9th Annual Graduate Research Symposium

March 26-27, 2010

The College of
William & Mary
Sadler Center
Williamsburg, Virginia

"Preparing Scholars, Presenting Excellence"

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Schedule at a Glance

Friday, March 26, 2010 -- Sadler Center

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9:45 am - 10:45 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
11:00 am - 12:00 pm	Poster Presentations with Q&A *Second Floor Lobby*
12:00 pm - 1:30 pm	Lunch & Welcoming Remarks *Chesapeake A*
1:45 pm - 2:45 pm	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
3:00 pm - 4:00 pm	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
4:15 pm - 5:15 pm	Careers Panel Discussion *Tidewater A*
5:30 pm - 7:30 pm	Evening Networking Reception *Chesapeake A*

Saturday, March 27, 2010 -- Sadler Center

8:00 am - 8:30 am	Registration *Second Floor Lobby*
8:30 am - 12:00 pm	Poster Displays *Second Floor Lobby*
8:30 am - 9:50 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
9:50 am - 10:50 am	Concurrent Sessions *Tidewater A, Tidewater B, Chesapeake C, James Room, and York Room*
11:00 am - 12:00 pm	Poster Presentations with Q&A *Second Floor Lobby*
12:00 pm - 1:30 pm	Luncheon & Awards Ceremony *Chesapeake A*

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

On behalf of the organizing committee, we would like to welcome you to the Ninth Annual Graduate Research Symposium.

We hope that you will attend many of the more than 135 engaging presentations that will facilitate the interdisciplinary and inter-institutional exchange of ideas. This year our scholars come not only from Arts and Sciences at The College of William & Mary, but from American University, Appalachian State University, The Citadel, The College of Charleston, Drexel University, George Mason University, The George Washington University, Hampton University, James Madison University, Johns Hopkins University, Old Dominion University, Towson University, The University of North Carolina at Wilmington, The University of Richmond, Virginia Commonwealth University, Virginia Tech, and West Virginia University. The diversity of our presenters not only reflects the geographical breadth of the symposium's reputation, but also the intellectual depth and breadth of the symposium.

In addition to the spectrum of research being presented over the duration of the symposium, we are pleased to have members of the Graduate Studies Advisory Board host a panel discussion on the practical application of a graduate education. We invite you to participate in this forum and engage the expertise of our advisory board members representing diverse fields of study and the utility of their graduate educations outside the walls of the academy.

Finally, we would like to thank all of the participants, faculty, staff, and administration for their ongoing support of the Graduate Research Symposium. We hope that you will find that this year's program continues the tradition of cultivating an environment of interdisciplinary intellectual exchange amongst peers and peer institutions, and that you will join us in making the Ninth Annual Graduate Research Symposium a success.

Jonathan R. Skuza
Natural & Computational Sciences Chair

Alix Méav Ellinwood-Jerome
Humanities & Social Sciences Chair

2010 Graduate Research Symposium Organizing Committee

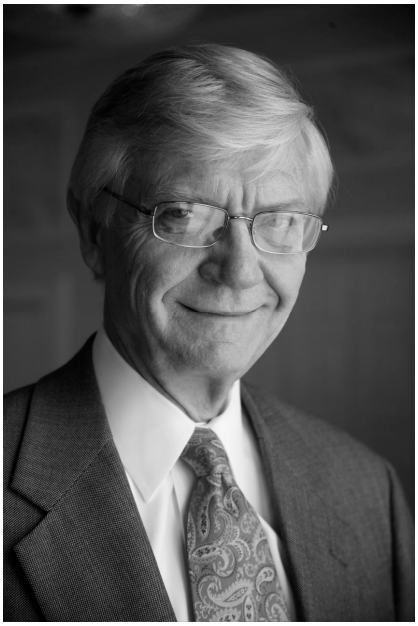
THE COLLEGE OF WILLIAM AND MARY
OFFICE OF THE PRESIDENT
P.O. BOX 8795
WILLIAMSBURG, VIRGINIA 23187-8795
757/221-1693; Fax 757/221-1259

Dear Students and Friends,

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

The Symposium's theme – "Preparing Scholars, Presenting Excellence" – reflects 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 and their peers from other schools to present their work, 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 2010 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 2010 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, 2009-10

President: Larry McEnerney '76 BA English & History
Vice-President: Cynthia Morton '77 BS Biology
Past President: Patricia Barry '63 BS Chemistry
Chair, Development and Communications Committee: Ann L. Koch '83 BA Religion
Chair, Student Professional Development Committee:
Diane Alleva Cáceres '87 BA Economics, '89 MA Government

Debbie Allison '77 BS Chemistry
John D. Burton '89 MA History, '96 PhD History
D. Nelson Daniel '90 BS Geology & Economics
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
Robert Stroube '68 BS Biology
William Tropf '68 BS Physics
Edwin Watson II '68 BA History, '70 MA History

2010 Graduate Research Symposium

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

Graduate Student Committee
Michael Duarte, *Computational Operations Research*
Jessica Herlich, *Anthropology*
Julia Kaziewicz, *American Studies*
Karl Mendoza, *Biology*
Jennifer Ogborne, *Anthropology*
Shaun Richards, *American Studies*
Kevin J. Smith, *Physics*
Christian Wilbers, *American Studies*
Sarah Zimmet, *Anthropology*

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

Distinguished Faculty Speakers
President W. Taylor Reveley, III
Dr. Michael R. Halleran, *Provost*

Careers Panel Discussion
Carl Strikwerda, *Dean, Arts & Sciences, Moderator*
Diane Alleva Cáceres, *Graduate Studies Advisory Board*
Larry McEnerney, *Graduate Studies Advisory Board*
Brian Morra, *Graduate Studies Advisory Board*
Cynthia Morton, *Graduate Studies Advisory Board*
William Tropf, *Graduate Studies Advisory Board*

Session Chairs
Dr. Timothy Barnard, *American Studies*
Dr. Marley Brown, *Anthropology*
Dr. John Burton, *Graduate Studies Advisory Board*
Dr. César Clavero, *Applied Science*
Dr. Maureen Fitzgerald, *American Studies*
Dr. Martin Gallivan, *Anthropology*
Dr. Mark Hinders, *Applied Science*
Dr. Oliver Kerscher, *Biology*
Dr. Rex Kincaid, *Computational Operations Research*
Dr. Hiroshi Kitamura, *History*
Dr. Arthur Knight, *American Studies*
Dr. Gunter Lüpke, *Applied Science*
Dr. Weizhen Mao, Computer Science
Prof. Elaine McBeth, *Public Policy*
Mr. Larry McEnerney, *Graduate Studies Advisory Board*
Dr. Charles McGovern, *American Studies*
Dr. Leisa Meyer, *History*
Dr. Cynthia Morton, *Graduate Studies Advisory Board*
Dr. Mike Nichols, *Psychology*
Dr. Neil Norman, *Anthropology*
Dr. Denys Poshyvanyk, *Computer Science*
Dr. Betsy Schroeder, *History*
Dr. Gregory Smith, *Applied Science*
Dr. Gene Tracy, *Physics*
Dr. Patricia Vahle, *Physics*
Dr. Janice Zeman, *Psychology*
Dr. Gang Zhou, *Computer Science*

Judging Panel
Graduate student poster and oral presenters were eligible to submit a paper for award consideration in the disciplinary category of their choosing. The names and institutions of the students and advisors were removed from the submissions prior to evaluation by the judging panel. Advisors whose students submitted papers recused themselves from ranking those papers.

GRS Humanities and Social Sciences
Dr. Joshua Burk, *Psychology*
Dr. John Burton, *Graduate Studies Advisory Board*
Mr. Nelson Daniel, *Graduate Studies Advisory Board*
Dr. Cindy Hahamovitch, *History*
Ms. Ann Koch, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Dr. Kimberley Phillips, *American Studies*

GRS Natural and Computational Sciences
Dr. Charles Johnson, *Applied Science*
Dr. Qun Li, *Computer Science*
Dr. William Tropf, *Graduate Studies Advisory Board*
Dr. Patricia Vahle, *Physics*
Dr. Matthew Wawersik, *Biology*

Mentoring Awards Humanities and Social Sciences
Dr. John Burton, *Graduate Studies Advisory Board*
Mr. Nelson Daniel, *Graduate Studies Advisory Board*
Dr. Cheryl Dickter, *Psychology*
Dr. Cindy Hahamovitch, *History*
Ms. Ann Koch, *Graduate Studies Advisory Board*
Prof. Elaine McBeth, *Public Policy*
Dr. Kimberley Phillips, *American Studies*

Mentoring Awards Natural and Computational Sciences
Dr. Charles Johnson, *Applied Science*
Dr. Qun Li, *Computer Science*
Dr. Robert Saunders, *Graduate Studies Advisory Board*
Dr. Patricia Vahle, *Physics*
Dr. Matthew Wawersik, *Biology*
Dr. Gexin Yu, *Computational Operations Research*

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Robin Cantor-Cooke
Barbara Monteith
Office of Student Activities Scheduling Office
Sadler Center Operations & Technical Services
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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 students from the College of William & Mary.

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

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

NANCY HILLMAN
The College of William and Mary, History. Advisor: Dr. Melvin Ely
A Complex Fellowship: Black and White Baptists in Southeastern Virginia, 1800-1860

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

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

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

NATHANIEL PHILLIPS
The College of William and Mary, Physics. Advisor: Dr. Irina Novikova
Quantum memory under conditions of electromagnetically induced transparency and four-wave mixing in a hot atomic gas

INCOGEN, Inc. (www.incogen.com) provides software and professional services to scientists involved in biomedical, pharmaceutical, and biotechnology research. The company was founded by Arts & Sciences 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

SARA KAMPFE
The College of William and Mary, Chemistry. Advisor: Dr. Deborah Bebout
Processing and Conversion of Algae to Bioethanol

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

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

KATHRYN HOLT
Psychology, Advisor: Dr. Paul Kieffaber
Cognitive Aging: Influences on Attention and Response Switching

William & Mary Honorable Mentions

JENNIFER OGBORNE
Anthropology, Advisor: Dr. Martin Gallivan
So… What Am I Supposed To Do With This Big Pile of Cans?: Methodological Techniques for Coping with 19th and 20th Century Can Dumps

SARAH GLOSSON
American Studies, Advisor: Dr. Charles McGovern
Domestic Music Making in Late Eighteenth-Century Elite Chesapeake Society: Playing Music, Performing Identity

Visiting Scholar Award for Excellence in the Humanities and Social Sciences

SUSAN LLEWELLYN
History, George Mason University, Advisors: Dr. Joan Bristol, Dr. Kathy McGill
Competing for Power: An Examination of Motivations Behind Changes in Women's Property Rights in Colonial Virginia

Visiting Scholar Honorable Mention

ASHLEY WHITEHEAD
History, West Virginia University, Advisor: Dr. Peter Carmichael
"A Debt of Honor": The Benevolence of Richmond's Female Elites at the "Last Confederate Christmas" of 1864

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

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

LEI LU
Computer Science, Advisor: Dr. Evgenia Smirni
Blocking for Efficient Server Overload Management under Bursty Arrivals

William & Mary Honorable Mentions

SHAHLA NASSERASR
Applied Science/Mathematics, Advisor: Dr. Charles Johnson
Conditions for a TP2-Completion

KEVIN SMITH
Physics, Advisor: Dr. Gunter Lüpke
Optical Control of Ultrafast Spin-wave Relaxation by Magnetic Anisotropy in a Ferromagnet

Visiting Scholar Award for Excellence in the Natural & Computational Sciences

SAMUEL SHIMP, III
Biomedical Engineering, Virginia Tech
Advisors: Dr. Marissa Rylander, Dr. Christopher Reilly
Computational modeling of Hsp90 as a therapeutic target to inhibit immune-mediated inflammation in systemic lupus erythematosus

Visiting Scholar Honorable Mention

SENTHILRAJA SINGARAVELU
Physics, Old Dominion University, Advisors: Dr. Michael Kelley, Dr. Geoffrey Krafft
Laser Processing on bulk Niobium to produce Niobium nitride

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Johns Hopkins University Information Security Institute Award for Excellence in Scholarship in the Computational Sciences

DUY LE
Computer Science, College of William & Mary, Advisor: Dr. Haining Wang
Detecting Kernel Level Keyloggers Through Dynamic Taint Analysis

The College of William & Mary
Awards for Excellence in Undergraduate Mentoring

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

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

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

DAVID BROWN
History Department, PhD

JULIA KAZIEWICZ
American Studies Program, PhD

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

STEPHEN COLE
Biology Department, MS

JONATHAN SKUZA
Physics Department, PhD

Friday Morning, March 26 Program Schedule

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

Coffee and donuts will be served.

8:30 AM - 9:30 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Gregory Smith*	**Session Chair:** *Dr. Timothy Barnard*	**Session Chair:** *Dr. Weizhen Mao*	**Session Chair:** *Dr. Neil Norman*	**Session Chair:** *Dr. César Clavero*
Ryan Carpenter Applied Science *College of William & Mary*	**Lita Tirak** American Studies *College of William & Mary*	**Duy Le** Computer Science *College of William & Mary*	**Zachary Waske** Anthropology *College of William & Mary*	**Jonathan Skuza** Physics *College of William & Mary*
Yan Hao Applied Science *College of William & Mary*	**M. Michaele Smith** American Studies *College of William & Mary*	**Zhenyu Wu** Computer Science *College of William & Mary*	**Sarah Chesney** Anthropology *College of William & Mary*	**Kevin Smith** Physics *College of William & Mary*
Samuel Shimp III Biomedical Engineering *Virginia Tech*	**Karen Smyth** American Studies *College of William & Mary*	**David Goldenberg** Computer Science *College of William & Mary*	**Jennifer Ogborne** Anthropology *College of William & Mary*	**Yichun Fan** Applied Science *College of William & Mary*
Ilker Tunc Applied Science *College of William & Mary*		**Chancellor Pascale** Computer Science *Johns Hopkins University*		**Kaida Yang** Applied Science *College of William & Mary*
Xueying Wang Applied Science *College of William & Mary*				

9:30 AM - 9:45 AM BREAK (except for Tidewater A)

9:45 AM - 10:45 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Mark Hinders*	**Session Chair:** *Dr. Charlie McGovern*	**Session Chair:** *Dr. Gang Zhou*	**Session Chair:** *Dr. Leisa Meyer*	**Session Chair:** *Dr. Gunter Lüpke*
Maria Cristina Picardo Applied Science *College of William & Mary*	**Ben Anderson** American Studies *College of William & Mary*	**Malcom Gethers** Computer Science *College of William & Mary*	**Sarah Glosson** American Studies *College of William & Mary*	**Lei Wang** Physics *College of William & Mary*
Eric Dieckman Applied Science *College of William & Mary*	**Renee Kingan** American Studies *College of William & Mary*	**Collin McMillan** Computer Science *College of William & Mary*	**Steven Scott** History *George Mason University*	**Nathaniel Phillips** Physics *College of William & Mary*
Corey Miller Applied Science *College of William & Mary*	**Brendan Boerbaitz** History *George Washington Univ.*	**Suzanna Schmeelk** Computer Science *College of William & Mary*	**Susan Llewellyn** History *George Mason University*	**Wei Zheng** Applied Science *College of William & Mary*
William Roach Applied Science *College of William & Mary*		**Chuan Yue** Computer Science *College of William & Mary*		**Erik Spahr** Physics *College of William & Mary*

10:45 AM - 11:00 AM BREAK

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

1) Amanda Bessler (Biology) *College of William & Mary*	**5) Katherine Luciano** (Geology) *College of Charleston*	**9) David Johnston** (Physics) *College of William & Mary*	**13) David Kovaz** (Psychology) *College of William & Mary*	**17) Teri Preddy** (Psychology) *University of Richmond*
2) Stephen Cole (Biology) *College of William & Mary*	**6) Subashini DeSilva** (Physics) *Old Dominion University*	**10) S. Singaravelu** (Physics) *Old Dominion University*	**14) Caitlin Lamm** (Psychology) *College of William & Mary*	**18) Katie Taylor** (Psychology) *VCU*
3) Sarah Lemelin (Biology) *College of William & Mary*	**7) N. Govindarajan** (Physics) *Hampton University*	**11) Adam Hirsh** (Psychology) *College of William & Mary*	**15) Courtney Lee** (Psychology) *University of Richmond*	
4) Catherine Lewis (Biology) *College of William & Mary*	**8) Megan Ivory** (Physics) *College of William & Mary*	**12) Daniel Kinka** (Psychology) *University of Richmond*	**16) Joseph Pochedly** (Psychology) *College of William & Mary*	

Friday Afternoon, March 26 Program Schedule

12:00 PM - 1:30 PM LUNCH & WELCOMING REMARKS (Chesapeake A)

Dr. S. Laurie Sanderson, *Dean of Graduate Studies and Research, Arts & Sciences, College of William & Mary*

1:45 PM - 2:45 PM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Maureen Fitzgerald*	**Session Chair:** *Dr. John Burton*	**Session Chair:** *Prof. Elaine McBeth*	**Session Chair:** *Dr. Martin Gallivan*	**Session Chair:** *Dr. Patricia Vahle*
Lisa Maguire History *American University*	**Nancy Hillman** History *College of William & Mary*	**Alana Romanella** Public & Internation. Affairs *Virginia Tech*	**S. Hasselbacher Berryhill** Anthropology *College of William & Mary*	**Douglas Beringer** Physics *College of William & Mary*
Zachary Hilpert American Studies *College of William & Mary*	**Maureen Connors** History *George Mason University*	**Deborah Trent** Public Policy & Admin. *George Washington Univ.*	**Matthew Thomann** Anthropology *American University*	**Stephen Coleman** Physics *College of William & Mary*
Michael Stratmoen History *George Mason University*	**Chris Pullen** History *James Madison University*	**Robin Ghertner** Public Policy & Admin. *George Washington Univ.*		**Siyuan Yang** Physics *College of William & Mary*
				Shahla Nasserasr Applied Science / Math *College of William & Mary*

3:00 PM - 4:00 PM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Betsy Schroeder*	**Session Chair:** *Dr. Arthur Knight*	**Session Chair:** *Prof. Elaine McBeth*	**Session Chair:** *Dr. Marley Brown*	**Session Chair:** *Dr. Denys Poshyvanyk*
Stefan Kosovych History *Citadel/Coll. of Charleston*	**Jamie Hager** History *Appalachian State Univ.*	**Mariglynn Collins** Public Policy & Admin. *George Washington Univ.*	**Derek Miller** Anthropology *College of William & Mary*	**Yixun Liu** Computer Science *College of William & Mary*
Ashley Whitehead History *West Virginia University*	**Julia Kaziewicz** American Studies *College of William & Mary*	**Aaron Hugeback** Public Policy *College of William & Mary*	**Malinda Rhone** Anthropology *American University*	**Seena Menon** Computer Science *Appalachian State Univ.*
Christian Wilbers American Studies *College of William & Mary*	**Elizabeth Howard** American Studies *College of William & Mary*	**Jose Alcaine** Public Policy *VCU*	**Shannon Mahoney** Anthropology *College of William & Mary*	**Biva Shrestha** Computer Science *Appalachian State Univ.*
				Kai Tian Computer Science *College of William & Mary*

4:15 PM - 5:15 PM CAREERS PANEL DISCUSSION (Tidewater A)

"WHAT CAREER OPTIONS ARE AVAILABLE?" - THE PRACTICAL APPLICATION OF A GRADUATE EDUCATION

Dr. Carl Strikwerda, *Dean of Arts & Sciences, College of William & Mary* – Moderator

Panelists are members of the College of William & Mary Arts & Sciences Graduate Studies Advisory Board
(For more information, see page 17)

Diane Alleva Cáceres, *'87 BA Economics (W&M), '89 MA Government (W&M)*
Larry McEnerney, *'76 BA English & History (W&M)*
Brian J. Morra, *'78 BA History (W&M), '84 MPA (Oklahoma), '87 MA Government (Georgetown)*
Cynthia Morton, *'77 BS Biology, PhD (Medical College of Virginia)*
William Tropf, *'68 BS Physics (W&M), PhD Physics (University of Virginia)*

5:30 PM - 7:30 PM EVENING NETWORKING RECEPTION (Chesapeake A)

Hors D'oeuvres and Refreshments will be served.

Saturday Morning, March 27 Program Schedule

8:00 AM - 8:30 AM REGISTRATION (Second Floor Lobby)
Coffee and donuts will be served.

