusions differ by method.

# Notes

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# Notes

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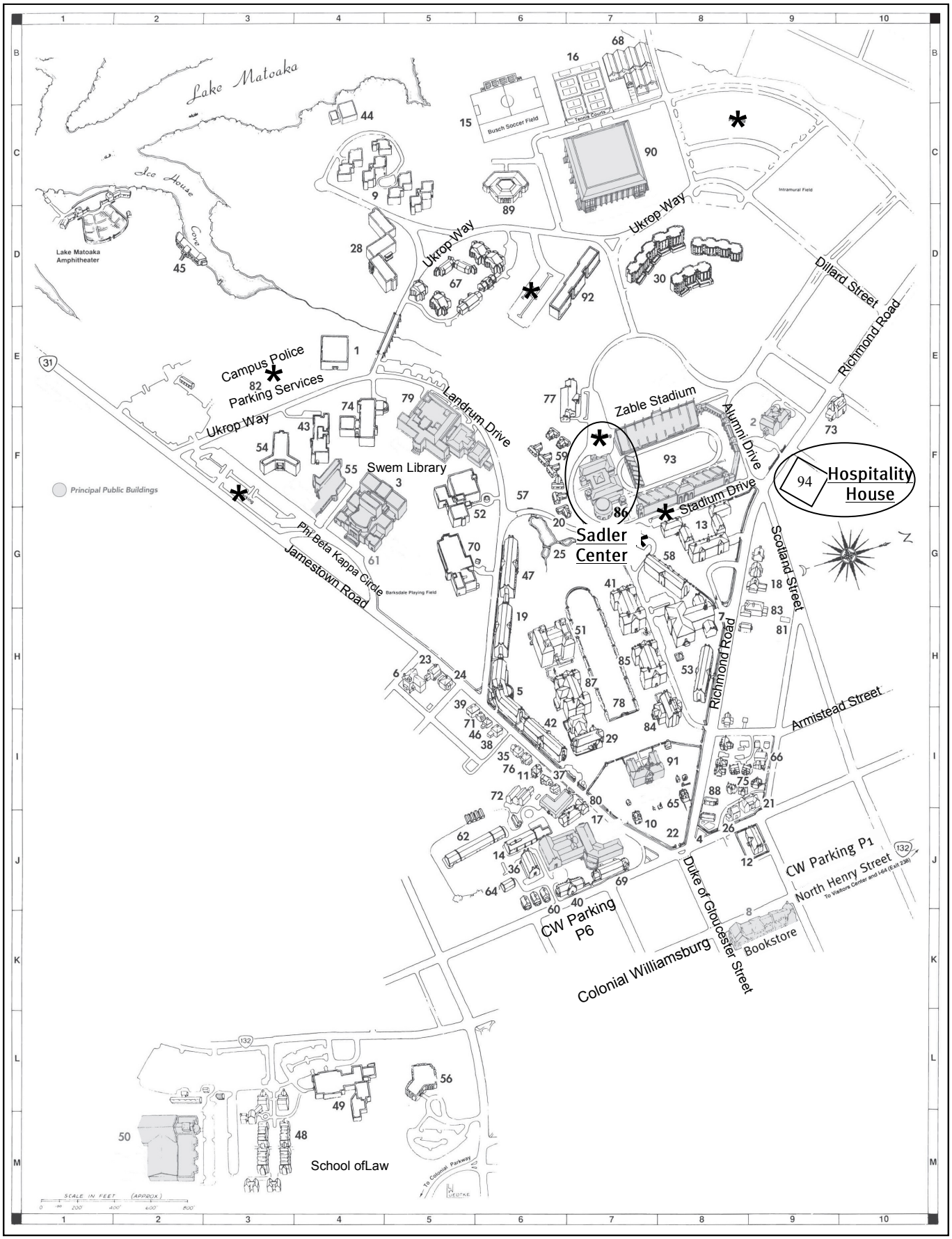
# Index of Presenters