8:30 AM - 9:50 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Michael Nichols*	**Session Chair:** *Mr. Larry McEnerney*	**Session Chair:** *Dr. Gene Tracy*	**Session Chair:** *Dr. John Burton*	**Session Chair:** *Dr. Cynthia Morton*
Kathryn Holt Psychology *College of William & Mary*	**Alix Ellinwood-Jerome** American Studies *College of William & Mary*	**Andrew Caniff** Computer Science *College of William & Mary*	**Patricia Costello** Women's Studies *Old Dominion University*	**Ashley DeCarme** Biology *College of William & Mary*
Nicole Karcher Psychology *College of William & Mary*	**Shaun Richards** American Studies *College of William & Mary*	**Lei Lu** Computer Science *College of William & Mary*	**Kathryn Bennett** American Studies *College of William & Mary*	**Sara Kreisel** Biology *College of William & Mary*
Laura Maruskin Psychology *College of William & Mary*	**Stephen Santelli** History *West Virginia University*	**Ruth Lamprecht** Computer Science *College of William & Mary*	**Kristen Proehl** American Studies *College of William & Mary*	**Andrew McGann** Biology *College of William & Mary*
	Leslee Key History *VCU*		**Merit Kaschig** American Studies *College of William & Mary*	**Marie Pitts** Biology *College of William & Mary*
(Tidewater A and James Room break from 9:30 - 9:50 AM. All other sessions continue without a break.)				**Leah Wilson** Biology *College of William & Mary*

9:50 AM - 10:50 AM CONCURRENT SESSIONS

Tidewater A	Tidewater B	James Room	York Room	Chesapeake C
Session Chair: *Dr. Janice Zeman*	**Session Chair:** *Dr. Oliver Kerscher*	**Session Chair:** *Dr. Rex Kincaid*	**Session Chair:** *Dr. Hiroshi Kitamura*	
Lauren Aaron Psychology *College of William & Mary*	**Bareza Rasoul** Biology *James Madison University*	**Kevin Cummiskey** Computational Operations Research *College of William & Mary*	**Brandon Byrd** History *College of William & Mary*	
Jonathan Freelander Psychology *Towson University*	**Anthony Giovengo** Biology *West Virginia University*	**Samy El-Tawab** Computer Science *Old Dominion University*	**Christopher Moreland** History *UNC - Wilmington*	**NO SESSION SCHEDULED.**
Kyle Gagnon Psychology *College of William & Mary*	**Zachary Elmore** Biology *College of William & Mary*	**Michael Duarte** Computational Operations Research *College of William & Mary*	**Matthew Thomas** History *College of William & Mary*	
	Jason Westerbeck Biology *College of William & Mary*			

10:50 AM - 11:00 AM BREAK

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

1) Sarah Zimmet (Anthropology) *College of William & Mary*	**5) Julia Stone** (Biology) *Drexel University*	**9) Steven Hendrickson** (Computational Operations Research) *College of William & Mary*	**13) Janna Bonesteel** (Psychology) *Towson University*	**17) P. Khuanghlawn** (PsyD) *College of William & Mary*
2) Matt Heidman (Biology) *College of William & Mary*	**6) Kelly Subramanian** (Biology) *College of William & Mary*	**10) Milka Nikolic** (Physics) *Old Dominion University*	**14) Chauncy Brinton** (Psychology) *James Madison University*	**18) Wesley Sanders** (Psychology) *College of William & Mary*
3) Anne-Marie Hodge (Biology) *UNC - Wilmington*	**7) Sara Kampfe** (Chemistry) *College of William & Mary*	**11) Janardan Upadhyay** (Physics) *Old Dominion University*	**15) Kirsten Gonzalez** (Psychology) *Towson University*	**19) Paola Sehannie** (Psychology) *VCU*
4) V. Quinlivan-Repasi (Biology) *College of William & Mary*	**8) Xiaojian Mao** (Chemistry) *West Virginia University*	**12) Austin Ziltz** (Physics) *College of William & Mary*	**16) Ivo Gyurovski** (Psychology) *College of William & Mary*	

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

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

CAREERS PANEL DISCUSSION

Friday, March 26, 4:15 PM - 5:15 PM (Tidewater A)

Please join us immediately following the discussion for a networking reception in Chesapeake A

"What career options are available?"
The Practical Application of a Graduate Education

Moderator: Dr. Carl Strikwerda, *Dean of Arts & Sciences, College of William & Mary*

Panelists: Members of the A&S Graduate Studies Advisory Board, College of William & Mary

Diane Alleva Cáceres ***'87 BA Economics (W&M), '89 MA Government (W&M)***
Diane Alleva Cáceres is Founder and Managing Director of her international trade, investment and enterprise development consulting firm, Market Access International, Inc., founded in 1997.

Larry McEnerney ***'76 BA English & History (W&M)***
Larry McEnerney is the Director of University Writing Programs at the University of Chicago. He consults for writing worldwide to businesses, academic institutions, and government agencies, and is a developer of internet-based programs for writing.

Brian J. Morra ***'78 BA History (W&M), MPA (Oklahoma), MA Govt (Georgetown)***
Brian J. Morra is the Sector Vice President for Business Development & Strategic Planning in Northrop Grumman Corporation's Electronic Systems Sector.

Cynthia Morton ***'77 BS Biology, PhD (Medical College of Virginia)***
Cynthia Morton is the William Lambert Richardson Professor of Obstetrics, Gynecology and Reproductive Biology and Professor of Pathology at Harvard Medical School, Associate Director of the Harvard-Partners Center for Genetics and Genomics, and Co-Director of the Biomedical Research Institute and Director of Cytogenetics at Brigham and Women's Hospital in Boston.

William Tropf ***'68 BS Physics (W&M), PhD Physics (University of Virginia)***
William Tropf is the former Head of Missile Engineering at the Johns Hopkins University Applied Physics Laboratory.

Recruiting / Mentoring Opportunity for Science Students

APL

The Johns Hopkins University
APPLIED PHYSICS LABORATORY

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

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

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Kind of Blue, Green, Black, and Red: Expressions of Race, Music, and Individualism in the Colored Trumpets of Miles Davis

Presenter: Ben Anderson
Advisors: Arthur Knight, Charles McGovern
College of William & Mary,
American Studies

From at least 1960 to the end of his life in 1991, jazz musician Miles Davis was known to have performed with colored trumpets. While recent research has confirmed that blue was one of those colors, available visual evidence supports the fact that Davis used green, black, and red trumpets most often (and roughly in that order). Evidence also suggests that all of those trumpets were custom-made by the same instrument manufacturer and, with one known exception, the same model as well. Though Davis is known to have said little regarding those trumpets, his comments indicate that, with them, he not only wanted to challenge the audience's assumptions about what gold and silver trumpets sounded like but that in doing so, he would force them to pay greater attention to his music. While keeping those goals in mind, this paper approaches Davis' trumpets as items that uniquely stood at the very intersection of his personal and artistic identities. Therefore, it attempts to move beyond Davis' intended focus on the audience and his music by exploring what they may have communicated about the trumpeter himself. By contextualizing them with information about Davis' performance practices, racial identity, and the broader relationship between jazz and the commercial world, this paper will present a unique image of one of the most influential, prolific, and intellectually examined artists of the 20th century.

The Women and the Critics: The Debate Over Rachel Carson's Silent Spring and Marilynne Robinson's Mother Country

Presenter: Kathryn Bennett
Advisor: Elizabeth Barnes
College of William & Mary,
American Studies

In 1962, Rachel Carson published a critique of pesticide use, Silent Spring. The text would engender enormous controversy and change forever the way Americans think about their relationship to the environment. It received scathing reviews that rejected the book as the ravings of a madwoman. But Carson's use of emotional rhetoric, her invocation of empathy, and her gendered understanding of the relationship between man and nature are arguably how the book was able to capture the public's imagination. One interesting and controversial examples of post-Silent Spring ecocriticism is Marilynne Robinson's Mother Country (1989), which addresses a British nuclear fuel reprocessing facility that disposes of waste in the Irish Sea. Mother Country also received negative reviews in which the author's ability to make a scientific pronouncement was challenged. While overt sexism was untenable by its publication, the critical reaction to Mother Country taps into ideas about authority, stewardship of the environment, and gender. I will argue that (male) reviewers of these books positioned themselves as guardians of scientific knowledge and argued that the (female) authors were unqualified to make scientific judgments. Both controversies demonstrate the fraught relationship between the scientific establishment and feminist writing and reveal fissures in feminist ecocriticism. What is different is that Carson, though writing before the modern feminist movement, is more comfortable with her position outside of traditional masculine structures of knowledge while Robinson tries to claim masculine authority for herself, denying feminist influences or antecedents thus making her text less efficacious.

Charlotte Perkins Gilman's Feminist Legacy

Presenter: Patricia Costello
Advisor: Lindal Buchanan
Old Dominion University,
Women's Studies

Not long ago, I read what I thought was the first chapter of Charlotte Perkins Gilman's 1898 polemic *Women and Economics* in the feminist anthology *Available Means*. Gilman's clever use of analogies linking and contrasting human and animal social behaviors presented an intriguing Darwinian variation on early feminists' attempts to refute contemporary assumptions of inherent and inviolable gender roles. The editors introduced Gilman as "one of the most important feminist social theorists and philosophers of her time." On reading *Women and Economics*, I found the first chapter was not as represented in *Available Means*, whose editors expurgated parts of Gilman's text. The reasons for the deletions become clear in the fifth paragraph, in which Gilman states, "As one clear, world-known instance of the effect of economic conditions upon the human creature, note the marked race-modification of the Hebrew people under the enforced restrictions of the last two thousand years." Thus began my true introduction: to how some feminist scholars contort themselves in defending Gilman's status as a feminist icon and to how academic circles are divided regarding the relevance of Gilman's theories of race, ethnicity, and class to her feminist theories. By analyzing feminist scholars' treatment of Gilman's *Women and Economics*, I will show how scholars have groomed Gilman's image for a modern audience, and suggest alternative ways to interrogate Gilman's social theories. I hope to persuade scholars to resist skirting or denying these vital unreconciled aspects of late-nineteenth-century feminists. Those who cannot resist risk becoming irrelevant to a generation of more diverse scholars.

Scheherazade in the White City: Muslim Women and the Imperial Gaze at the 1893 World's Columbian Exposition

Presenter: Alix Méav Ellinwood-Jerome
Advisor: Maureen Fitzgerald
College of William & Mary,
American Studies

As the showcase of the imperial ambitions of America during the Gilded Age, the World's Columbian Exposition in 1893 initiated the exchange of Muslim women as a consumable commodity in American Protestant culture. Erected-upon the existing framework for the cultural consumption of the "Oriental Other" as created by the Exposition Universelle Internationale de 1889 à Paris through the commodification of North African colonies, especially Egypt and Algeria, the World's Fair at Chicago allowed the American public to participate in the material and cultural consumption of Muslim women produced by Americans themselves, rather than filtered through the earlier schools of British and French Orientalism. It also permitted Americans to reject competing, "authentic" images of Muslim women provided to the exhibition by the Ottoman Empire (albumens that were a precursor to W.E.B. DuBois's exhibit on the "American Negro" in 1900), establishing a cultural, imperial, and religious hegemony over a modern Islamic empire. The material and performance culture of the fair produced by entrepreneurs like Sol Bloom, responsible for introducing the world to *la danse du ventre* and "Little Egypt", sponsors of the fair, media outlets, photographers and various writers visiting the spectacle created a wholly American-style Orientalist-Consumerist culture that influenced advertising, Elvis, and America's conception, reproduction, and consumption of the Muslim Women as a harem subculture extending beyond the conclusion of the Gilded Age.

Domestic Music Making in Late Eighteenth-Century Elite Chesapeake Society: Playing Music, Performing Identity

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

In late eighteenth-century Chesapeake society, music making in the home was not simply a leisure activity; it was a social endeavor through which elites were able to express and experience their gentility, and thereby demonstrate their taste, status, and wealth. As a prominent family of the Chesapeake, the Carters of Shirley Plantation used music as a way of performing – and engaging with – their status within society. Reconstructing a context through which to view the eighteenth-century sheet music collection of Shirley Plantation, including the physical environment in which the music was consumed, and contemporary letters, diaries, and documents from Shirley and other Virginia plantations, I suggest how we might better understand the little-known praxis of eighteenth-century domestic music making and its significance in early American culture. I suggest how musical performance functioned in the lives of late eighteenth-century elites, arguing that the parlor, a semi-public space, was a stage for the performance of identity and status, on which cultural identity was constituted, defined, and redefined. The Carters' choice of sheet music – and the performance of that music in the Shirley parlor – suggests the family's tastes, but more significantly, offers a nuanced and complex view of the role of music making in elite society.

The Birth of Urban Disaster Imagery: the Civil War, the Chicago Fire, and the Rise of the Aesthetic of Calamity

Presenter: Zachary Hilpert
Advisors: Charles McGovern,
Chandos Brown
College of William & Mary,
American Studies

This presentation will argue that modern portrayals of urban disaster can trace their aesthetic inspiration to the imagery of the Civil War. The war provided image makers their first opportunity to profit from large-scale calamity, developing a market for images that played off of the communal grief caused by the fighting. Following the cessation of conflict, this industry found its first major postwar boom in the great fire that swept through Chicago on October 10, 1871. In this presentation, the coverage of the 1871 conflagration will be compared both with the imagery of the Civil War, and the relative lack of coverage of the Peshtigo, Wisconsin fire that took place two days before Chicago's disaster. The Peshtigo fire, which claimed as many as seven times more lives than the Chicago conflagration, was virtually ignored by the visual media. I will argue that while Chicago's status as a vital industrial center played some role in this discrepancy, it was largely the more picturesque – and, therefore, sellable – qualities of that city's disaster which led image makers to focus their attention there rather than in the more rural areas further north that had burned October 8, killing as many as 1,500 people. In seeking a source for the visual aesthetic that prevailed in the recording of the Chicago fire, then, this presentation will trace the links between the image makers who covered the Civil War, and the visual documentarians who chose Chicago over Peshtigo, photographers and illustrators in a position to know which types of images would sell, and who were keenly aware of the public's postwar taste for poetic ruins and stories of recovery rather than charred bodies.

"Every American Should Stand Here Once": Jamestown's 400th Anniversary Commemoration and the Creation of an American Origin Narrative

Presenter: Elizabeth Howard
Advisor: Charles McGovern
College of William & Mary,
American Studies

This paper looks at the way that narratives of American origin are created, sustained, and altered, utilizing the 400th anniversary of the English settlement of Jamestown, Virginia as a lens. Jamestown is a location with centuries of recorded history and ever-shifting significance in the American imagination. The 2007 commemoration was billed to potential visitors not only as Jamestown's 400th anniversary, but also as America's 400th birthday. The complex history of the site, including conflict between English colonists and native people and the beginnings of English use of African slave labor, was packaged and marketed to appeal to as many potential visitors as possible. This paper utilizes the methodology and framework of cultural history to look at alterations to museum exhibits and other physical sites, as well as external factors like the Virginia legislature issuing a formal apology for its participation in slavery and Virginia's native tribes applying for official federal recognition, to analyze the origin narrative supported by Jamestown's 400th anniversary. The 2007 commemoration had to contend not only with 1607, but also with the variety of ways that 1607 has been understood, historicized, and memorialized in the intervening years. The evolution of Jamestown and the way that its history and public memory have changed over time result in a framing not only of America's past, but of its present and future as well, creating a distinct American origin narrative. An understanding of the factors at play in that process of narrative creation can be utilized to study other significant sites and to highlight a fundamental piece in the puzzle of American identity.

Red Power: Human-Animal Practices and the Centrification of Borderland Identities in James Welch's *The Death of Jim Loney*

Presenter: Merit Kaschig
Advisor: Chandos Brown
College of William & Mary,
American Studies

In stark contrast to postmodern re-readings of subdominant literature, *The Death of Jim Loney* remains, untouched, a monument to post-imperial Native American identity suspended in deracination. This paper challenges the dichotomous reception of James Welch's *Jim Loney* as the imperviously indigenous vanishing "indian" (Vizenor 15), who chases short-lived humanity in the form of interspecies intimacy at the loss of procreative relations and long-term survival as well as the ancillary misinterpretation of continental culture as fundamentally less ecological / humane if not narcissistically set on self-preservation. I argue that Loney, the protagonist of Welch's second novel, creatively articulates a coherent cultural identity from the seemingly "hopelessly tangled" fragments of his mixed cultural heritage by skillfully synthesizing western animal fetishism and native ecology or totemism employing canis lupus familiaris or omitaa as fetish and "literary totem." The novel's deliberate deployment of seemingly disinterested animal practices and allied totemic practices as a cross-cultural signifier of Loney's humanity (Native and white), social capital and power situates his protagonist firmly outside the "gothic imposition of European America upon the Native American" (Owens) and at the center of both continental and native identity or group membership. Seen in this light, Loney's conception of a coherent cultural identity on the basis of mutual (or mutually recognized) animal practices, then, is nothing less than "survivance," the "alchemy of consecration" (Bourdieu), or the mixing of a potent elixir of life that secures the inclusion and survival of hybrid identities within the dominant social group long-term.

Attack on All Fronts: MoMA, Colonial Williamsburg and the Rockefeller Family during the Cold War

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

In the short 1974 article "Abstract Expressionism, Weapon of the Cold War," Eva Cockcroft charges that the Rockefeller family's mid-century philanthropic work was actually cultural imperialism aimed at shaping the cultural politics of the Cold War. This paper explores Cockcroft's theory, with particular interest in how the work of Nelson A. Rockefeller, and the interests of his mother, Abby Aldrich Rockefeller, worked to equate modern art and culture with the American way of life at a time when it was imperative that the United States "sell the rest of the world on the benefits of life and art under capitalism." At about the same time that Nelson A. Rockefeller left the Office of Inter-American Affairs to expand his role as head of the new International Program at the Museum of Modern Art (an institution established primarily by the efforts of his mother), the preparations for a new Folk Art Center in Colonial Williamsburg, Virginia were in the works. The Center would house hundreds of pieces donated by Abby Aldrich Rockefeller and the museum would bear her name. This talk will examine how Nelson A. Rockefeller used his work with the United States government and MoMA to promote America's global image during the early Cold War via art and culture. As arguably the most influential family in mid-century America, Rockefeller's mingling of the public and private sectors, in conjunction with family ties to both MoMA and the collection at Colonial Williamsburg, has serious implications for how American modernism functioned between 1945-1965.

Playing With Fire: Jayne Cortez's Collaborations with The Firespitters

Presenter: Renee Kingan
Advisors: Charles McGovern, Arthur Knight
College of William & Mary,
American Studies

Since 1964, Jayne Cortez has been performing collaborative jazz poetry rooted in the Black Arts aesthetic with the same collective of musicians. By incorporating free jazz elements, various forms of incremental repetition, rapid-fire surrealistic imagery, squalid vernacular language, and improvisation in their work, Cortez and her musicians create a unique form of jazz poetry imbued with both aesthetic merit and a tangible sense of political and social activism. Building upon ideals of collectivity and Pan Africanism that took root during the Black Arts movement, Cortez continues to speak on behalf of oppressed people throughout the African Diaspora, addressing contemporary issues such as Hurricane Katrina and the genocide in Darfur. In this paper, I argue Cortez's collaborations exemplify the power of jazz poetry in effecting social change. This paper provides the historical, social, musical, theoretical, and literary contexts necessary to analyze live and studio recordings of one of Cortez's poems – both musically and textually. I also draw on personal and published interviews in order to explain Cortez's creative process through her words and through those of her collaborators. Finally, this paper provides an explanation of my own creative process as a poet collaborating with musicians to create an original piece grappling with my own social activism. My recording of "A Beginning" will be the final piece of this presentation.

Scout as Social Critic: Civil Rights, Sympathy, and the Tomboy Figure

Presenter: Kristen Proehl
Advisor: Elizabeth Barnes
College of William & Mary,
American Studies

From Jo March of Little Women (1868) to Scout Finch of To Kill a Mockingbird (1960), the classic American tomboy figure has become an icon of modern girlhood and a symbol of female empowerment. My dissertation, "Battling Girlhood: Sympathy, Race and the Tomboy Narrative in American Literature," traces the evolution of the American tomboy figure from its literary origins in the nineteenth century to the mid-twentieth century. As tomboy figures grapple with issues of sympathy, I argue that they not only unmask the cultural performance of femininity and heterosexuality, but also challenge the social construction of racial and class hierarchies. My paper, "Scout as Social Critic," derived from Chapter 5 of my dissertation, will focus upon the gender-bending girl protagonist of To Kill a Mockingbird. I argue that tomboy Scout Finch's sympathetic alliances across racial, gender, and class lines challenge normative mid-twentieth-century Southern society, offering social criticism upon Civil Rights era issues. By establishing an alternative support network with marginalized individuals in her small-town community, she signals independence from, rather than dependence upon, mainstream acceptance. As tomboys like Scout develop and articulate compassion for "outsider" figures, they also serve as moral barometers, instructing other characters – and, by extension, readers – about how to respond to a variety of social issues, including racial segregation, class divisions, and other forms of oppression.

Bachelor of Science: Literary Representations of Rational Masculinity

Presenter: Shaun Richards
Advisor: Susan Donaldson
College of William & Mary,
American Studies

The turn of the twentieth-century is considered a watershed moment in American social, intellectual, and literary history. Objective truths advanced by science were displacing the dogmas of orthodox religion, while larger cultural shifts helped make realism the dominant genre of literature. As a result, the man of science became a leading cultural authority, as well as a stock figure in fiction. Harold Frederic's 1896 novel *The Damnation of Theron Ware* is indicative of this historical moment, reflecting the individual's incapacity to cope with the intellectual disorder of modernity. One of its secondary characters, Dr. Ledsmar, is representative of the reification of post-Darwinian scientific racism and male disembodied reason. What can a seemingly insignificant character in an oft-neglected piece of literature tell us about rational masculinity in the 1890s? Bachelorhood and science intersect in this character; the potential for sexual deviance suggested by the lifestyle of the bachelor combines with the immoral practices of the scientist. The iconography of knowledge that symbolizes professionalized science – "the very profusion of scholarly symbols" that conflate notions of separate gendered spheres – is the same used to signify single masculinity. This paper problematizes the reductive assessment of Ledsmar, utilizing an interdisciplinary approach consisting of literary criticism, masculinity studies, and material culture studies, in order to resist the oversimplified categorizations of him as an irreligious, misogynistic, and cold-hearted man of science. (This paper is part of a larger project seeking to historicize representations of bachelorhood in America.)

What if it Were Your Daughter?: Controversial Marriages and the Media

Presenter: M. Michaele Smith
Advisor: Leisa Meyer
College of William & Mary,
American Studies

Media coverage of interracial relationships, specifically black-white relationships, changed dramatically in the years between Brown vs. the Board of Education and Loving vs. Virginia, the Supreme Court decision ending state anti-miscegenation laws. In the 1990s the debate over a case pending in the Hawaiian State Supreme Court resulted in widespread coverage of same-sex marriage in the national media. Although interracial marriage and same-sex marriage were two different issues, there were similarities in media coverage between them. Both interracial marriage and gay marriage gained increasing support and acknowledgement from the press and the American public. Those opposed also garnered the media's attention and gained support as well. The issue of marriage was avoided by the Civil Rights Movement and was not a major objective of the Gay Liberation Movement but in both cases it was a crucial aspect in the fight for equal rights.

Blood, Sex and Tears: Sex and Choice in True Blood vs. Twilight

Presenter: Karen Smyth
Advisor: Maureen Fitzgerald
College of William & Mary,
American Studies

HBO's True Blood, part of the current vampire phenomenon, is quick to establish that vampires are intensely sexual creatures where the act of taking blood and having sex are simultaneous. Having sex with a vampire is undoubtedly dangerous yet it is an acutely erotic experience that our human heroine, Sookie, enjoys with multiple partners. Stephenie Meyer's Twilight saga, arguably the catalyst of today's vampire craze, is a virginal love story between the human, seventeen-year-old Bella and a forever-seventeen, vampire Edward that is heavy on the sexual tension and hormones but very light on the sex. Bella continually pushes the boundaries of what Edward deems sexually appropriate and he constantly chastises her for her sexual desire. Meyer utilizes vampire literature, with its theme of sexual purity vs. immorality, to highlight a relationship where Edward is the gatekeeper of Bella's sexuality because he is a strong, male vampire. True Blood uses the same themes to make sex and sexuality essential to vampires and is unapologetic in its portrayal of how that desire manifests in women and men. While Bella learns to be ashamed of her desire, Sookie uses hers to empower herself. The sexual repression in Twilight strongly suggests to readers that this patriarchal relationship is not only normal but desirable, whereas in True Blood, Sookie is not a slave to sexual desire but enjoys sex on her own terms. In the current vampire zeitgeist, True Blood and Twilight occupy opposite ends of the spectrum in terms of their attitudes toward sex and female sexuality.

The American Grotesque: Liberal Idealism in Science in Story

Presenter: Lita Tirak
Advisor: Alan Wallach
College of William & Mary,
American Studies

Historians frame the Victorian era as conservative and prudish; however, there were some Victorians who broke with tradition and advocated liberal ideals. The counter-cultural children's series *Science in Story: Sammy Tubbs the Boy Doctor and Sponsie the Troublesome Monkey* (1874) is a cultural artifact that compels us to re-evaluate this period. Published in New York City, *Science in Story* aimed to educate pre-teens about human anatomy in an entertaining narrative about a black boy maturing into a medical practitioner, and his sidekick, a roguish monkey. It comprised five illustrated volumes, each chronicling Sammy Tubbs' stages of development with a different educational topic. The final volume taught children about sexual reproduction, a controversial subject in the era of Anthony Comstock's obscenity regulations. The author and publisher, Dr. Edward Bliss Foote, was a champion of free speech and a leader of the Free-Thought movement. In *Science in Story*, he created grotesques that countered the standard notions of beauty and race, and humorously ridiculed the restrictions established by Comstock. I argue that the grotesque affronted late-century conservative conventions of behavior by exhibiting the human body in text and imagery to promote liberal ideals. I explore three frameworks – the art historical grotesque, the culture of obscenity regulations, and race science – which I apply to case studies from the text. This study shows how Foote's grotesques destabilize Victorian-era prudery and racial typing; how the destabilization results in liberal idealism; and how his humorous grotesques become forces of free speech within the oppressive era of Comstock.

Herbert Hans Haupt: In Between Identities

Presenter: Christian Wilbers
Advisor: Charles McGovern
College of William & Mary,
American Studies

The German-American identity went through one of its most decisive phases before, during, and after World War II, when the lives of German-Americans became entangled in the Manichaen worldview of the time, which forced them to choose between loyalty for the United States and Nazi Germany. This dichotomy, however, failed to capture the complicated experience of many who still felt the bonds of heritage while not necessarily aligning themselves with the politics of National Socialism. Herbert Hans Haupt, a young German-born American citizen, who had spend all but the first few years of his live in Chicago, epitomizes the impossibility of being both, German and American, during that time. Struggling with his past and present, he set out on an adventurous trip around the globe only to be caught up between forces beyond anything he could have imagined: Arriving in Europe on the day Germany declared war on the U.S., he was immediately arrested by the Gestapo in France and subsequently agreed to participate in a sabotage mission against the United States. Back in the U.S., he was seized by the FBI, tried, and executed as an "enemy agent". To this day his links to American National Socialists and his dubious involvement with the Gestapo continue to be accepted as sufficient evidence for his "treason". But his story challenges and sheds new light on the history of German immigration to the United States and simultaneously forces us to rethink questions of loyalty and belonging during World War II.

Come All Ye Future Botanists: Landscape Design and Management at The Woodlands

Presenter: Sarah Chesney
Advisors: Frederick Smith, Marley Brown
College of William & Mary,
Anthropology

The formal landscapes constructed by early American elites on their country estates bring to mind images of control, order, and, above all, privacy. Such estates were often built as retreats, places where elites could enjoy the pleasures of carefully landscaped nature, but where access was limited to the individual owners and those of their choosing. The Woodlands, William Hamilton's Schuylkill River estate west of Philadelphia, was an exception, however. In the decade following the American Revolution William Hamilton not only completely redesigned his country retreat; he also challenged the closed-door tradition of many country estates by opening his gates to all who cared to enter. Hamilton, an amateur botanist himself, saw The Woodlands as a vehicle through which to encourage his fellow countrymen in fields of landscape design and botany, and himself as a patron bestowing gifts rather than as a member of the elite closing his gates.

The Vitality in Revitalization: The Place of Novelty in the Language Revitalization of the Coushatta Nation

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

Since the early 1990s, literature on language revitalization has proliferated in academic literature as well as the popular press. The popular media tends to focus on small language speakers as tragic heroes and linguists as salvagers of the historic, ignoring one of the most important pieces of language vitality: newness. The Coushatta Nation of Louisiana is in the early stages of a long-term revitalization process, including the innovation of a new writing system and written Coushatta materials for public consumption. This paper describes the process of the Coushatta language committee's community-driven linguistic work and the client-based research model employed by the academics on the team. It focuses on the novel Coushatta literacy, offering preliminary observations on its nature and uses, which have implications for how the Coushatta define themselves as a speech community.

Convergence and Collaboration in Charles' Corner, Virginia: 1862-1918

Presenter: Shannon Mahoney
Advisor: Michael Blakey
College of William & Mary,
Anthropology

After the Civil War, newly freed African American families settled an area that came to be known as Charles' Corner, Virginia. Most residents were able to purchase their land by the end of the nineteenth century due, in part, to their dedication to entrepreneurship, economic diversification, and social institutions. Ultimately, the families were forced to relocate in 1918 when a Presidential Proclamation commandeered the land for creation of the Yorktown Naval Weapons Station. Although the superstructures were demolished by the Navy, the secure environment and lack of development on the Weapons Station preserved the Charles' Corner homesteads as archaeological sites. Therefore, these sites encapsulate a finite amount of time (1862 – 1918) when socioeconomic networks provided stability during a precarious period of African American history. During this presentation, I will summarize the results of archaeological assessments conducted on the sites by Southeastern Archaeological Research, Inc. and discuss the significance of the results for both archaeologists and Charles' Corner descendants.

The Jewish Merchants of St. Eustatius: A Diasporic People's Contribution to the American War of Independence

Presenter: Derek Miller
Co-Author: R. Grant Gilmore
Advisor: Frederick Smith
College of William & Mary,
Anthropology

By the 1770's the small Caribbean island of St. Eustatius was the busiest port in the Atlantic World with over 3000 ships making berth in its harbor annually. Much of the economic success of St. Eustatius came from the American Revolution. St. Eustatius was one of the major sources for guns, gun powder, and other provisions necessary for the rebelling Thirteen colonies to sustain their fight against the British. This was a fact not ignored by the British who sent Admiral George Bridges Rodney to seize St. Eustatius in 1781 in hopes of cutting the supplies for the revolting colonists. At the time the British captured the island, there were over 80 Jewish families on the island. The majority of the male Jewish inhabitants on the island were involved in the trade throughout the Atlantic world most likely including the shipment of guns and gunpowder. The extent of this trade has only been briefly discussed before now and this paper will explore the mercantile connections between Jewish inhabitants on St. Eustatius with Jewish peoples in the thirteen colonies highlighting the role these Jewish individuals played during the American War of Independence.

So… What Am I Supposed To Do With This Big Pile of Cans?: Methodological Techniques for Coping with 19th and 20th Century Can Dumps

Presenter: Jennifer Ogborne
Advisor: Martin Gallivan
College of William & Mary,
Anthropology

The much maligned tin can is, for better or worse, the ubiquitous artifact for historical archaeologists working in the American West. Despised, ignored and sometimes shot full of holes, nothing seems more frustrating than coming across an enormous pile of rusted cans. Many of the frustrations in attempting to obtain useful data from cans are completely valid; due to their material and construction methods they can be difficult to date and it is almost impossible to determine what they once held. However, cataloging specific attributes of tin cans found on archaeological sites may yield useful data that can contribute to site analysis and foodways studies.

Sister Sojourners: Routing the Transnational Movement of African American Women

Presenter: Malinda Rhone
Advisor: Sabiyha Prince
American University,
Anthropology

African American women's transnational movements and experiences represent a departure from predominant characterizations of gendered migration and diaspora. In contrast to making a vertical movement from a "third world" nation to a "first world" nation, African American women's migration from one industrialized, predominately white space to another places them in a paradoxical position in which they may have access to certain privileges associated with first world citizenship yet continue to be devalued for being black and female despite geographic context. While few studies focus on Western European cities as an endpoint in an African American diasporic trajectory, this presentation is based on ethnographic data collected in London, England with current African American female residents. With a focus on how transnational mobility influences their identities as gendered diasporic subjects, I use interviews, social network analysis, and participant observation to explore how African American female transmigrants' negotiate the "politics of home and away" – defined as the relationship between ways of being, knowing, identifying and getting identified emerging from the "home space" to reconciling and/or (re)creating forms of being, knowing and identifying in a new "away" space. I treat the interviews as texts for critical discourse analysis. I found that African American women's transnational mobility offered a space from locally specific articulations of identity on both individual and group levels as they engaged with challenges of what it means to be a black woman, an American and what it means to be part of an African diasporic community.

"The Third Millenium": Shifting Notions of Sexuality and Identity in Ivory Coast

Presenter: Matthew Thomann
Advisor: William Leap
American University,
Anthropology

My research examines the emergence of a community of same-sex identified individuals in Ivory Coast and shifting notions of sexuality and identity in Ivoirian society. While drawing upon circulating global forms and notions of sexuality, these individuals also claim a form of citizenship and identity that is authentically Ivoirian. I examine the use of an authentically Ivoirian form of slang (le nouchi) as well as claims to gendered space, activity, and dress. Additionally, I will examine the connection between development capital surrounding HIV/AIDS prevention programs and shifting notions of sexuality and identity in Ivoirian society. My research questions are: 1) How do the same-sex identified individuals in Ivory Coast maintain an identity that is at once global and uniquely Ivoirian? 2) Through what channels are global ideas about sexuality and identity transmitted? 3) How are interactions with global forms shifting notions of sexuality and identity in Ivory Coast? As the initial data set, my research uses the language of same-sex identified Ivoirians in a documentary entitled Woubi Cheri. My data shows how notions of sexuality and identity are embedded in the flow of development capital surrounding international and domestic based NGOs. I argue that individuals use language, as well as claims to gendered space, activities and dress as markers of belonging to a community that exists outside Ivoirian mainstream society. Future research will include extensive ethnographic interviews with members of the community discussed, as well as mapping of same-sex space by participants in Abidjan, Ivory Coast.

Provisioning Williamsburg in the 18th Century: An In-Depth Look at Feeding a Colonial Capital

Presenter: Zachary Waske
Advisors: Marley Brown, Neil Norman
College of William & Mary,
Anthropology

Colonization of the New World by the English was a very tumultuous process. Many Americans are familiar with the trials and tribulations of Jamestown during its founding, but what happened after that? How did urban centers develop in a tobacco monoculture society? Jamestown never did flourish as a city or urban center yet provisioning urban settlements was vital to increasing the population within the colonies, allowing a vast and complex system of trade and sustainability. Urban centers are important for cultural, economic, and political development. This is possible because a large number of farmers in the surrounding countryside are willing and able to provide the urban center with food, fuel, and supplies so it can concentrate on other pressing matters within the colony and abroad. Williamsburg was established in 1699 as the new capital of Virginia, and many colonists and government officials flocked to the town, boosting its population. How were these people fed and supplied with firewood to cook and stay warm with during the 18th century? This project discusses the differences between tobacco and provisioning plantations, showing that some plantations were created after the founding of Williamsburg strictly for provisioning the town, while others switched to provisioning earlier than they would have due to the establishment of Williamsburg. Historical records and faunal data from local butchers and sites within Colonial Williamsburg will be used to identify changes in provisioning for Williamsburg. This is important in assessing how tobacco monoculture gave way to crop diversification changing Virginia society, and colonization as a whole.

Pottery on an Island with No Clay: Examining Bermuda's Colonoware

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

The interpretation of colonoware, a handmade earthenware with European stylistic elements, is a point of contention in archaeology. Some have suggested that the ceramic has Native American origins while others argue that it has roots in African pottery traditions (Noel Hume 1962; Ferguson 1999). More recently however, research has pointed towards colonoware production by both Native Americans and enslaved Africans (Singleton and Bograd 2000). A broader discussion of this pottery is needed. In my research I am going to examine the different archaeological contexts in which colonoware is found. During the summer of 2010, I will focus on Bermudian colonoware from domestic sites dated to the late 17th through early 19th century in order to gain an understanding of the context, use, and procurement of colonoware on Bermuda. The presence of colonoware on Bermuda is an interesting case since the island does not have a source of raw clay for local production. The ware was therefore imported, perhaps for use by enslaved Africans. By the late 17th century Bermuda's charter company had dissolved and the economy shifted from agriculture to the maritime trade. Enslaved Africans, as crew members of trading ships, had access to ports throughout the Caribbean and Eastern seaboard where colonoware may have been available. Access to markets raises many research questions: why is colonoware found on Bermuda? What is it being used for? Do use, consumption, and distribution patterns change over time? Analyzing and comparing Bermuda colonoware assemblages overtime through a comprehensive, detailed typology will facilitate a broader understanding of this ware.

Modeling the effects of genetic manipulations of calsequestrin on local calcium release and depletion in cardiac myocytes

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

Cardiac calsequestrin (CASQ2), a Ca buffer localized to the junctional SR (jSR) of cardiac myocytes, is known to bind to the RyR-triadin-junctin complex, participate in the luminal regulation of RyRs, and modulate Ca spark activity. To investigate the functional role of CASQ2 during spontaneous Ca sparks, we constructed a hybrid CTMC-ODE stochastic simulation of a Ca release site model composed of 100 Lee-Keener RyRs that includes Ca activation, Ca inactivation, CASQ2-RyR binding, and the dynamics of myoplasmic and luminal domain Ca and buffer concentrations. The model reproduces average properties of spontaneous sparks in normal myocytes including spark amplitude, blink nadir, and junctional SR recovery time. Parameter studies were performed to interpret the effects of known arrhythmogenic CASQ2 mutants on average spark properties. Increases in the total amount of CASQ2 resulted in increased spark amplitudes and increased jSR recovery times (observed in myocytes overexpressing wildtype CASQ2); shallower nadirs were observed in simulations but not experiment. Increasing the Kd of CASQ2 and Ca binding decreases spark amplitude and jSR recovery time (observed in myocytes expressing the dominant negative mutation CASQ2-DEL that suppresses CASQ2-Ca binding); in simulations (but not experiment) release-reuptake balance leads to increased network SR [Ca]. Increasing the Kd of CASQ2 and RyR binding is associated with decreased network SR [Ca], as in myocytes expressing CASQ2-R33Q, a variant with dominant negative effects on interactions of CASQ with RyRs. The implications of these results to mechanism of release regulation by CASQ2 will be discussed.

A method of detecting subsurface flaws in microelectronics using high-frequency contact ultrasound

Presenter: Eric Dieckman
Co-Authors: Mark Hinders, Jonathan Stevens
Advisor: Mark Hinders
College of William & Mary,
Applied Science

The goal of this work is to develop a prototype system for characterizing subsurface features in microelectronic components using direct-contact high-frequency pulse-echo ultrasound. Of particular interest are components which may have been recycled and thus contain delaminations from the desoldering operation. Chips need to be inspected quickly and nondestructively (in situ) with portable equipment that doesn't require extensive training to operate. Although ultrasound in the 100 MHz frequency range routinely images the relevant subsurface features in microelectronic components, scanning acoustic microscopes are not portable or inexpensive, and they require the component to be submerged in a bath of coupling water. Our alternative approach involves a custom-designed probe which uses direct contact with the component surface and does not employ water for coupling. Also, rather than high-precision computer controlled scanning to produce C-scan images, the A-line echo waveforms are processed in real time to map out the subsurface layers and interfaces and hence differences from nominal values that indicate the part is flawed or counterfeit.

Distinctly Different Switching Characteristics of Interface and Bulk Magnetization in Fe / AlGaAs(001) and Fe / MgO(001)

Presenter: Yichun Fan
Co-Authors: Haibin Zhao, Gunter Lüpke, Aubrey Hanbicki, Connie Li, Berry Jonker
Advisor: Gunter Lüpke
College of William & Mary,
Applied Science

The interface magnetic properties primarily affect performances of spintronics in spin tunneling efficiency, spin lifetime and spin dependent transportation. The Magnetization induced Second Harmonic Generation (MSHG) provides a direct optical way to study magnetism at interfaces of ferromagnetic-material/spin-tunneling-barrier. The interface magnetization switching processes of two interesting systems Fe/AlGaAs(001) and Fe/MgO(001) are investigated. The interface switching characteristics of Fe/AlGaAs(001) are distinctly different from the bulk Fe film due to magnetization curling in nano-islands located at the interface. We estimate the thickness of Fe interface to be a few atomic layers thick and the interface exchange stiffness to be three orders of magnitude less than the bulk. In Fe/MgO(001) interface, the cubic magnetic anisotropy is dominant, but the interface magnetization exhibits an exchange bias which is absent in the bulk. The implications of these findings for spintronic applications will be discussed.