Presenter *(Advisor)*

# Index of Presenters

Presenter *(Advisor)*

# The College of William & Mary Campus



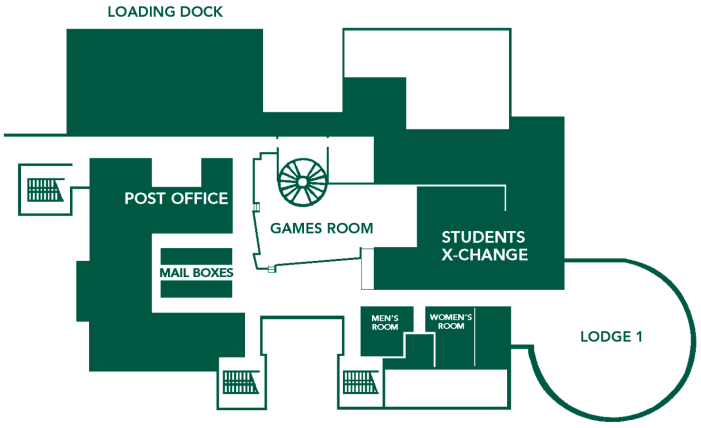
# The College of William & Mary Campus

## Key for Visitors

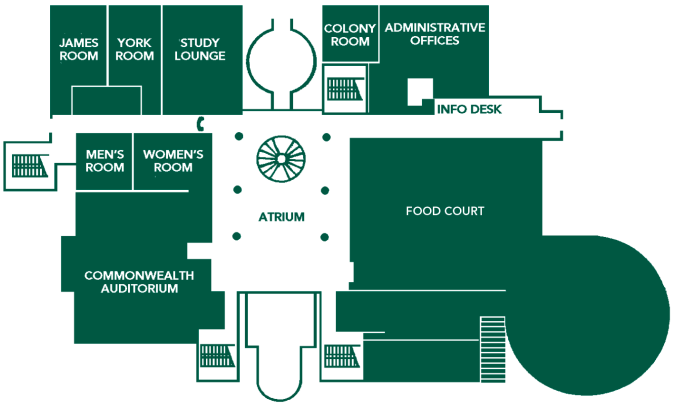
1. Adair Hall (E-4)
2. Alumni Center (F-9)
3. Andrews Hall (F-4)
4. Baldwin Memorial Garden (J-8)
5. Barrett Hall (H-6)
6. Bell Building (H-5)
7. Blow Memorial Hall (H-8)
8. Bookstore (K-9)
9. Botetourt Residence Complex (C-4)
10. Brafferton (J-7)
11. Bridges House (I-6)
12. Brown Hall (J-9)
13. Bryan Complex (G-8)
14. Building and Grounds Office (J-6)
15. Busch Field (B-6)
16. Busch Tennis Courts (B-7)
17. Campus Center (J-7)
18. Center for Archaeological Research (G-8)
19. Chandler Hall (H-6)
20. Coffee House -Daily Grind (F-7)
21. College Apartments (J-9)
22. College Yard (J-8)
23. Commuter Student House (H-5)
24. Corner House (H-5)
25. Crim Dell (G-6)
26. Davis House (J-8)
27. Dillard Complex Ironbound Road
28. Dupont Hall (D-4)
29. Ewell Hall (I-7)
30. Fraternity Complex (D-7)
31. Galt Complex –Alexander Ironbound Road
32. Galt Complex –Gabriel Ironbound Road
33. Galt Complex –Minson Ironbound Road
34. Galt Complex –Patrick Ironbound Road
35. Graduate House (I-6)
36. Heating Plant (J-6)
37. Hoke House (I-6)
38. Holmes House (I-6)
39. Hornsby House (I-5)
40. Hunt Hall (J-7)
41. James Blair Hall (H-7)
42. Jefferson Hall (I-6)
43. Jones Hall (F-4)
44. Keck Environmental Field Lab (C-4)
45. Lake Matoaka Art Studio (D-2)
46. Lambert House (I-5)
47. Landrum Hall (G-6)
48. Lettie Pate Whitehead Evans Graduate Student Housing (M-3)
49. Marshall-Wythe School of Law (L-4)
50. McCormack-Nagelsen Tennis Center (M-2)
51. McGlothlin-Street Hall (H-6)
52. Millington Hall (F-5)
53. Monroe Hall (H-8)
54. Morton Hall (F-3)
55. Muscarelle Museum of Art (F-4)
56. National Center for State Courts (L-5)
57. Natural Wildflower Refuge (F-6)
58. Old Dominion Hall (G-8)
59. Old Lodges (F-6)
60. Vacant (J-6)
61. Phi Beta Kappa Memorial Hall (G-4)
62. Physical Plants Crafts Shop (J-5)
63. Plumeri Park Ironbound Road
64. Vacant (J-6)
65. President's House (I-8)
66. Prince George House (I-9)
67. Randolph Student Residence Complex (D-5)
68. Recreational Sports Center (B-7)
69. Reves Center for International Studies (J-7)
70. Rogers Hall (G-5)
71. Rowe House (I-5)
72. Sarah Ives Gore Child Care Center (I-6)
73. Savage House (F-10)
74. Small Physical Laboratory (F-4)
75. Sorority Court (I-9)
76. Stetson House (I-6)
77. Student Health Center (E-7)
78. Sunken Garden (H-7)
79. Swem Library (F-5)
80. Taliaferro Hall (J-7)
81. Taylor Building (H-9)
82. The Garage - Police/Parking (E-3)
83. Thiemes House (Personnel Office) (H-9)
84. Tucker Hall (I-8)
85. Tyler Hall (H-7)
86. Sadler Center (F-7)
87. Washington Hall (H-7)
88. Western Union Building (I-8)
89. William and Mary Commons (Cafeteria) (C-6)
90. William & Mary Hall/Kaplan Arena (C-7)
91. Wren Building (I-7)
92. Yates Hall (D-7)
93. Zable Stadium (F-8)
94. Hospitality House (F-9)

*Parking areas

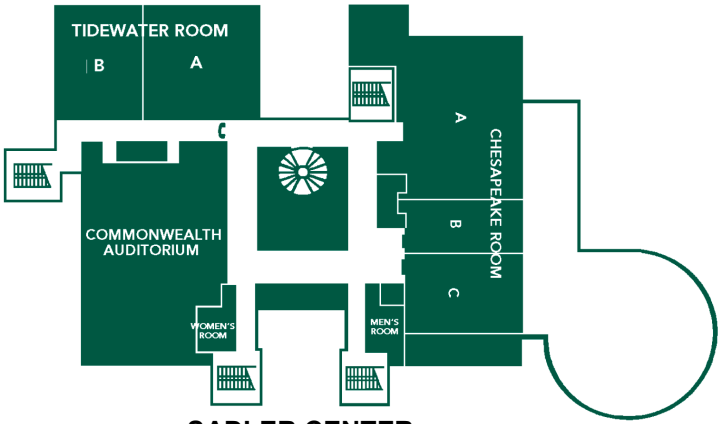
# Meeting Space at the Sadler Center




**SADLER CENTER**
**First Level**




**SADLER CENTER**
**Second Level**




**SADLER CENTER**
**Third Level**

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