Automated Reduction of Calcium Release Site Models via State Aggregation

Presenter: Yan Hao
Co-Authors: Peter Kemper, Gregory Smith
Advisor: Gregory Smith
College of William & Mary,
Applied Studies

Realistic simulations of local cardiac EC coupling control require Ca release unit (CaRU) models consist of Markov chain models of L-type Ca channels and ryanodine receptors (RyRs). Because compositionally defined CaRU models result in a combinatorial explosion of release site states, most whole cell simulations to date have utilized ad hoc CaRU models to maintain computational efficiency (e.g., modeling RyR clusters as a "megachannel"). To overcome this state-space explosion, we have implemented, validated, and benchmarked several methods for reduction of mechanistic CaRU models that feature an automated process of state aggregation and error evaluation. When time-scale separation exists in the single channel model (e.g., fast activation and slow inactivation), we perform numerical fast/slow reduction by categorizing rate constants as either fast or slow, aggregating states that are connected by fast transitions, and calculating transition rates between lumped states using the conditional probability distribution of states within each group. For large problems where the conditional distributions can not be directly calculated directly, iterative aggregation/disaggregation method is employed in a memory-efficient fashion. When time scale separation is absent, how states should be aggregated cannot be determined a priori. Consequently, we implemented a genetic algorithm that evolves potential schemes for state aggregation, ultimately yielding simplified CaRU models with low reduction error over a wide parameter range. We demonstrate that such automated CaRU reduction procedures can be used to accelerate multiscale models of local control of CICR in cardiac myocytes.

Impacts of underlying stratigraphy, inlet formation, and geomorphology on coastal sediment dynamics: Capers Inlet Quadrangle, SC (USA)

Presenter: Katherine Luciano
Co-Author: M. Scott Harris
Advisor: M. Scott Harris
College of Charleston,
Geology

Coastal areas are geologically dynamic, undergoing changes that result from an interplay between underlying and surficial geology and physical factors such as tides, waves, and wind. To protect both public and private interests, coastal policymakers need a thorough grasp of the natural processes and underlying factors responsible for influencing coastal geologic evolution. This study is funded by the U.S. Geological Survey (USGS) and focuses on gaining a better understanding of the geologic framework underlying the barrier islands, inlets, and shallow offshore marine areas in a region of coastal South Carolina. Sidescan sonar and chirp subbottom profiler acoustic surveys provide shallow surficial marine stratigraphy data for the area of interest. On the barrier islands in the study area, ground-penetrating radar (GPR), an instrument that uses radar pulses to image subsurface geology, was used for data collection. Data were processed and incorporated into maps illustrating sediment thickness, geomorphology, and surficial sediment distributions. The study addresses questions pertaining to sediment distribution, as well as long and short-term barrier island geologic evolution. Much of the study area has undergone significant population growth over the past several decades, and the people living there have a vested interest in understanding coastal geologic change. Maps resulting from the project will serve to incorporate geologic data into a visual format that is useful to geologists, policymakers, and members of the general public seeking to better understand the geomorphology and underlying geology of the area.

Inspection of Complex Steel Structures using Guided Waves for Structural Health Monitoring

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

We describe the use of ultrasonic guided waves for identifying material loss in welded steel plates and through-bulkhead pipes for use in structural health monitoring. The Dynamic Wavelet Fingerprint (DWFP) technique is used to render the guided wave mode information in two-dimensional binary images, allowing both arrival time and scale features from the original signal to be retained. These DWFPs are used to automate the interpretation of these complex multi-mode ultrasonic signals. We here compare mode arrival times extracted from parallel ray paths to determine the locations of flaws hidden beneath thick coatings. The guided wave modes propagate the full length of the samples and through the welds without significant distortion of wavelet fingerprints.

Conditions for a TP2-Completion

Presenter: Shahla Nasserasr
Co-Author: Charles Johnson
Advisor: Charles Johnson
College of William & Mary,
Applied Science

A partial matrix is a matrix in which some of the entries are specified and the remaining entries are unspecified. Such a matrix is called partial TP2 if all 1-by-1 and 2-by-2 fully specified minors are positive. If there exist values for the unspecified entries such that the result is TP2, then the matrix is called TP2-completable. For a given pattern of the specified entries, polynomial conditions on the data that are equivalent to the existence of a TP2-completion, are given. It is shown that TP2-completable patterns are those for which the completability conditions are simply equivalent to being partial TP2.

Evaluating Dbx1-derived neurons as the rhythmogenic kernel in mammalian respiration

Presenter: Maria Cristina Picardo
Co-Author: Christopher Del Negro
Advisor: Christopher Del Negro
College of William & Mary,
Applied Science

Understanding the neural mechanism that drives breathing requires the identification of the neurons involved in respiratory rhythm generation. A region of the ventral medulla oblongata dubbed the pre-Bötzinger Complex (preBötC) is essential for breathing in mammals. However, the rhythm-generating neurons that comprise the respiratory central pattern generator (CPG) in the preBötC remain the subject of speculation. Dbx1 is a homeodomain transcription factor that plays a role in neural development in the brainstem and spinal cord. A population of Dbx1-expressing neurons are present in the preBötC region and possess anatomical and physiological properties that suggest a crucial role in respiration. This study aims to evaluate the role of Dbx1-derived neurons as the core rhythm generators in mammalian respiration. The electrical properties of the Dbx1-derived neurons are consistent with electrophysiological recordings. The results obtained in this study advance our understanding of the neural origins of breathing.

Comparison of Graphene Formed via Mechanical Exfoliation and High Temperature Annealing of 4H-SiC

Presenter: William Roach
Co-Authors: D. Beringer, B. Wincheski, J. Skuza, C. Clavero, R. Ale Lukaszew
Advisor: R. Ale Lukaszew
College of William & Mary,
Applied Science

Interest in graphene, a single layer of carbon atoms arranged in a hexagonal lattice, has increased in recent years due to exciting characteristics such as its predicted very high mobility [1]. The simplest fabrication method, called the "Scotch tape method," uses adhesive tape to exfoliate layers of graphene from highly oriented pyrolitic graphite. While this method is excellent for studying the fundamental properties of the material, it is not plausible for existing electronic device fabrication methods. The most promising method for this application is high temperature annealing of 4H-SiC such that Si desorption occurs [2], although this method leads to graphene that exhibits lower mobility than predicted [3]. Raman spectroscopy can be used to determine the number of graphene layers present. Atomic force microscopy is further used to characterize the surface morphology, specifically the roughness, of the samples and can also be used to assess how many graphene layers are present. We investigate a variety of growth conditions (i.e. temperature, annealing time, and pressure) to determine how these conditions affect the resulting sample surface. Knowledge gained from this exploration will be used in the future to correlate surface roughness to mobility in an effort to determine what causes the decreased mobility in methods prepared using the SiC method.

[1] Novoselov *et al.*, Science **306**, 666 (2004).
[2] C. Berger *et al.*, J. Phys. Chem. B **108**, 19912 (2004).
[3] G. Gu *et al.*, Appl. Phys. Lett. **90**, 253507 (2007).

Computational modeling of Hsp90 as a therapeutic target to inhibit immune-mediated inflammation in systemic lupus erythematosus

Presenter: Samuel Shimp, III
Co-Authors: M. Nichole Rylander, Christopher Reilly
Advisors: M. Nichole Rylander, Christopher Reilly
Virginia Tech,
Biomedical Engineering

Systemic lupus erythematosus (SLE) is a chronic inflammatory autoimmune disorder that can affect nearly every organ in the body. Mesangial cells from lupus mice are hyper-responsive to immune stimulation and overproduce inflammatory mediators including IL-6, IL-12, and nitric oxide (NO). Recent studies have shown inflammation can be diminished by inhibiting the immune activated phosphatidylinositol 3-kinase (PI3K), Akt, and mTOR (PI3K/Akt/mTOR) pathway. Heat Shock Protein 90 (Hsp90) is known to chaperone numerous signaling client proteins including PI3K and Akt leading to their activation and subsequent downstream production of inflammatory mediators. Geldanamycin (Geld) and epigallocatechin-3-gallate (EGCG) inhibit Hsp90 function by binding to the carboxyl (C-) or amino (N-) terminal domain resulting in deactivation, destabilization and degradation of Hsp90 for decreased inflammation. Our long-term goal is to elucidate and mathematically model the cellular and molecular mechanisms by which Hsp90 modulates the PI3K/Akt/mTOR pathway in SLE. Lupus mouse mesangial cells were cultured and treated with various concentrations of Geld or EGCG followed by immune stimulation (LPS/IFN-γ) for 12, 18, and 24 hours. Cell cytokine analysis showed a concentration dependent effect of Hsp90 inhibitors on immune stimulated NO, IL-6, and IL-12 production. Based on the measured data an empirical model for predicting the extracellular cytokine concentration following treatment with EGCG or Geld was formulated. The empirical model suggests that inhibition of the N-terminus of Hsp90 may be a therapeutic target to decrease immune mediated inflammation.

Epidemic spread in adaptive networks with community structure

Presenter: Ilker Tunc
Advisor: Leah Shaw
College of William & Mary,
Applied Science

In the simplest epidemic models, it is assumed that an infected person can infect anyone in a population, but for most diseases infection is transmitted between neighbors in a network of social connections. Nodes in the network represent individuals, and links represent relations with other members of the population. An adaptive network is one in which the network structure changes in response to the states of its nodes. Social networks for epidemic spread are expected to be adaptive because susceptible individuals tend to reduce their connections with infected individuals to protect themselves from disease. Social adaptation has been shown to qualitatively change the dynamics in previous models for epidemic spread. Human social networks have an underlying community structure, in which groups of nodes are more densely connected within their community than to nodes outside their community, and this community structure has not been included in previous adaptive network models. We study the effects of community structure in epidemic dynamics on an adaptive social network. We show that epidemic spread can alter the community structure of the network.

A 'seek-and-destroy' approach to discover the neural basis for rhythmic behavior in the mammalian respiratory network *in vitro*

Presenter: Xueying Wang
Co-Authors: Christopher Del Negro, John Hayes, Maria Cristina Picardo
Advisor: Christopher Del Negro
College of William & Mary,
Applied Science

Lesion is a powerful tool for studying cell function by eliminating particular cells from a neural circuit, and assessing the subsequent effects on behavioral abnormalities or network functions. We developed an automated system for detecting rhythmically active neurons within an *in vitro* slice preparation and individually laser-ablating these neurons based on Ca^{2+}-activated fluorescence changes or the genetic expression of fluorescent protein markers. The system relies on a laser-scanning confocal microscopy for imaging and laser control, while a pulsed long-wavelength laser is used for localized spot ablation of single neurons. The critical feature of this system is custom Python software that autonomously controls stage movement, focuses the multi-photon laser, identifies cell targets, and implements the lesion protocol. We applied this method to examine the role of respiratory neuron classes located in the preBötzinger Complex (preBötC) in the ventral medulla, which spontaneously generates inspiratory motor rhythm in thin slice preparations from neonatal mice *in vitro*. We have ablated several hundreds of respiratory-related neurons one at a time, sequentially, and observed that the inspiratory motor output of the XII cranial nerve discharge is significantly diminished. This technique enables us to test the role of specific neuron types, as well as to estimate the required size of a given population that produces a fictive behavior *in vitro*. Therefore our lesion system will be broadly applicable to discover a network behavior like rhythm generation *in vitro*, such as locomotor pattern generators in the spinal cord or masticatory (oral-motor) networks of the hindbrain.

Surface plasmon resonance enhancement of magneto-optical activity in Au-Co nanocomposite thin films

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

Appropriate design of a metallic nanocomposite thin film allows modification of the surface plasmon excitation. This phenomenon occurs when the optical extinction is resonantly enhanced at the interface between a metal and a dielectric material. Slight changes in the dielectric constant at this interface can drastically influence the phenomenon. Thus, Surface Plasmon Resonance (SPR) based sensing techniques have been successfully implemented in biosensors. A limitation for enhanced sensitivity arises because all SPR sensing methods commercially available are "passive", i.e. they are based on changes in the optical constants. A potential improvement would be an "active" plasmonic system, i.e. a system where some optical property can vary under the effect of an externally applied field. Such possibility would enable more sensitive modulated detection schemes. Our research team has been able to demonstrate the use of magnetic fields to influence the propagation of surface plasmon polaritons (SPP) when mixing magnetic materials with adequate plasmonic materials. I will present our results on noble-metal/ferromagnetic-metal nanocomposite Au-Co thin films that were co-deposited using DC magnetron sputtering on glass substrates at different temperatures. We also controlled the Co concentration ranging from 5% to 60% to explore optimal magneto-optical (MO) enhancement. Our studies led to different nanocomposite AuCo microstructure and this was correlated to the MO signal enhancement. Our results offer promising new venues for highly sensitive biosensing.

Lensing effect in strongly pumped Ti:Sapphire Ultrafast laser Amplifier

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

Ti:Sapphire ultrafast laser amplifier can largely increase the pulse energy and average power of the ultrafast laser pulses. In the developing of Ti:Sapphire amplifier, one major problem is the lensing effect, which focuses the ultrafast seed beam. Lensing effects are of serious especially in strong pump condition. It restricts amplification rate and may even damage the crystal. We systematically studied the lensing effects in strong pump condition (pump power is in the scale of 100 million Watts). We found that the lensing effects are composed of three parts: steady state thermal lensing, transient thermal lensing and population lensing. Finite element analyze method (COMSOL) was used to carried out steady state and transient thermal lensing calculation. The calculated results accord with experimental results. Population lensing (PL) is caused by the polarizability of exited electrons. It is hard to measure in the past because of its very fast transient nature. A new technique called PLPP is developed to trace the time resolved PL by our group. In our method, resolution of nano second is achieved. Our measurement proved the life time of PL is 2.3 micron second, which accords with the life time of 2Eg excited state of Ti^{3+} ion. Experimental result shows the PL contributes about 40% of total lensing effect under our high pump condition. The study in PL not only completes the research in lensing effect but also opens the research in the anisotropy of excited electrons. We found a strong refractive index difference for S and P polarized photon in excited electron state. The mechanism is under study.

Mercury's Effect on Spatial Memory in the Zebra Finch, Poephila guttata

Presenter: Amanda Bessler
Co-Authors: Daniel Cristol, John Swaddle
Advisors: Daniel Cristol, John Swaddle
College of William & Mary,
Biology

Recent research on mercury contamination has focused on determining the extent of damage to organisms, particularly birds, in mercury-contaminated food webs. Though studies have documented high mercury blood levels, differences in song, and decreased reproductive success in terrestrial songbirds, no one has yet examined the potential impacts to spatial memory (Cristol *et al.* 2008; Brasso and Cristol 2008; Hallinger *et al.* 2009). Spatial memory is important for locating nests, food, territory boundaries and migration routes, and is thus important for survival and fitness. Given that other research has documented effects of methylmercury on spatial memory, it may affect birds as well (Dore *et al.* 2001; Gao *et al.* 2008; Liu *et al.* 2009). I will compare the spatial memory of methylmercury-dosed zebra finches to control zebra finches. The subjects' spatial memory will be quantified as the number of mistakes made in relocating food and the acquisition time necessary to learn the task. Using a mercury dose equivalent to that at a well-studied contaminated site (0.4 ppm), this experiment will determine if mercury contaminated areas have the potential to damage a necessary cognitive function in terrestrial songbirds, spatial memory. My results will contribute to the applied question of how much environmental mercury can be tolerated by birds, as well as the basic question of what specific effects this potent neurotoxin has on bird cognition.

Genetic Differences of the Bovine and Piscine Pathogen *Streptococcus parauberis*: A Molecular Epidemiology Approach

Presenter: Stephen Cole
Co-Authors: Jennifer Quigley, Ashley Haines
Advisor: Ashley Haines
College of William & Mary,
Biology

Streptococcus parauberis is a bacterial pathogen that causes two costly diseases: mastitis in dairy cattle and streptococcosis in aquacultured fish. This project aims to elucidate some aspects of the molecular epidemiology of this bacterium using strains isolated from these two hosts. Previous research has shown that certain *S. parauberis* strains isolated from cattle are non-pathogenic in fish. Similarly, our lab has isolated strains that infect fish but show no obvious pathology. In contrast, other strains of *S. parauberis* have caused costly mortalities in cultured flatfish like flounder and turbot. Our goal is to understand the determinants of disease amongst these strains, as well as their phylogenetic relationships. To do this we will use several genetic approaches. Genomic subtractive hybridization will provide us with genomic sequences that are unique to each strain. These may identify putative host specificity or virulence factors. Multilocus sequence typing (MLST), using both housekeeping genes and virulence factors, will be performed to generate a phylogeny of the strains, providing insight into their recent evolution. Lastly, phylogenetic relationships will also be analyzed using pulsed-field gel electrophoresis (PFGE) to generate "genetic fingerprints" of the strains from bovine and fish hosts. The application of these data lies specifically in the area of vaccine design. Phylogenic data may also help us understand why *Streptococcus parauberis* appears to be emerging as a pathogen in new parts of the world.

Searching for the seed plant ethylene pathway in a basal plant lineage: a genomic approach

Presenter: Ashley DeCarme
Co-Author: Eric Engstrom
Advisor: Eric Engstrom
College of William & Mary,
Biology

The plant hormone ethylene is required for a wide range of developmental processes and stress responses. Ethylene biosynthesis in seed plants depends on the coordinated activities of two enzymes. ACC Synthase generates ACC (1-aminocyclopropane-1-carboxylic acid), production of which is thought to be the rate-limiting step in synthesizing ethylene. ACC Oxidase (ACO), a member of the 2-oxoacid-dependent dioxygenase (2-ODD) superfamily, converts ACC into ethylene. Two previous studies failed to see increased ethylene production in basal plants when fed exogenous ACC (as is typically observed in seed plants), suggesting that basal plants do not employ ACO in ethylene production. The genome of the lycophyte *Selaginella moellendorffii*, a basal plant, has revealed sequences with significant homology to seed plant ACOs. We have identified and annotated 137 putative 2-ODDs in *S. moellendorffii* and subjected them to phylogenetic analysis. Preliminary analyses indicate that *S. moellendorffii* does not possess ACO orthologs. *Arabidopsis thaliana*, a representative seed plant, has five ACO genes. Using each corresponding loss-of-function mutant, we are developing a trans-species complementation assay to determine if putative *S. moellendorffii* 2-ODD genes possess ACO function. As related work is completed in other basal lineages, it should be possible to identify the evolutionary point(s) of origin of the ACO enzyme and the ethylene biosynthesis pathway(s) in plants. More than 420 million years of divergence between the lycophyte and seed plant lineages has almost certainly led to physiological differences that could potentially be exploited by crop scientists.

Getting the SUMO protease Ulp1 on target

Presenter: Zachary Elmore
Co-Author: Oliver Kerscher
Advisor: Oliver Kerscher
College of William & Mary,
Biology

Post-translational modification by the small ubiquitin-like modifier (SUMO) is an important mechanism to alter the function, location, or activity of target proteins. The modification of target proteins by SUMO (sumoylation) is a dynamic process that is mediated by SUMO ligases and proteases. In the yeast Saccharomyces cerevisiae, the ubiquitin-like protease Ulp1 is responsible for removing SUMO from target proteins and for processing precursor SUMO into its conjugatable form. Yeast cells lacking Ulp1 are not viable and arrest at the G2/M stage of the cell cycle. While the crystal structure of the catalytic domain of Ulp1 bound to SUMO has been characterized, it is not well understood which domains of Ulp1 target Ulp1 to sumoylated proteins. Many proteins, and potentially also the SUMO protease Ulp1, interact non-covalently with SUMO modified proteins through the use of hydrophobic SUMO interacting motifs (SIMs). The goal of this research is to determine if Ulp1 contains SIMs to target its substrates. To identify possible SIMs in individual domains of Ulp1, we tested the ability of individual Ulp1 truncations to colocalize with highly sumoylated septins. Ulp1 domains that localize to septins in this novel targeting assay will allow us to confirm the presence of putative SIMs in Ulp1. Finally, understanding the molecular recognition mechanism between SUMO and Ulp1 will allow us to identify important cell cycle mediators that rely on sumoylation for their function.

Development of molecular recognition elements for nitroamine explosives through capillary electrophoresis

Presenter: Anthony Giovengo
Co-Author: Letha Sooter
Advisor: Letha Sooter
West Virginia University,
Biology

In vitro selection (SELEX) is a reliable process for molecular recognition element (MRE) development. MRE's are small molecules, typically nucleic acid or peptide based, that bond with high specificity to their target. SELEX is a cyclical process of partitioning and amplification. Traditional SELEX methods require chemical modification of the target in order to perform the partitioning. Utilizing capillary electrophoresis (CE), SELEX is performed against unmodified targets. This offers higher selectivity and affinity to the resulting MRE's. As the MRE-target interaction is heavily dependent on surface chemistry, any changes of this nature will decrease the fidelity of the results. Capillary electrophoresis performs separations through the use of a large electrical gradient and solution flow. The gradient causes a buffer solution to travel through the capillary, pulling along the target molecules. The charge and size of these molecules affect the rate at which they travel, providing the means of separation. The capillary electrophoresis instrument was built from commercially available components including a high voltage power supply, UV/VIS detector and desktop computer. After assembly, the CE passed control tests with benzoic acid derivatives. The targets of interest for these selections are HMX and RDX.Nitroamine explosives are highly relevant targets in today's world. Due to their high molecular weight and multiple amine groups, they are some of the most potent explosive chemicals manufactured. These explosives are widely used in military fields. MRE's against these targets can be integrated into sensitive, portable detectors that can greatly enhance global security.

Food Particle Selectivity in Gizzard Shad

Presenter: Matt Heidman
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Suspension-feeding detritivorous fish feed on detritus particles that are found in the water column or at the sediment-water interface. They are an important link between dead and decaying matter and higher organisms in the trophic structure of many environmental systems. Detritus is, however, much lower in nutrient content compared to other food sources. Previous researchers have suggested that suspension-feeding fish such as gizzard shad (*Dorosoma cepedianum*, Clupeidae) can selectively choose particles in the water column that are more nutrient rich (i.e., higher in carbon and nitrogen). Selectivity can be quantified by comparing the nutrient composition of the food source vs. the food in the fish's foregut. However, this approach does not address two questions: how much nutrient content in the foregut is attributable to mucus from the interior of the mouth that has been swallowed by the fish, and whether or not the selectivity is behavioral or somehow mechanical within the fish's mouth. Lammons (W&M Biology Master's thesis, August 2009) reported that mucus constituted 30% to 60% of gizzard shad foregut contents by dry mass. The purposes of my study are to (1) test Lammons' conclusion using a modified experimental protocol, and (2) conduct selectivity experiments using a controlled environment with a homogeneous mixture of "low-quality" and "high-quality" food sources to eliminate behavioral selectivity. These studies will aid in understanding whether gizzard shad use a mechanical method to selectively ingest high-quality food.

Non-invasive field survey methods for tropical carnivores: applications for conservation

Presenter: Anne-Marie Hodge
Co-Authors: E. N. Vanderhoff, B. Arbogast, T. Knowles, J. Camper, R. Burger
Advisor: Brian Arbogast
University of North Carolina-Wilmington, Biology

Carnivore populations across the globe are experiencing critical declines and numerous challenges as human impact increases in range and intensity. It is essential to collect natural history information in order to implement effective conservation programs. The elusive nature of mammalian predators, however, makes them extremely difficult to study. Traditional methods such as trapping and darting were not only labor intensive but highly invasive, potentially altering the very behavior they were intended to observe. New attention is currently being given to the development of noninvasive methods for surveying carnivores, resulting in significant innovations in study design and methodology. These techniques can provide both behavioral and molecular data, which can be used for analysis of a variety of ecological and physiological traits that would otherwise be impossible to document. Despite the plethora of innovative data collection methods and study design strategies that have been developed in recent years, there is still a lack of data on the comparative effectiveness of these methods in different habitats or in unique ecological communities. Here we review the benefits and challenges involved in a series of non-invasive survey methods for carnivores, and describe a case study in which guild interactions within a mammalian carnivore assemblage in eastern Ecuador are being studied using non-invasive methods.

Assessing the Functional Status of Created Wetlands in Eastern Virginia via a Soil and Vegetative Developmental Trajectory

Presenter: Sara Kreisel
Advisors: Randy Chambers, James Perry
College of William & Mary, Biology

Creation of wetlands has been used since the 1980s as a tool for the environmental mitigation of natural wetlands lost to development. Although current wetland policy attempts to compensate for lost wetland acreage, replacement of function may lag considerably. To measure this suspected lag we evaluated the plant community and soil composition of nine created palustrine forested wetlands in Virginia relative to natural wetland standards. A previous study in 2003 indicated that the vegetation and soil composition was far from that observed in natural wetlands. This study re-sampled these wetlands in 2008 to determine whether the functional gap between created and natural wetlands has changed with age. Plant communities were analyzed for the presence of hydrophytic vegetation (weighted average) and species richness. Our results showed that all sites had >50% plots dominated by hydrophytic vegetation and most exhibited positive successional changes represented by more woody species. Soil cores were obtained from around the vegetative plots and analyzed for physical, chemical, and morphological properties. Data showed that soil organic matter nearly doubled (to 4.41%). All analyzed extractable nutrients (C, N, Fe, P) increased significantly (to 1.68%, 0.17%, 0.75%, 159 mg/kg respectively), while C:N decreased (to <14:1). Bulk density decreased significantly in most of the sites. Three sites saw chroma changes towards becoming more oxidized, four more reduced, and two saw no overall change. Results of this study could be used to validate the untested assumption that created palustrine forested wetlands may attain the functional equivalency of wetlands lost to development.

The Effects of Methylmercury on Reproductive Success and Adrenocortical Function: A Captive Dosing Study on Zebra Finch

Presenter: Sarah Lemelin
Advisors: Dan Cristol, John Swaddle
College of William & Mary,
Biology

Mercury is a ubiquitous environmental contaminant associated with a host of behavioral, physiological, and reproductive effects in wild birds. However, little is known about the effects of mercury bioaccumulation in insectivorous songbirds. Reduced hatching success has been strongly correlated with elevated egg mercury levels and exposure is associated with reduced reproductive output in a growing number of passerines. Through the first sublethal dosing study performed on a passerine, I will determine the effects of maternally deposited methylmercury on hatchability and ultimate reproductive success and investigate effects of exposure on adrenocortical function. Goals of the proposed research include the determination of intra-clutch variation in maternally deposited methylmercury, the relationship between maternal blood mercury levels and egg mercury concentrations, hatchability of eggs produced by females of different mercury treatment groups, and ultimate reproductive success of each control and dosed pair. Additionally, measurement of baseline corticosterone levels in breeding females, corticosterone deposited into eggs, and the effects of mercury exposure on nestling adrenocortical response will provide insight into endocrine disruption and subsequent reproductive impairment. Data obtained will provide a foundation upon which threats posed by current environmental methylmercury levels can be assessed. Results will be used to determine the risk of mercury bioaccumulation in wild songbirds and to establish a threshold level for reproductive impairment. Such insight into the effects of sublethal methylmercury exposure will be widely applicable as global mercury contamination worsens and passerine populations continue to experience precipitous declines in North America and around the world.

Does mercury have sublethal effects on the zebra finch immune system?

Presenter: Catherine Lewis
Co-Authors: John Swaddle, Daniel Cristol, Patty Zwollo
Advisors: John Swaddle, Daniel Cristol
College of William & Mary,
Biology

Mercury is a ubiquitous contaminant that has well-documented effects in many wildlife populations. Studies have predominantly focused on fish and fish-eating birds with the assumption that these organisms have the highest levels of mercury consumption. However, newer studies have found comparable blood-mercury levels in insectivorous songbirds. As a result, research is now being performed to elucidate the effects of mercury on songbirds. One fundamental endpoint that is still poorly understood is the effect of sublethal levels of mercury on the songbird immune response. This is important to determine because if mercury affects the functioning of the immune system, an exposed organism will be unable to mount an appropriate immune response against invading pathogens. This study will be the first experimental study that tests immune function in songbirds in response to sublethal levels of mercury. Two tests will be conducted including 1) a monocyte phagocytosis assay to study innate immune response and 2) a B-cell proliferation assay to study antibody response. It is important to better understand whether mercury levels representative of those found in the wild have an effect on the immune system, so that it is possible to better educate environmental agencies, polluters, and the general public about the dangers of mercury contamination. A more detailed, mechanistic understanding of how mercury affects immune function will contribute to policy and legislation designed to protect both wildlife and humans against mercury threats.

Rusty Blackbird Winter Foraging Ecology in the Coastal Plain of Virginia

Presenter: Andrew McGann
Advisor: Daniel Cristol
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. Yet the reasons for the decline remain unknown. The Rusty Blackbird is an omnivorous, wetland-dependent and migratory species that breeds across the boreal forest of Canada and Alaska and winters exclusively in the southeastern United States. Rusty Blackbirds exhibit sexual size dimorphism (SSD), with males averaging about 15% larger than females by mass. Many other avian species with SSD also exhibit different foraging ecologies by sex, ostensibly as a means to reduce competition between sexes. I will investigate the foraging ecology of Rusty Blackbirds wintering in the Williamsburg area by capturing individuals, taking blood samples, and analyzing whole blood for carbon, nitrogen, and sulfur stable isotope signatures. The following three questions will be pursued: (1) Do male and females eat different diets? (2) What are the relative contributions of each of the following main food items: acorns, animal prey, and corn? (3) Does body condition (a ratio of weight to size) correlate with specific isotope signatures indicative of heavier consumption of a particular food type? Stable isotope analyses are a powerful technique for quantifying diet. The results of this study will contribute to the slim body of knowledge of Rusty Blackbird winter foraging ecology. These results will help managers and conservationists facilitate the recovery of the Rusty Blackbird population.

Do land cover patterns predict occurrence and reproductive success of eastern bluebirds living on golf courses?

Presenter: Marie Pitts
Co-Authors: John Swaddle, Kerri Duerr, Allyson Jackson
Advisor: John Swaddle
College of William & Mary,
Biology

Natural landscapes worldwide are being converted into areas for human use. The change in land cover type and fragmentation, as well as the associated noise, traffic, and chemical application associated with human-altered landscapes may potentially harm wildlife. One increasingly common human-altered landscape is the golf course, which varies widely in design and chemical use. There is controversy over whether golf courses are beneficial or harmful to native bird communities. Many previous studies have focused only on bird abundance and diversity on golf courses, but it is also necessary to consider reproductive rates when evaluating the effect of a habitat on a population. I am investigating whether patterns of land cover and chemical use explain variation in the presence and reproductive success of eastern bluebirds (*Sialia sialis*) living on nine southeast Virginia golf courses. Using GIS and areal images, I will map out land cover and golf course pesticide intensity. I will test for correlations between proportions of land cover type, level of fragmentation, and pesticide intensity with reproductive parameters such as lay date, clutch size, and percent of fledged young. These data will be analyzed at multiple spatial scales in order to determine which features at which scales are most influential in determining reproductive success. The results will provide golf course managers with guidelines for designing and managing golf courses in a way that optimizes bluebird success, and add to our general understanding of how human activity is impacting wildlife.

Genetic regulation of acetone metabolism in *Helicobacter pylori*

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

Helicobacter pylori is a gram negative helical bacterial pathogen that exclusively colonizes the gastric epithelium. The ensuing chronic inflammation leads to gastritis in most humans who are infected, promotes development of peptic ulcers in ~10% of those infected, and is a significant risk factor for gastric cancers such as adenocarcinoma. In addition to being an important human pathogen, *H. pylori* is also an ideal system for basic study of bacterial gene regulation. This species controls expression of a wide array of target genes using only three two-component signal transduction (TCST) systems. (In contrast, *B. subtilis* and *E. coli* each use more than 40 separate TCST pathways to regulate a similar number of genes.) Evidence of co-regulation of certain genes by more than one of these pathways suggests that *H. pylori* compensates for this apparent deficiency in regulatory ability through a complex network of cross-regulation interactions. My work will focus on *acxABC*, the acetone carboxylase operon, which may be affected by all three of these signal transduction pathways. This extensive regulation of acetone metabolism suggests that this capability is important for *H. pylori's* ability to infect and survive in the gastric mucosa, and may reveal promising targets for drug development. I aim to map the *acxABC* promoter, to identify and characterize the activity of transcription factors that regulate this operon, to establish how environmental acetone concentrations affect acetone carboxylase production, and to investigate the putative cross-regulation of *acxABC* by *H. pylori's* three TCST systems.

Functions of Arabidopsis Kinesin-5 Motor Proteins

Presenter: Bareza Rasoul
Advisor: Alex Bannigan
James Madison University,
Biology

There are various kinesin motor proteins involved in structuring the microtubule cytoskeleton during interphase and the mitotic cell cycle. The plant Arabidopsis thaliana has the largest number of kinesins amongst all the sequenced organisms. Some of those kinesins have not been studied. The Kinesins -5 family members cross link microtubules and are crucial for separation of mitotic spindle poles. There are 4 members of this family in Arabidopsis but only one has been studied. Animals have one Kinesin-5 member, which has been well studied and used as a reference for other kinesin-5 proteins. There is evidence that some functions are conserved between species; however the multiple family members in Arabidopsis suggests that kinesin-5 motors play some roles in plants that are unknown in animals. With further study of these motor proteins in plants, more can be elucidated about the plant's still enigmatic mitotic cycle. We have identified t-DNA insertion lines from 3 members in the Kinesin-5 family of Arabidopsis. A published study of a temperature sensitive mutant of one Arabidopsis Kinesin-5 member shows collapsing spindles. In our lab, preliminary examinations of one other member t-DNA mutant indicate a defect in cytokinesis in the root. The other members do not show obvious defects in the root microtubule structure or cell structure. This points to a redundancy in function. Further detailed examination of mitotic stages of the Kinesins-5 t-DNA insertion mutants could identify a divergence and a role for these kinesins in the plant cell division or during interphase.

Distribution and abundance of non-native red-eared slider turtles (*Trachemys scripta elegans*) and native red-bellied turtles (*Pseudemys rubriventris*) in relation to wetland characteristics in southeastern Pennsylvania, USA.

Presenter: Julia Stone
Co-Authors: James Spotila, Walter Bien, Harold Avery
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Habitat destruction and introduction of non-native species are among the greatest threats to the Earth's biodiversity. The threatened red-bellied turtle, *Pseudemys rubriventris*, historically prevalent throughout the Mid-Atlantic region, is now restricted to a few fragmented wetlands. In addition to destruction of wetland habitat, introduction of the non-native red-eared slider turtle, *Trachemys scripta*, may play an important role in the decline of red-bellied turtle populations. Because the niches occupied by these two turtle species overlap, the invasion of red-eared slider turtles represent a threat to the red-bellied turtle as a competitor for limited wetland resources. In 2005 and 2006 we assessed 52 wetlands throughout Southeastern Pennsylvania for the occurrence of red-eared slider turtles in historic red-bellied turtle habitat. *T. scripta* occurred at 25 of the 52 wetlands (48%). Thus, *T. scripta* are pervasive within the geographic range of *P. rubrientris* in Southeastern Pennsylvania. From 2007 to 2009, we used mark-recapture to determine relative abundances of the two species in different wetlands. GIS -based landscape data will be used to determine relationships between habitat degradation and human presence to relative abundances of both turtle species. Landscape characteristics correlated with presence of each species include: basin, township, size and type of wetland. Watershed correlates with presence of *P. rubriventris*. Presence of industrial development (buildings) and presence of dams correlate with presence of *T. scripta*. Our data will provide wildlife and habitat management agencies important information on the relationship between invasive *T. scripta*, the state threatened *P. rubriventris* and wetland characteristics.

Nuclear Export of Thyroid Hormone Receptor α and β

Presenter: Kelly Subramanian
Co-Author: Lizabeth Allison
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College of William & Mary,
Biology

Thyroid hormone regulates genes responsible for metabolism, growth, and development. Thyroid hormone receptors (TRs) bind thyroid hormone and activate or repress gene transcription. Two genes, THRA and THRB, encode the TR isoforms α and β. Primarily found in the nucleus, TRs have been found to shuttle between the nucleus and cytoplasm. Various exportins and charperones have been implicated in nuclear export of these receptors. Recently, TRα has been shown to use a cooperative CRM1/calreticulin-mediated export pathway but can also use other CRM1-independent pathways. These receptors are important in maintaining normal cells, so any disruption in the shuttling pathway may be a cause for disease. Receptor mutations can cause resistance to thyroid hormone syndrome and various cancers such as thyroid or kidney cancer. The mechanism of TR nucleocytoplasmic shuttling remains to be elucidated. It is hypothesized that nuclear export pathways other than the known CRM1/calreticulin pathway are used for TR export. To test this hypothesis, a combined approach of monokaryon and heterokaryon assays and RNA interference (RNAi) will be used. Human or mouse cells will be transiently transfected with fluorescent protein-tagged TR, and short-hairpin RNA will be used to knock-down particular exportin gene expression to determine what exportins are essential. Visualization of cells by confocal or fluorescence microscopy will show any change in subcellular compartmentalization of receptors. Changes in TR distributions will also be visualized using fluorescence recovery after photobleaching (FRAP). This research will help to expand the knowledge of the nuclear export shuttling pathway for TR α and β.

Identifying Sumoylated Targets Destined for Destruction

Presenter: Jason Westerbeck
Co-Author: Oliver Kerscher
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College of William & Mary,
Biology

The budding yeast proteins Slx5 and Slx8 comprise the two subunits of a SUMO-targeted Ubiquitin Ligase (STUbL). In vitro the Slx5/ Slx8 STUbL complex targets sumoylated proteins to modify them with ubiquitin. Slx5 is the targeting subunit of the Slx5/ Slx8 complex while Slx8 performs the ubiquitin ligase function. Slx5 forms distinct foci in the nuclei of live yeast cells and interacts with double stranded DNA breaks. These foci are dependent upon the presence of SUMO, the ability of the cells to synthesize poly-SUMO chains, and the presence of SUMO-interacting motifs (SIMs) within the Slx5 protein. These findings suggest that Slx5 may bind directly to chromatin by interacting with sumoylated target proteins at sites of DNA repair. However, the precise functional interactions of Slx5 in the nuclei of living cells are not known. The goal of this research is to better characterize STUbL activity through a structure function assay of individual Slx5 domains. Here we present our analysis of the subnuclear localization of Slx5, how it interacts with its binding partner and substrates, as well as a potential role or substrates of Slx5 in the cytosol of yeast cells. Our research has the potential to further our understanding of the human STUbL RNF4 which has been implicated in the SUMO dependent turnover of oncogenic fusion protein PML-RAR.

Manipulating the paternity threat: Is mate guarding behavior flexible in the Australian zebra finch?

Presenter: Leah Wilson
Co-Author: John Swaddle
Advisor: John Swaddle
College of William & Mary,
Biology

Mate guarding likely limits opportunities for extra-pair copulations (EPCs), thereby influencing individual fitness and mating strategies. Implicit within the functional explanations for mate guarding, there is a tradeoff between protecting within-pair paternity and pursuing EPCs. It is therefore generally predicted that the intensity of mate guarding behavior will increase as the threat to within-pair paternity increases and decreases as the opportunity for EPCs increases. This prediction lays at the foundation of most examinations of mate guarding, but it has not been explicitly tested experimentally. We examined the flexibility of mate guarding behavior in captive breeding pairs of Australian zebra finch (*Taeniopygia guttata*) by manipulating the perceived opportunity for EPCs within an experimental arena. Quantifying the changes in mate guarding behavior allows for the 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 undesirable EPCs and attaining desirable EPCs. Exploring the flexibility and optimization of mate guarding behavior will allow for a better understanding of the ecological factors that structure and limit promiscuous behavior.

Processing and Conversion of Algae to Bioethanol

Presenter: Sara Kampfe
Advisor: Deborah Bebout
College of William & Mary, Chemistry

The biofuel potential of algae has been gaining national and international attention in the last two to three years. Fundamental issues are currently the subject of much debate. Issues related to the preferred algae strains and optimal growth environments are taking top priority, but little literature exists on the comparison of various types. In this work, algae were taken from two environments: wild algae from the Algal Turf Scrubber® operating on the campus of the Virginia Institute of Marine Science and the blue-green algae *Spirulina*, grown in controlled conditions and typically sold as a nutritional supplement. These algae were chosen due to their purported high carbohydrate contents, which are ideal for possible conversion to bioethanol. Each type of algae was evaluated for use as a feedstock to produce bioethanol using processing parameters typical of the fuel ethanol industry. Algae was also processed and evaluated after using several methods of cell disruption to affect exposure of the maximum amount of carbohydrates. Measured carbohydrates included maltotetraose, maltotriose, maltose, glucose, and fructose. Preliminary results show that the wild algae contain a significantly larger amount of carbohydrates, with some instances showing an increase of ten times the level found in *Spirulina*. Batch fermentations of wild algae also demonstrated higher bioethanol concentrations over *Spirulina*. Since the fermentation trials indicate the biofuel potential of algae is strongly dependent on both the type of algae and growth environment, a wide range of algae should be assessed prior to initiating large scale production.

Potential Energy Surface of Urea

Presenter: Xiaojian Mao
Advisor: Charles Jaffe
West Virginia University, Chemistry

Urea is a simple but interesting floppy molecule. In the solid state it is known to be planar while in gas phase it is non-planar. This difference is attributed to the hydrogen bonding that is present in the solid state. Quantum mechanics calculations suggest that in the gas phase there exist two different non-planar minima: anti- and syn- respectively. In addition to these minima there also exist both rank-one and rank-two saddles separating these minima. All these important conformations are connected by rotation and inversion motion within the molecule. Ab initio quantum mechanics calculations are carried out and the topology of the potential energy surface of urea are constructed to understand the dynamics of the molecule.

Fastrack for Taming Burstiness and Saving Power in Multi-Tiered Systems

Presenter: Andrew Caniff
Co-Authors: Lei Lu, Ningfang Mi, Ludmila Cherkasova, Evgenia Smirni
Advisor: Evgenia Smirni
College of William & Mary, Computer Science

Burstiness (i.e., sudden surges) in user demands in enterprise systems that operate under the multi-tiered paradigm is a common phenomenon that leads to overprovisioning: the system is configured with excess hardware to meet peak user demands, often resulting in excessive (and unnecessary) power costs. In this paper, we present Fastrack, a parameter-free algorithm for dynamic resource provisioning that uses simple statistics to promptly distill information about changes in workload burstiness. This information, coupled with the application's end-to-end response times and system bottleneck characteristics, guide resource allocation that shows to be very effective under a broad variety of application burstiness profiles and bottleneck scenarios. Extensive simulations illustrate Fastrack's robustness with respect to consistently meeting predefined service level objectives while minimizing power usage.

Office Space Allocation

Presenter: Kevin Cummiskey
Co-Author: Rui Pereira
Advisor: Rex Kincaid
College of William & Mary, Computational Operations Research

In large organizations, the allocation of building and office space to departments and employees is a challenging task. For example, in 2004, the NASA Langley Research Center reorganized and reallocated personnel. This move consisted of assigning workspace to more than 3,500 individuals and 1,600 research labs in approximately 6,200 rooms and 300 buildings. Reorganizations of this scale or larger occur frequently in the real world as mergers and acquisitions create the need for a top-to-bottom review of an organization's footprint. In many cases, it takes planners significant time and effort to develop possible configurations for decision makers to review. The purpose of this research is to develop a tool that generates high quality solutions to office space allocation (OSA) problems. The tool will provide planners with a means of quickly generating configurations based on a set of preferences. As a result, planners will be able to concentrate their efforts on solution refinement and other details as opposed to generating solutions from scratch. The OSA tool makes use of mathematical models and advanced optimization algorithms. In optimization, an objective function is defined mathematically by the modeler. In this study, the two objectives are to maximize the total synergy in the organization and to minimize office space misallocation. Office space misallocation is the assigning of office space to employees that is not appropriate for their job title, rank, etc. Special algorithms are then used to guide the search through the set of possible solutions to ones that are close to optimal with respect to the objective function.

Improving Metroplex Efficiency with Mixed Integer Programming

Presenter: Michael Duarte
Co-Author: Christopher E. Weld
Advisor: Rex Kincaid
College of William & Mary,
Computational Operations Research

Much is riding on the efficient operation of metroplexes (groupings of airports with arrivals and departure operations that are highly interdependent), from the service quality to millions of travelers worldwide, to the financial gains and losses of a multibillion dollar a year airline industry. With up to three times the current traffic demand expected by the year 2025, this problem turns from a matter of efficiency to one of necessity. The growing capacity problem cannot simply be addressed with the construction of additional runways. Even if the funding was available to do so, the most congested airports are typically located in metropolitan areas where they are restricted both geographically and by noise constraints from expansion. As such, approaches that improve efficiency and implement the sharing of resources to increase capacity must be considered. The development of algorithms to quickly determine the ideal runway configuration for metroplexes is necessary to address this growing problem, and in a system rich with uncertainty, the problem quickly complicates. Using a mixed integer linear programming approach, the airport configuration problem is addressed. We start by examining a single airport's efficiency under a prescribed airport configuration algorithm in hopes to later expand to the larger metroplex structure, with the final goal of restricting the generation and propagation of delays.

Information Propagation in VANET using Intelligent Road Monitoring Systems

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

One of the important issues in Vehicular Networks is the propagation of information captured from an event or incident to the coming vehicles. We introduce an information propagation model that notifies coming drivers with an incident that happened along the road. Different types of events or incidents require different levels of propagation depending on how critical the incident and how long it will stay. Our system depends on the spread sensors placed uniformly on the highway which is built inside the Cat eye's (which has been used for years as reflectors to help drivers over night). Drivers would like to receive information that affects their decision rather than just notification about incidents that will be solved by the time they reach this point on the highway. Current GPS (global positioning system) with life traffic information can give warning messages about incident far from the point of drivers. Also, it depends more on the traffic flow than the event itself. Our simulation compares different density with the level or distance of propagation taking in mind the principle of locality where drivers very close to an incident can see the incident and close sensors can sense the slow of the flow on the highway. Our model gives an intelligent propagation model in Vehicular Ad-hoc Networks (VANETs) to highways without suffering from any disconnection problems or loss of satellite signals.

Measuring Coupling Between Classes in Software Systems using Latent Dirichlet Allocation

Presenter: Malcom Gethers
Co-Author: Denys Poshyvanyk
Advisor: Denys Poshyvanyk
College of William & Mary,
Computer Science

Coupling measures capture the degree of interaction and relationships among source code elements in software systems. A large majority of coupling metrics in the literature rely on structural information, which shows relations such as usage relations between source code elements (e.g. class, method, etc.). Those metrics lack the ability to identify conceptual relationships, which, for example, specify relationships encoded by developers in identifiers and comments of source code. In this work we propose a new coupling measure for object-oriented software systems, which uses Latent Dirichlet Allocation (LDA), an unsupervised probabilistic topic modeling technique. LDA, a novel Information Retrieval method, identifies latent topics associated with documents (e.g. source code elements). We are the first to use the similarity of latent topics of documents to measure coupling among classes, thus capturing key conceptual relationships. In order to evaluate a novel metric, we compute established structural coupling metrics along with our LDA-based coupling metric on the source code of Eclipse, a large open source software system. We compare the performance of our coupling metric against a host of existing structural coupling metrics for impact analysis, an important software maintenance task. Impact analysis entails detecting source code elements impacted by a change to a given source code element. While structural coupling metrics have been successfully used for impact analysis in the literature we conjecture that proposed conceptual coupling metric not only provides good accuracy but also identifies relevant source code elements not captured by structural coupling metrics.

Utilizing Hard Learning Problems in Cryptography

Presenter: David Goldenberg
Advisor: Moses Liskov
College of William & Mary,
Computer Science

Hard learning-theoretic problems are an interesting alternative to more traditional number theoretic approaches to cryptography for two main reasons. First, they are often much more efficient to describe and to compute than their number-theoretic counterparts. Second, hard learning problems are thought to be different in nature from number-theoretic problems as there exists polynomial time quantum algorithms which can break most number-theoretic assumptions while no such quantum algorithms are known for learning-theoretic assumptions. While hard learning problems offer many advantages to the design of cryptographic protocols they offer several large disadvantages as well, one of the biggest being that an algorithm tasked to solve a learning-theoretic problem is non-adaptive. This often results in the construction of primitives which are secure for non-adaptive adversaries, but lose their security when the adversary is given minimal additional abilities in leveraging an attack. To address this problem we introduce the idea of "adaptive learning," and use this idea to introduce the SBF and SHCF problems, two new problems that we argue are computationally hard to solve. We then build several constructions based off the SHCF problem, including the first known (multi-use) provably related key secure MAC.

Analysis of Low Probability/High Consequence Risk Assessment Methods

Presenter: Steven Hendrickson
Advisor: Rex Kincaid
College of William & Mary,
Computational Operations Research

NASA and aviation-based organizations are in need of risk assessment (RA) models to assess low-probability/high-consequence events. Currently, probabilistic RA methods, are used to analyze system failure as a reactive measure. Though valid, new models are desired which assess risk as a proactive measure since the absence of data in newly emergent systems requires an alternative RA approach. An ideal model would successfully integrate various inputs from subject matter expert elicitation, hazard analysis, or simulation results. The development of a versatile, proactive RA method should be focused on the analysis of how systems are designed, built, operated, and maintained. A desired characteristic of all selected RA methods in this analysis is to provide decision makers and developers a high-level picture of the likelihood of success in an accurate, timely, cost effective, and procedural manner. Therefore, this RA method will succumb to six criteria: it will be validated, exhibit reasonable development time, mathematically sound, cost-effective, accommodating of variable inputs, and exhibit a reasonable learning curve. This research focuses on the initiation of such an RA method: an exhaustive literary search on RA methods was performed to evaluate all potential models that can be used for the needed lp/hc model. From a set of over 700 models, a subset of eight potential models was identified based on their conformity to the six selected criteria above. This research discusses these eight models' strengths that can contribute to the development of the desired RA model.

Modeling Spatial Systems in Mobius

Presenter: Ruth Lamprecht
Co-Author: Peter Kemper
Advisor: Peter Kemper
College of William & Mary,
Computer Science

Dynamic systems are prevalent in many disciplines. These systems are used to express and study the behavior of both natural and man-made structures; for example, the study of calcium signaling complexes in biology or the study of the dependability of sensor networks in computer science. Many times the information for these systems includes the layout of the units – what we consider "spatial systems". A spatial system is one where the concept of distance between units is an important aspect of the system. This spatial awareness can be found in the number of units that data must travel through, or the actual physical distance between units. To model such a system requires the detailing of a lot of information: the number of units, the positions of the units, and the specific relationships between every pair of units. As the number of units in the system grows, the number of relationships that must be specified also grows. The challenge we are interested in is to find a way to input these systems into a modeling formalism concisely, to be simple to use, but also expressively, to include much of the detail of the real system. Using the Mobius modeling tool for the assessment of these systems, we propose a new method of model composition where the modeler can specify the unit, state the number of units and the desired layout, and describe the proportion function, which can be any mathematical formula dependent on two units and the distance between them. This information can then be used to have the computer iterate through all the units to make the connections, and the full system model, automatically, which can then be assessed either by simulation or numerical analysis.

Detecting Kernel Level Keyloggers Through Dynamic Taint Analysis

Presenter: Duy Le
Co-Authors: Tyler Smart, Chuan Yue, Haining Wang
Advisor: Haining Wang
College of William & Mary, Computer Science

Keyloggers as invisible keystroke recorders have posed a serious threat to user privacy and security. It is difficult to detect keyloggers, especially kernel keyloggers that operate at the operating system's kernel level, because of their inconspicuous activities and flexible interception methods. In this paper, we propose a framework using a dynamic taint analysis technique to detect kernel level keyloggers. Our design is originated from the observation that kernel keyloggers usually manipulate the data flow of a keyboard driver in order to record typed keystrokes. By tainting and monitoring the keystroke data, this framework detects and analyzes any illegitimate uses of the tainted keystroke data. Based on Argos, a system that can perform host-based intrusion detection and support dynamic taint analysis, we build a prototype of the proposed framework and evaluate its effectiveness. Our experimental results show that the proposed framework can accurately detect kernel level keylogging activities and identify their root causes.

Real-time Non-rigid Registration of Medical Images on a Cooperative Parallel Architecture

Presenter: Yixun Liu
Co-Authors: Andriy Fedorov, Ron Kikinis, Nikos Chrisochoides
Advisor: Nikos Chrisochoides
College of William & Mary, Computer Science

Unacceptable execution time of Non-rigid registration (NRR) often presents a major obstacle to its routine clinical use. Parallel computing is an effective way to accelerate NRR. However, development of efficient parallel NRR codes is a very challenging task. Multicores and GPU provide us a cooperative architecture, in which both Single Instruction Multiple Data (SIMD) and Single Program Multiple Data (SPMD) programming models can co-exist and complement each other. We present a method to parallelize a NRR on this cooperative architecture. Our approach is first to separate the sequential algorithm into regular and irregular parts. We then map the regular part on GPU following SIMD paradigm and irregular part on multicores in a SPMD fashion. Unlike the approaches that use multicores or GPU alone, our approach leads to desirable speedup for the whole application by taking advantage of all components of the cooperative parallel architecture, for all individual parts of the application. This helps us to get closer to our goal: accelerating using architecture without reimplementing a new parallel algorithm. The results on clinical brain MRI data show that the GPU-based Block Matching (regular part) can run at least 1.9 times faster than on a typical cluster of workstations with eight high-performance nodes. The multicores-based implementation of the incremental finite element solver (irregular part) achieves speedup of up to 7 times compared to its sequential version. As a result, the total run time of the NRR code can be reduced to less than 1 minute therefore satisfying the real time requirement for its clinical application.

Blocking for Efficient Server Overload Management under Bursty Arrivals

Presenter: Lei Lu
Co-Authors: N. Mi, V. de Nitto Persone, L. Cherkasova, E. Smirni
Advisor: Evgenia Smirni
College of William & Mary, Computer Science

One of the most challenging problems for public Internet and e-commerce sites is the delivery of performance targets to users given the unpredictability of Web accesses. Sudden and unexpected surges (burstiness) in user demand leave the Internet service site overload and unable to meet the desired QoS agreement. As Internet services become indispensable both for businesses and personal productivity, the efficient management of Internet services under periods where the system is overloaded is a critical task for the system administrator. There are a host of solutions that target at maintaining user-perceived performance levels in the form of service-level objectives (SLOs) during overload periods that focus mainly on admission control and/or service differentiation techniques. In this paper we advocate the use of a methodology that is based on blocking (or in other words, additional, differentiated request buffering) to shield admission control from performance pitfalls that are due to sudden workload bursts. We present an effective blocking mechanism that adjusts the blocking queue capacity to the degree of burstiness of the workload. We explore the effectiveness of different fixed blocking queue limits under different burstiness profiles and conclude that the effectiveness of blocking is strongly related to the workload burstiness. To address this issue, we propose a parameter-free, autonomic policy that adjusts the blocking queue capacity in response to workload burstiness. Detailed simulations that are parameterized using the TPC-W benchmark demonstrate the effectiveness and robustness of this admission control mechanism.

Finding Source Code Examples

Presenter: Collin McMillan
Co-Authors: Denys Poshyvanyk, Mark Grechanik
Advisor: Denys Poshyvanyk
College of William & Mary, Computer Science

As a developer writes new functionality into existing software, he or she may instinctively sense that certain portions of the work are generally or widely-enough applicable to have been previously implemented. In this instance, the programmer may look for a third-party library with the desired functionality or similar code in open-source applications to provide an example of reusable features. He or she may attempt to leverage knowledge from programming manuals or online discussion forums. Unfortunately, the programmer must often begin the odious task of re-implementing common functionality. Ideally, the developer could find source code fragments directly related to his or her programming requirement to serve as examples in their original executable context and most up-to-date state. This ideal is not typical, however. Current automated methods generally search only textual information, providing few hints about the retrieved results' reliability or relevance as the searched information is of widely varying quality and origin. Our goal is to conduct a search using as many facts about the source code under investigation as possible, including dependencies, executable context, and call graph data. We consider a collection of software in terms of clearly defined software artifacts (e.g. functions, projects, and usage documentation) then interpret the interconnectivity of these artifacts to retrieve relevant source code. Ultimately, we provide the developer a list of relevant source code components, examples of other code fragments using those components, and the entire executable context in which to understand them.

Evaluating and Improving the Readability of Scientific Web Pages using Intelligent Analysis Tools

Presenter: Seena Menon
Advisor: Rahman Tashakkori
Appalachian State University,
Computer Science

The World Wide Web (WWW) is a primary resource of information. However, due to its exhaustive and complicated nature, verification of the relevancy and quality of information on WWW presents a major problem. A user has to search for an appropriate document, verify the relevancy, read and comprehend the information provided. This is more complicated in the case of scientific web pages. Scientific web pages often include text content, tables, graphs, charts, images, and mathematical formulae that are difficult to represent in a legible manner. Readability of a web page is an indicator of how easy it is to view, read, and understand the contents. There are multiple factors that affect the readability of web pages – like consistency of fonts, use of background colors, formatting. The proposed study involves creating a sample scientific website along the lines of a conventional scientific website. Users will browse through the sample website and answer a survey questionnaire to record their experience with the website. The collected data will then be analyzed using the data mining techniques of the SAS Enterprise Miner, to determine the main factors affecting readability of the website. The SAS Miner offers visualization techniques that are utilized for data analysis. This analysis will further help in developing an algorithm to reformat/ reconstruct a web page for better readability. The study also uses standard web analytic packages (e.g. Google Analytics) for extracting and analyzing additional usage data from the sample website. Keywords: web page readability, scientific web page readability, online scientific documents.

An 8-Bit Microcontroller Test Bed for Proxy Encryption

Presenter: Chancellor Pascale
Co-Authors: Jorge Vasconcelos, Gerald Masson
Advisors: Gerald Masson, Jorge Vasconcelos
Johns Hopkins University,
Computer Science

The development of a hardware test bed able to perform minimal RSA proxy encryption is presented. RSA algorithm can be used to generate public keys to encrypt messages between a key issuer that holds the private key and a second party, which has been given a public key. Proxy encryption is a system that allows a third party to take part in the transmission of messages between two entities, with the proxy taking an already encrypted message and further encrypting it given a second generated key. This process of letting the proxy be an integral part in this secure communications chain, insures that the holder of the public key cannot allow other parties mimic their role. The system is based on an elementary state machine enabling several devices to play different roles within a point-to-point network. The initial encryption algorithm follows the scheme proposed by Dodis [1] , in which computer A provides public keys to computers B and C, such that computer B re-encrypts computer C's message before forwarding it onto computer A. Despite inherent issues with this scheme, it allows for testing the underlying communication system between 8-bit microcontrollers. Currently, we are working to expand the capabilities of this test bed to incorporate a larger network, enable transfer of larger encrypted messages, and develop a re-encryption scheme similar to the one developed by Ateniese [2].

[1] Y. Dodis and A. Ivan, "Proxy cryptography revisited," in Proceedings of the Tenth Network and Distributed System Security Symposium, 2003.
[2] G. Ateniese, K. Fu, M. Green, and S. Hohenberger, "Improved proxy reencryption schemes with applications to secure distributed storage."

Using the Java Static Checker to Improve Software Reliability

Presenter: Suzanna Schmeelk
Advisor: Robert Noonan
College of William & Mary,
Computer Science

Industries that develop life-dependent code for the general public are becoming very concerned with security, accountability, reliability and production time. Unreliable programs can cause catastrophic software failure. These concerns are heightening the need for programmers within software industries to produce reliable programs. One way to locate potential software points of failure (faults) is during development. This technique is called static analysis. Companies including Yahoo!, nVidia, Oracle, HP, Samsung, McAfee, NASA and Ericsson have invested large amounts of money in static analysis tools to equip their developers. Our research is motivated by an experiment with heavily-used current static analysis tools where we encountered many usage difficulties. We found that current tools may not find obvious faults and may report warnings on code that will not cause faults. Thus, as many current tools are somewhat counter-productive, we decided to build our own tool. Our tool, the Java Static Checker (JSC) was built from the ground-up. Our tool is unique in that it examines software based on fault classes rather than the more traditional examination technique that looks for specific code patterns. We currently use the tool to examine programs for one of the most frequent programming faults, null pointer dereferences. Our results show that our tool locates many more faults than current static analysis tools. Our tool can be used by anyone developing programs written in Java to help produce more reliable software. Future work includes expanding the tool to check software for many other categories of failures.

Computer Based Classification of Plants Using Images of their Leaves

Presenter: Biva Shrestha
Co-Author: Rahman Tashakkori
Advisor: Rahman Tashakkori
Appalachian State University,
Computer Science

Plant recognition is a matter of interest for scientists as well as laymen. Computer aided technologies such as image processing techniques can make the process of plant recognition easier. Botanists use morphological features of plants to recognize them. These features can also be used as a basis for an automated classification system. For example the most abundantly available plant part is leaf. leaves are two dimensional so they are easier to be captured and studied as an image. Images of leaves of different plants can be studied to determine effective algorithms that could be used in classifying different plants. The focus of this proposal is to investigate how plants could be classified appropriately based on the images of their leaves. We propose to study the salient features of plant leaves that could be used as a basis for plant classification and recognition; features that are independent of leaf maturity. Some of these features are shape, aspect ratio, eccentricity, and the shape of leaf margin. The leaf images in the Appalachian State University-Irvin Watson Carpenter, Jr. Herbarium would be used as test images. The algorithms developed would be used first to classify some of the images in the herbarium. The remaining images would be used for testing the developed classification algorithm. Different algorithms or a combination of variety of them would be studied to develop one approach that produces the best classification results. The research will provide the results of the classification investigation as well as their application.

A Study on Optimally Co-scheduling Jobs of Different Lengths on Chip Multiprocessors

Presenter: Kai Tian
Co-Authors: Yunlian Jiang, Xipeng Shen
Advisor: Xipeng Shen
College of William & Mary,
Computer Science

Cache sharing in Chip Multiprocessors brings cache contention among corunning processes, which often causes considerable degradation of program performance and system fairness. Recent studies have seen the effectiveness of job co-scheduling in alleviating the contention. But finding optimal schedules is challenging. Previous explorations tackle the problem under highly constrained settings. In this work, we show that relaxing those constraints, particularly the assumptions on job lengths and reschedulings, increases the complexity of the problem significantly. Subsequently, we propose a series of algorithms to compute or approximate the optimal schedules in the more general setting. Specifically, we propose an A*-based approach to accelerating the search for optimal schedules by as much as several orders of magnitude. For large problems, we design and evaluate two approximation algorithms, A*-cluster and local-matching algorithms, to effectively approximate the optimal schedules with good accuracy and high scalability. This study contributes better understanding to the optimal co-scheduling problem, facilitates the evaluation of co-scheduling systems, and offers insights and techniques for the development of practical co-scheduling algorithms.

On Energy Security of Server Systems

Presenter: Zhenyu Wu
Co-Authors: Mengjun Xie, Haining Wang
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Computer Science

Power management has become increasingly important for server systems. Numerous solutions have been developed to optimize server power consumption and to achieve energy proportional computing. However, the security perspective of power management in a server system has not yet been studied. In this paper, we investigate the energy security issue of server systems. We define energy attack on server systems, covering its motivation, objective, and extent of the threat. We propose and study a type of energy attack that exhibits very different behavior from conventional attacks. The existing power management schemes and security mechanisms provide virtually no defense against this type of energy attack. We first characterize the power consumption of major system hardware components. Then, by profiling energy cost of an open web service under different operation conditions, we identify the vulnerabilities that subject a server to energy attacks. Meanwhile, we systematically design and evaluate the proposed attack tactic. Finally, we discuss possible defense strategies against energy attacks.

The RCB (Real-time Collaborative Browsing) Framework

Presenter: Chuan Yue
Co-Authors: Zi Chu, Haining Wang
Advisor: Haining Wang
College of William & Mary,
Computer Science

Collaborative browsing, also known as co-browsing, is the technique that allows different users to browse the same webpages in a simultaneous manner and collaboratively fulfill certain tasks. Co-browsing has a wide range of important applications. For example, instructors can illustrate online materials to distance learning students, business representatives can provide live online technical support to customers, and regular Web users can conduct online searching or shopping with friends. Existing co-browsing solutions must use either a specific collaborative platform, a modified Web server, or a dedicated proxy to coordinate the browsing activities between Web users. In addition, these solutions usually require co-browsing participants to install special software on their computers. These requirements heavily impede the wide use of collaborative browsing over the Internet. In this paper, we propose a simple and practical framework for Real-time Collaborative Browsing (RCB). This RCB framework is a pure browser-based solution. It leverages the power of Ajax (Asynchronous JavaScript and XML) techniques and the end-user extensibility of modern Web browsers to support co-browsing. RCB enables real-time collaboration among Web users without the involvement of any third-party platforms, servers, or proxies. It allows users to perform fine-grained high quality co-browsing on arbitrary websites and webpages. We implemented the RCB framework in the Firefox Web browser and evaluated its performance and usability. Our evaluation results demonstrate that the proposed RCB is simple, practical, helpful and easy to use.

"The King and I": A New View of the Relationship of E.D. Nixon and Martin Luther King Jr. during the Montgomery Bus Boycott

Presenter: Brendan Boerbaitz
Advisor: William Becker
George Washington University,
History

The Montgomery Bus Boycott is noted as the catalyst of the African American civil rights movement and as having transformed Rosa Parks and Martin Luther King Jr. into American icons. It has also been presented as a model of how community organizations can achieve their goals in the face of insurmountable socio-economic, legal, and political barriers. What lacks critical study is the nature of the relationship between the movement's chief leaders, Martin Luther King Jr. and Edgar Daniel Nixon, and the corresponding impact on the movement's success. The popular and unchallenged perspective of this relationship depicts these men as antagonistic and uncooperative. It portrays both men as having competed for power and credit while ignoring evidence and logic that suggest alternative understandings. This paper argues that Martin Luther King Jr. and Edgar Daniel Nixon maintained complementary leadership roles throughout the course of the Boycott. It uses qualitative tools, such as rhetorical and textual analyses, to assess the boycott in its organizational and sociological contexts. This paper is ordered with backgrounds of King, Nixon, and the circumstances of the movement; a revisionist perspective of the complementary nature of King and Nixon's skills, leadership styles, and personalities; and most importantly, argues how this relationship was a necessary component of the boycott's success. This paper provides a model that students of history, American studies, organizational science, and public administration can utilize to reveal the intimate connections existing between leadership and mission-based organizations on the brink of transformational change.

To "Throw up a Highway": Charles Clinton Spaulding and Conservative Black Internationalism

Presenter: Brandon Byrd
Advisors: Kim Phillips, Robert Vinson
College of William & Mary,
History

Historiography of twentieth-century black internationalism has primarily focused upon the anti-colonial and anti-capitalist agenda of liberal and leftist leaders such as W.E.B. DuBois and Paul Robeson. My research counters this trend and centers on Charles Clinton Spaulding and a trip he took to Haiti along with other black businessman in 1937. In doing so, this study will show how conservative black leaders acted and thought in an international context. Black newspapers, most of which extensively covered this trip, Southern white newspapers, correspondences between Spaulding and his fellow travelers, published statements made by him about Haiti and in response to the trip, and business documents pertaining to the Haitian coffee company established by these black businessman provide the basis for this study. Secondary literature concerning black internationalism, African American - Haitian relations, black Durham, and Booker T. Washington are also used in order to contextualize Spaulding's internationalism as well as its relation to his conservative and accomodationist domestic leadership. This study will show that Spaulding adhered to a Washingtonian internationalist perspective predicated upon the economic uplift and Americanization of "benighted", foreign blacks. His adherence to this conservative internationalism thus complicates our historical understanding of what it meant to be a black internationalist, as well as a black conservative, in this time period.

Vox Populi: The Classical Idiom in Early American Public Opinion Articles, 1789-1791

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

Public opinion articles written at the time of the First Federal Congress (1789-1791) indicate a wide spread understanding of the classics as well as an active engagement in a classically driven medium of discussion. Even if it cannot be known to what extent the American public actively read the classics, it is evident upon examining printed discourse there was a widespread admiration for republican values as were demonstrated in ancient texts. Some articles were saturated with the classical influence and others merely footnoted it, but one thing that remained evident was a widespread deference to the classics when writing about politics. By examining the shades of classical influence found in public opinion articles from newspapers in both northern and southern states, it can be inferred what themes, allusions, and characters were particularly persuasive to those actively participating in the public discourse during the First Federal Congress. These articles demonstrate that the classical idiom served as a gateway for audience members desiring full participation in the republic of letters. By referencing classical texts or signing with a classical pseudonym, not only could an author add weight to their argument, but they also signaled to their audience that they had the necessary intellectual background to engage in the debate. Public opinion articles written in response to issues the First Federal Congress faced, such as the location of the national capital, public funding, Indian treaties, and slavery, shed light on the presence of the classical idiom in the public discourse.

War, Consumerism, and Agitation: The African American Press during the Early Civil Rights Movement

Presenter: Brian Flynn
Advisors: Herb Berg, Beth Barton
University of North Carolina-Wilmington,
Graduate Liberal Studies

This project will examine how the African American press influenced the early civil rights movement and the creation of the “New Negro” during the first thirty years of the twentieth century. The rise of the NAACP coupled with the growing influence of the African American press brought an opportunity to form a national, concerted movement for the civil rights of African Americans. Photographs, illustrations, and advertisements from these publications each provide examples of the power of images to shape history. Through several angles, African American publications facilitated and influenced the early push for civil rights. Once more, these publications showcased the influence of a growing African American elite class and consumer market. By examining two nationally circulated African American publications, the Chicago Defender and the NAACP’s Crisis magazine, I will show that these publications influenced the creation of the “New Negro” by nurturing burgeoning economic and political influence of African Americans and consolidating the message of the early civil rights movement. Archived copies of these newspapers as well as secondary research on African American identity, consumerism, and political participation is used to provide necessary background information and create a context for discussion of the content in the Defender and Crisis. Understanding early representations of African Americans in the mass media helps researchers better understand the issue of racial identity in the media as these representations continue to be a magnifying glass for discussions of the larger role of African Americans in society.

**** ABSTRACT WITHDRAWN BY PRESENTER ****

Iredell Museums, Inc.: A Social History

Presenter: Jamie Hager
Advisors: Lisa Holliday, Charles Watkins
Appalachian State University,
History

The Iredell Museum is a pinnacle establishment within the city of Statesville, located in Iredell County (roughly forty miles north of Charlotte, North Carolina). I intend to document how Statesville residents claim they perceive the history of the county based on information they receive from local cultural institutions, like exhibits staged by the Museum. I contend that the Museum provides the only public history available for residents, in turn excluding alternative histories due to its power and prestige. Given the amount of control the museum has over what can and will be shared with the citizens, I argue that the history of the county has been "sanitized" as that of a small town whose citizens worked diligently to rise from the poverty, racism, and sexism so commonly associated with rural areas. It has struggled with the realities of racism and poverty, and has not always endured these challenges successfully. My intent is to determine whether the Museum's "professional promotional historians" have promoted the history of Iredell County based on the concept of the "Progressive Paradox" attributed to North Carolina after the American Civil War. This theory argues that North Carolina was not nearly as progressive in terms of attitudes and perceptions as North Carolinians and historians have noted. However, historians Jack Bass and Walter Devries argue that the idea of NC as progressive is, in fact, a myth. Bass and Devries explain that "The progressive image the state projected in the late 1940s has evolved into a progressive myth that remains accepted as fact by much of the state's native leadership, despite ample evidence to the contrary."

A Complex Fellowship: Black and White Baptists in Southeastern Virginia, 1800-1860

Presenter: Nancy Hillman
Advisor: Melvin Ely
College of William & Mary,
History

Historians of antebellum Virginia agree that blacks and whites negotiated conflicted and complex relationships under slavery. Evangelical churches provided unusually fertile spots for such negotiations to develop. Although Baptist organizations were replete with racism, students of history should not overlook ways that black and white Christians did maintain genuine fellowship with one another. Additionally, black and white members' disciplinary practices and moral standards frequently mirrored each other, revealing a shared evangelical worldview. Black and white Christians valued marital vows, reported drunkenness, restored repentant congregants to fellowship, and sought to keep peace between members. Scholars have also asserted that the reaction of white Virginians to Nat Turner's Rebellion in 1831 essentially put an end to black religious autonomy. Yet despite heightened supervision in the decades after the revolt, African American religious leaders continued to exercise autonomy in governing black members, in both biracial and all-black churches. In my investigation of Virginia Baptists, I have studied the minute books of forty Baptist churches in southeastern Virginia from 1800 to 1870. My research will demonstrate that, even after 1831, many black evangelicals maintained positions in church leadership, oversaw the discipline of black members, successfully defended fellow black congregants before church courts, and gathered in increasingly autonomous meetings. Although the sun was setting on biracial fellowship, examples of its persistence, as well as of the continued leadership of black Christians, deepen our understanding of antebellum Virginia, and the South.

Cashing in on Chivalry: Dignity, Desegregation, and the Demarcation of Space in the Thalhimers Boycott

Presenter: Leslee Key
Advisor: Timothy Thurber
Virginia Commonwealth University, History

This effort critically examines segregation in Richmond between World War II and 1960, particularly how concepts surrounding female consumerism, domestication, and male violence evolved within Jim Crow Virginia and how these conceptions influenced the sit-in and boycott movement in the downtown shopping district. The urbanization of downtown created a cultural climate of genteel race relations, which was reflected in the paternalisticly driven civic policies of the state. These community values strengthened after the war effort, and contributed to not only a broad acceptance of black women in downtown Richmond, but aided in the increasing perception among white citizens that black women could be utilized as a social means to control the increasing racial tensions during Massive Resistance. Recent literature on the role of black women who initiated the boycott of Thalhimers and Miller & Rhoads explain their actions as a consequence of black male chauvanism. However, the radicalization of black women was attributable to the increasing economic and political resistance of policy makers, which escalated upon the arrest of the "Richmond 34." Community housewives, teachers, and workers who shared a communal discourse attributed the economic ruin of blacks to the Jim Crow system and subsequently used white male chivalry and their advanced social influence as tools to fight the system of segregation. Finally, I will delineate the insights that I have gleaned through this examination and pose directions for the future of the history of Civil Rights in Richmond.

Commemoration of War during the Late Roman Republic and Early Principate

Presenter: Stefan Kosovych
Advisor: Darryl Phillips
The Citadel / The College of Charleston, History

The Roman elite maintained authority within the state by promoting the aristocratic values of honor and courage (Rosenstein 2006). War, above all else, was the elite's proving ground, and Roman practices of war commemoration enabled the display of one's virtue to the public. In the late Republic and early Principate, Romans utilized commemoration to deliberately obscure the role of common soldiers while glorifying the achievements of elite generals. Burial practices of Roman soldiers, the triumphal parade as well as monumental and funerary art served to sublimate views of war. Appian, Livy and Tacitus depict the anonymous fate of deceased Roman soldiers – those who died in battle were cremated, interred in mass graves or left unburied on the battlefield. The triumphal procession, as Mary Beard (2007) demonstrates, showcased the general while the mass of soldiers remained in the background. Roman art, in the form of monuments and sculptures, captured the general's victory for posterity. In the rare instances where common soldiers had funerary monuments, they imitated the commemoration standard set by the elite. Because of the Romans' imperial objectives, they sought to alter the perception of war by concealing the effects of war on the masses and promoting the celebration of victory by the elite. The inequality between the commemoration of war and its reality was intentional policy to propel Rome's expansion. Unfortunately, the memory of the ordinary Roman soldier was left out in order to induce victory.

Competing for Power: An Examination of Motivations Behind Changes in Women's Property Rights in Colonial Virginia

Presenter: Susan Llewellyn
Advisors: Joan Bristol, Kathy McGill
George Mason University,
History

Earlier studies of colonial wills consistently highlighted the deterioration of women's property rights in Colonial Virginia. However, the usual interpretation has been that this was due to eighteenth century men's heightened love of patriarchy and power, while rarely exploring any other underlying causality. Viewing these wills with a wider lens uncovers less-examined but important conflicts behind the more obvious male/female struggles. Using an Atlantic history approach, examination of earlier English inheritance laws reveals an intense clash between civil and church courts in the sixteenth and seventeenth centuries. When civil courts won, legislative bodies responded by repeatedly altering inheritance laws, granting men increasing power over the distribution of their possessions. At the same time, an analysis of 734 colonial Virginia wills discloses men's attempts to use those documents to cope with life stressors and relationship issues in a world of shortened life expectancies and blended families. Men began to use their wills both to express generational values and to "protect" their children by attempting to anticipate and block unfair actions by unscrupulous stepfathers. While women did experience the greatest losses in terms of inheritance bequests, these findings propose that two of the underlying issues were really the practical and philosophical battles for control between religious and secular values, and men's reactions to interpersonal dynamics resulting from blended families. This would suggest that women may have been as much "collateral damage" as they were the actual "targets" of eighteenth century power struggles among men in Colonial Virginia.

The Syrian Revolt of 1925 in the French Daily Press: A Case Study in French Colonialism

Presenter: Lisa Maguire
Advisor: Lisa Leff
American University,
History

Recent shifts in the historiography of French colonialism have involved more nuanced analyses, with a number of scholars tackling the seeming disconnect between the concrete actions of French colonialism and the rhetoric of French republicanism during the Third Republic. Rejecting the standard trope that French colonial policy failed to live up to republican ideals, scholars have begun raising questions regarding the nature of French colonialism during the interwar period and how French colonialism was understood during this period; to understand how and why republicanism and colonialism existed side by side. Studying the Syrian Revolt of 1925 in light of these developments raises a number of questions regarding the scope of French colonialism, particularly given that Syria was under a mandate at this time and never, technically, a colonial possession. While this paper focuses on the Syrian Revolt, it does so from a French perspective. Drawing on Gary Wilder's theoretical framework, outlined in *The French Imperial Nation-State*, of a new colonial logic that simultaneously incorporated the universality of republicanism and the particularity of imperialism, this paper argues that the treatment of the Revolt by the French daily press offers an analytical point of entry into the dual nature of the interwar colonial mentalité. Situating the Revolt in this framework highlights the inherent tensions within French colonialism. Moreover, analyzing the press coverage illustrates that it was the very duality underpinning colonialism that drove the projection of colonial logic.

Characterizing Sodomites in Early Modern Iberia

Presenter: Christopher Moreland
Advisors: Lynn Mollenauer, William McCarthy
University of North Carolina-Wilmington, History

At the height of its power during the sixteenth and seventeenth centuries, Spain exerted control over a vast empire spanning several continents. Its dominions encompassed the Americas, outposts in Asia, and swaths of European territory. The Spanish portrayed themselves as a hypermasculine, militaristic society dedicated to upholding the tenets of Catholic orthodoxy through the power of the Inquisition. Despite this portrayal, sodomy and other homosexual acts were prolific in Spanish society. With the exception of heresy, the Inquisition prosecuted more cases of sodomy, the *pecado nefando*, than any other crime. This paper attempts to examine the groups associated with sodomy and sodomites in early modern Iberia. Spanish conceptions of same-sex behavior, as with any other society before Freud and Kinsey, were not necessarily consistent or monolithic. Historians such as David Halperin and Michael Foucault have argued that sexuality is not "fixed and immutable" but constructed by cultural and chronological factors. Therefore, attempting to identify a singular conception of the homosexual in this period is anachronistic and self-limiting. Rather, Spanish characterizations of sodomy and sodomites were complex. There were several groups, such as Moors, Italians, soldiers, sailors and clerics, who were considered more likely to engage in homosexual activity. Furthermore, issues of penetration, social hierarchies, and effeminacy all contributed to the complex Iberian conceptions of sodomy and sodomites.

The Talented Mr. Littlepage & His Magnificent European Public Life

Presenter: Chris Pullen
Advisor: Kevin Hardwick, Mary Gayne
James Madison University, History

Elite socio-political venues such as Versailles and the various salons, where eighteenth century European elites met, mingled and expressed their social status, have often been viewed by historians as places where enlightened intellectualism was transmitted. These assumptions have conveniently detached the European Enlightenment's grand philosophical and political achievements from socio-political realities. The fundamental research question addressed in my presentation is: What social values most defined elite eighteenth century French society? I will answer this question through the study of an unusual outsider, William & Mary alumnus Lewis Littlepage (1778-79), who was able to traverse cultural and class barriers to become one of the most socially and politically successful Americans in late eighteenth century Europe. In my presentation, I will argue that noble eighteenth century French society was more concerned with entertainment (and passing time), than with intellectualism. Therefore, theatrics, poetic talent, witticisms, and gallant celebrity were often more highly prized than authorship or other intellectualism. In order to prove this, I will utilize (among other works) my research from the Curtis Carroll Davis Collection, Special Collections Research Center, Swem Library, College of William & Mary. One major implication of my work is that social values, rather than the realms in which socio-political interaction occurred, defined eighteenth century French high society. A second implication is that elite socio-political life in Enlightenment era France was separate and distinct from the period's intellectualism.

King Arthur and the Industrial Revolution

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

Late nineteenth and early twentieth century Britain experienced some of the most radical social changes in its history. Domestically, Britain was well into the Industrial Revolution. On the international stage, it controlled the largest empire in human history. How did these huge historical forces affect British culture? One of the affects, really a reaction, was the growth of dissenting ideologies. Focusing on William Morris, a nineteenth century socialist and artist, this presentation will examine these ideologies through the lens of Morris' medievalism and his use of the stories of King Arthur. Morris wrote several poems with Arthurian themes. He and many of his contemporaries reacted to these changes in British society by focusing on a bucolic, nostalgic English past which emphasized the countryside and handmade crafts. Morris' use of Arthurian themes was just one aspect of these larger reactions, which took the form of movements like the Pre-Raphaelite artists and the Arts and Crafts Movement. What relevance does this have to today? Many of Morris's works and ideas influenced later writers like J. R. R. Tolkien and C. S. Lewis. In the last decade, these authors have exerted a tremendous pull on modern audiences. One can have a better understanding of their popularity by examining what influenced them and the cultural circumstances which produced these ideas. In this case, a long tradition of looking to a nostalgic, idealized, English past.

A Slow and Messy Transition: The Switch from Indentured Servitude to African Slavery in Northumberland County, Virginia, 1650-1705

Presenter: Steven Scott
Advisor: Randolph Scully
George Mason University,
History

Few trends in the study of the colonial Chesapeake are more important than the work discussing the changing structure of bound labor there during the seventeenth century and the eventual transition to a slave labor force. The nexus of this debate has centered around when that transition occurred and whether it was based on bald economics or on racial prejudice. While these debates are far from resolved, recent scholars such as Anthony Parent and John Coombs have argued that this switch was well underway by 1676 – Bacon's Rebellion and Edmund Morgan's watershed date for the transition – if the major planters become the focal point. By contrast, my paper returns to the methodology of the county study made popular by Darrett and Anita Rutman in the 1980s. Looking extensively at county court records, this paper focuses on one Virginian county, Northumberland, in great analytical detail in the vein of Russell Menard's 1977 article "From Servants to Slaves." These methodologies will help prove that this fateful transition to black slavery was not as neat or as orderly as many Chesapeake scholars have implied. Several stopgap measures such as Indian slaves and white apprentices joined "Negroes" in the fields during the last decades of the century. Furthermore, servant importation was on the rise in turn-of-the-century Northumberland County and vastly outnumbered the paltry slave population by 1700. If Coombs and Parent are correct in pushing the starting date for the shift earlier in time, Northumberland's experience proves that the transition to a majority reliance on slavery was not fully completed until the first or even second decades of the eighteenth century.

Indian Violence in Montana and Idaho!: The Media's Portrayal of the Nez Perce Indian War of 1877

Presenter: Michael Stratmoen
Advisor: Jack Censer
George Mason University,
History

The year 1877 marked a year on the Great Plains when American Indians fought a violent campaign with United States military forces. It was part of a cycle of violence that occurred frequently in the years after the Civil War. Like the other cycles of violence, the American Indians, a group of Nez Perce under the leadership of Chief Joseph, lost their fight with the United States military. While the Nez Perce would lose this conflict with the government and military, they won a very important aspect of the campaign: they won the sympathies of the press. Instead of treating Joseph and his people simply as a group of evil murderers and the whites as victims, the American press chose to blame the government and military policies, as well as the settlers at times, both during and for decades after the campaign, for the outbreak of hostilities. Newspapers often chose to praise Joseph and his people. Even local presses grudgingly accepted by the end of the campaign that the Nez Perce had conducted themselves honorably in this campaign. This would not be the first time the 19th century American press showed sympathy towards the American Indians and this shows that the 19th century press was not a monolithic voice against American Indians. Instead, there was a rising sense among the American press that American Indians had been abused by the government policies towards them, and this Indian War was one instance where the press chose to comment on those policies.

Fighting the ReOrientation: Spain, the Manila Galleon, and the Sinocentric Global Economy, 1571 -1604

Presenter: Matthew Thomas
Advisors: Brett Rushforth, Kris Lane
College of William & Mary,
History

With the establishment of Manila in 1571, the markets of Asia lay open to Spaniards flush with American silver. Over the next three decades, Spanish galleons crossed the Pacific and flooded New World markets with lower priced Asian goods. This caused an alarming amount of specie to make its way directly to China, the center of the sixteenth century global economy. By 1604 however, transpacific trade was restricted to the port of Acapulco and only two ships a year were allowed to ply the Pacific. Earlier historians explained this heavy regulation by the need of Spain to preserve the royal tax revenue collected on American silver and maintain its monopoly over colonial markets. A review of sixteenth century primary documents however, revels that existing research failed to recognize the larger threat that Spain saw in transpacific trade. Access to the comparatively lower priced wares of Asia had the potential to erase America's economic dependence on Spain and result in an economic reorientation of the New World away from Europe and towards China. Faced with this critical threat, Madrid enacted a series of regulations to suppress commerce. This effort culminated in a royal decree of 1604 that ultimately proved successful in preventing the further expansion of transpacific trade. The commercial isolation of the Americas in the early 1600s not only secured Spain's control over its colonies but also maintained Europe's ability to develop New World resources and markets as it expanded its role in the early modern global economy.

"A Debt of Honor": The Benevolence of Richmond's Female Elites at the "Last Confederate Christmas" of 1864

Presenter: Ashley Whitehead
Advisor: Peter Carmichael
West Virginia University, History

Organized and hosted by Confederate First Lady, Varina Davis and her female peers, the last "Christmas of the Confederacy" in Richmond, Virginia is a fascinating lens into southern sensibilities and the cultural rituals which helped to sustain the Confederacy through four years of civil war. This Christmas celebration occurred during the Confederacy's darkest hour in the conflict. However, Richmond's elites sought to perpetuate their southern Christmas traditions in spite of, and indeed in light of, the otherwise "solemn and despondent" mood of the starved-out city. Essential, adaptable elements of southern culture – inter-class paternalism, benevolence, charity, honor, Christian ideals, communal sensibilities, and a strong hegemonic social structure – continued to hold the Confederacy together. I argue that Richmond's 1864 Confederate Christmas celebration reflects those cultural elements, and that rituals such as the Christmas celebration served to reinforce, rather than undermine (as some scholars have argued), the tenets of Confederate nationalism and Confederate morale. I will use Richmond's 1864 Christmas celebration as a lens through which to discuss the evolution and adaptation of southern cultural rituals to the demands of the war-beleaguered Confederacy. I will show that, through their re-gendering of the discourse of Confederate nationalism, and through dramaturgical displays of collective self-sacrifice and benevolence in the Confederate capital, Richmond's elite women played a key role in helping to maintain the hegemonic power of the upper classes and the loyalty of the lower classes which was necessary for sustaining the Confederacy.

Thermal Removal of Native Niobium Oxides

Presenter: Douglas Beringer
Co-Authors: R. Ale Lukaszew, Charlie Reece
Advisor: R. Ale Lukaszew
College of William & Mary, Physics

Currently, most super-conducting radio-frequency (SRF) cavities are fashioned from expensive bulk niobium. As such, there exists considerable interest, particularly in particle accelerator communities, in developing thin-film alternatives which will potentially optimize the super-conducting properties of the SRF cavities while reducing production costs. In order to better understand the parameters which dictate homo-epitaxial growth of niobium thin-films, a systematic study of the surface energetics of native niobium oxide removal is underway. Single crystal niobium samples with varied crystallographic face orientations are obtained and verified via XRD (X-Ray Diffraction). Samples are subsequently annealed in an UHV (ultra-high vacuum) system up to a temperatures around 800 degrees Celsius, sufficient to remove most of the surface oxide. The crystalline structure is monitored in situ during the high temperature annealing with RHEED (Reflection High-Energy Electron Diffraction) to determine surface evolution during the treatment.

Measuring Neutrino Oscillations in MINOS

Presenter: Stephen Coleman
Advisor: Jeffrey Nelson
College of William & Mary, Physics

The Main Injector Neutrino Oscillation Search (MINOS) is a two detector experiment in the NuMI muon neutrino beam at the Fermi National Accelerator Laboratory outside of Chicago, Illinois. It is designed to measure muon neutrino disappearance after traveling 734km through the Earth to a detector in the Soudan Iron Mine in northern Minnesota. The survival probability of the oscillation hypothesis for neutrino disappearance is L/E dependent, where L is the baseline of the beam and E is its energy. With a fixed L an energy-dependent muon neutrino disappearance measurement allows precision determination of the atmospheric neutrino oscillation mixing angle and mass splitting. Other exotic disappearance hypotheses are also tested. We present techniques developed to improve our sensitivity compared to previous analyses. These include improving our beam extrapolation from the Near Detector to the Far Detector, the determination of backgrounds, and systematic uncertainties. We are also including information from additional datasets, such as anti-neutrino oscillations and muons from beam neutrino interactions in the rock upstream from the Far Detector. These techniques will be used to analyze data obtained from an accumulated 7.2×10^{20} protons on target, which is about twice the size of the previously analyzed dataset.

Design Optimization and HOM Analysis of Superconducting Parallel-Bar Cavities

Presenter: Subashini De Silva
Co-Author: Jean Delayen
Advisor: Jean Delayen
Old Dominion University,
Physics

The parallel-bar structure [1] is a new superconducting geometry whose features and properties may have significant advantages over conventional superconducting deflecting and crabbing cavities for a number of applications. The deflecting structure is considered as an rf separator for the Jefferson Lab 12 GeV upgrade. The design optimization is performed by modifying the shape of the parallel-bar cavity to generate a higher deflecting gradient with low surface fields. The optimized cavity design with further study of the Higher Order Modes (HOM) of the structure and its properties are presented.

[1] J.R. Delayen and H. Wang, Phys. Rev. ST Accel. Beams 12, 062002 (2009).

Novel Shielded Balloon Brachytherapy and Real Time Dose Verification

Presenter: Nandakarthik Govindarajan
Co-Authors: Vahagn Nazaryan, Cynthia Keppel, P. Gueye
Advisors: Cynthia Keppel, Vahagn Nazaryan
Hampton University,
Physics

About 130,000 women are candidates for Breast Conservation Therapy (BCT) in the U.S. every year. Accelerated Partial Breast Irradiation (APBI) using, for instance, the Hologic balloon applicator is a relatively new technique for post lumpectomy breast cancer radiation treatment. Its popularity is in part due to a good dose distribution, improved cosmetic outcome, and relatively short five day treatment procedure. The balloon to skin spacing in this treatment modality may pose a major concern. If the skin to balloon distance is less than 7mm, the procedure may not be recommended due to adverse skin reactions leading to poor cosmesis, particularly for patients undergoing adjuvant chemotherapy. The skin spacing issue can be overcome by partially shielding the radiation dose to the skin by introducing a thin layer of high Z ferrous material inside the balloon catheter. A slight magnetic field will be applied externally to arrange the powders internally under the segment of surface of the balloon where the skin spacing is less than 7 mm, thereby protecting the skin from radiation damage. The information about the radiation source position within the balloon applicator and the dose delivered to the breast may be verified in real time using a combination of methods that includes usage of scintillating fiber technology and a MOSFET patient dose verification system. Novel concepts of shielded balloon brachytherapy and fiber based dose verification systems, as well as preliminary Monte Carlo simulation and laboratory measurement results will be presented and discussed.

Theoretical considerations for applications of ultracold degenerate quantum gases

Presenter: Megan Ivory
Co-Authors: James Field, Austin Ziltz
Advisor: Seth Aubin
College of William & Mary,
Physics

The inherent quantum coherence of ultracold degenerate quantum gases such as Bose-Einstein condensates (BECs) and degenerate Fermi gases (DFGs) makes them ideal tools for performing precision phase and interference measurements. However, the precision and accuracy of such measurements with BECs are limited due to the atom-atom interactions within the gas. Using DFGs in applications such as atomic clocks and atomic interferometry promises to provide more accurate measurements due to the remarkable characteristic that they essentially do not interact. Fermion atomic clocks build upon an already existing technology which provides the most accurate time and frequency measurements today by eliminating the self-interactions which limit the accuracy. Similarly, fermion atom interferometry can be used for high precision measurements of accelerations, rotations, electric and magnetic fields, force gradients, and forces close to surfaces. Beyond precision measurements, the exquisite control permitted by atomic and optical techniques on ultracold gases can be used to simulate mesoscopic solid state systems which are difficult to produce in real systems. Quantum pumping is one such phenomenon which can precisely control bias-less flow of single electrons in a circuit. Simulating this effect with ultracold atoms can bypass the difficulties associated with producing it in a solid state system while testing theoretical predictions. We present theoretical overviews on the development of an ultracold fermion atomic clock, fermion atom interferometer, and quantum pumping schemes.

Multiple Mode Conversions in a Plasma

Presenter: David Johnston
Co-Authors: Eugene Tracy, Nahum Zobin
Advisor: Eugene Tracy
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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 done 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 wavevector, both of which have time as a parameter. The advantage here is that problems the fullwave calculations run into in configuration space simply do not occur in phase space. Furthermore, we are investigating the phenomenon of multiple mode conversions within a cavity. In a plasma with a minority species there is the possibility for the incoming wave to satisfy the dispersion relation for the ion-hybrid wave, at some position within the cavity, and some of the energy will convert into an ion-hybrid wave with the rest being transmitted. Subsequently, the ion-hybrid wave will propagate and has the potential to convert back into a magnetosonic wave, with some of the energy being deposited in the plasma, and the remainder continuing as an ion-hybrid wave. We are interested in modeling this behavior in phase space and searching for closed orbits to determine the final distribution of the energy.

Different Techniques for Electron Density Measurements in a Supersonic Flowing Ar/H_2/Air Discharge

Presenter: Milka Nikolic
Co-Authors: D. J. Drake, P. Laurent, S. Popović, L. Vušković
Advisors: L. Vušković, S. Popović
Old Dominion University, Physics

Local measurements of the electron density in high pressure discharges have commonly been performed through use of an electrical probe, such as a Langmuir probe, or by the Stark broadening of the hydrogen lines. However in supersonic flowing discharges the use of electrical probes is almost prohibitively intrusive. In addition, these types of discharges do not often contain the hydrogen needed to determine the electron density through Stark broadening where the measurements are hampered by the lack of intensity and breadth of the hydrogen Balmer lines. An alternative approach is to use the intensity of the rotational bands of the N2 second positive system. We performed detailed measurements of the population densities of the N2 C3_u-B3_g system and the hydrogen Balmer lines in a supersonic flow of weakly ionized Ar/H_2/Air. Experiments were performed in a supersonic flowing discharge tube at ODU. The absolute intensities of N2 bands were combined with the detailed kinetic model of Nitrogen C states to evaluate the electron density of the plasma. 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 pressure range of 100-700 Pa. Absolute emission spectroscopy was used to determine the gas temperature in the flow from the N2 system. Comparison was made between the results obtained from the N2 band intensity technique and Stark broadening of the hydrogen Balmer lines.

Quantum memory under conditions of electromagnetically induced transparency and four-wave mixing in a hot atomic gas

Presenter: Nathaniel Phillips
Co-Author: Irina Novikova
Advisor: Irina Novikova
College of William & Mary, Physics

Technologies that fill the niche for uncrackable encryption and vastly accelerated computation speed will harness the quantum world. Like its classical analogue, a quantum information processor will, generally speaking, write one or more quantum states to a quantum memory, manipulate them in a non-destructive way, and send the resulting state(s) to an adjacent device. Photons, which can travel long distances without interacting, are excellent candidates for carrying quantum state information between devices. Atoms, which can have long-lived coherences, represent a promising architecture for quantum memories. We investigate ways to optimally map photonic states onto a quantum memory comprised of an ensemble of hot Rubidium atoms in a vapor cell. In particular, under conditions of electromagnetically induced transparency (EIT), a strong classical control laser field renders a normally opaque medium transparent for a co-propagating weak probe field. Further, the group velocity of a probe pulse can be reduced from 3×10^8 m/s to <10 m/s ('slow light'). By properly adjusting the intensity of the control field, the quantum state of this pulse can be mapped onto a collective atomic spin excitation, stored for up to 500 μs, and retrieved as a light pulse ('stored light'). Optimizing the memory efficiency requires a high atomic density. However, at high densities, a near-resonant Stokes field, which is simultaneously created via four-wave mixing, interferes with EIT and stifles memory performance. We experimentally and theoretically study stored light under conditions of EIT and FWM and discuss the prospect of simultaneously storing signal and Stokes pulses.

Laser Processing on bulk Niobium to produce Niobium nitride

Presenter: Senthilraja Singaravelu
Co-Authors: J. M. Klopf, Geoffrey Krafft, Michael Kelley
Advisors: Michael Kelley, Geoffrey Krafft
Old Dominion University, Physics

Particle accelerators are an important tool for scientific research projects ranging from high energy physics to human medicine. Their performance depends upon the Superconducting Radio Frequency (SRF) Niobium accelerator cavities, at their heart. Forming the active interior surface from Niobium nitride (T_C ~ 17 K) vs the present Niobium (T_C ~ 9.2 K), would reduce cryogenics cost and simplify the engineering design of the cryomodule. Surface modification on Niobium produces Niobium nitride, which creates a harden surface and also it allows the cavity to operate at cryogenics temperature of 4.2 K instead of 2 K. Laser treatment of Niobium in the nitrogen (N_2) atmosphere can produce Niobium nitride. Results from computer simulation were used to find the actual melting depth, maximum melting depth and energy density of the laser, which can reach the boiling temperature of Niobium. The influence of experimental parameters on the Niobium (the number of pulses, the laser fluence, and the N_2 atmosphere pressure) are studied. The phase, surface morphology, elemental composition of nitride layer and simulation are shown.

Microstructural, magnetic anisotropy, and magnetic domain structure correlations in $L1_0$ FePd thin films

Presenter: Jonathan Skuza
Co-Authors: César Clavero, Buzz Wincheski, Wei Chen, R. Ale Lukaszew
Advisor: R. Ale Lukaszew
College of William & Mary, Physics

Understanding microstructural, magnetic anisotropy, and magnetic domain structure correlations in materials with large perpendicular magnetic anisotropy (PMA) is of fundamental interest and it is also important in many technological applications such as next generation magneto-recording media and spin-transfer torque devices. $L1_0$ ordered phases in some binary alloys (FePd, FePt, MnAl) have PMA due to chemical ordering that can be controlled with adequate thin film deposition parameters. A detailed study on epitaxial FePd thin films grown by dc magnetron sputter deposition on MgO(001) substrates will be presented. X-ray diffraction (XRD), magnetic force microscopy (MFM), superconducting quantum interference device (SQUID) magnetometry, and ferromagnetic resonance (FMR) were used to investigate structure-property correlations in these films. A quantitative analysis and correlation of the strong PMA to magnetic domain structure in these FePd thin films was accomplished with good agreement using an analytical energy model [1] and builds on previous work that had only correlated magnetic domain structure with film thickness.[2],[3]

[1] C. Kooy and U. Enz, Philips Res. Reports **15**, 7 (1960).
[2] V. Gehanno *et al.*, J. Magn. Magn. Mater. **172**, 26 (1997).
[3] V. Gehanno *et al.*, Phys. Rev. B **55**, 12552 (1997).

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Optical Control of Ultrafast Spin-wave Relaxation by Magnetic Anisotropy in a Ferromagnet

Presenter: Kevin Smith
Advisor: Gunter Lüpke
College of William & Mary, Physics

Spintronic devices, such as magnetic logic and memories, combine the quantum-mechanical magnetic and electric properties of the electron to store and transfer information. Progress in part depends on a detailed understanding of the control mechanisms for spin-wave excitation and relaxation. To this end, there has been a recent wealth of activity in utilizing ultrafast (femtosecond) lasers and the Time-Resolved Magneto-Optical Kerr Effect (TR-MOKE) to generate and study magnetization dynamics in the time domain. Nevertheless, there is still an incomplete understanding of damping, and reports have shown that TR-MOKE in particular, while capturing the excited precession frequency quite well, often yields stronger damping than that observed using other techniques, such as ferromagnetic resonance (FMR). In this presentation, we demonstrate that an ultrafast laser pulse can control the effective damping by interacting with the magnetic anisotropy of a ferromagnet. In this process, the relatively slow (picosecond) recovery of the anisotropy in the presence of the pump pulse broadens the excited mode distribution, which enhances damping through dephasing. We present evidence of this effect in 10nm thick Ni(001)/MgO(001). We rule out other contributions to the damping by contrasting TR-MOKE with FMR, and we show that the techniques are inconsistent for geometries in which anisotropy is important. We thus introduce a novel optically mediated decay mechanism: pump-induced anisotropic damping.

Infrared Photon Stimulated Proton Transport in Oxides

Presenter: Erik Spahr
Co-Authors: Gunter Lüpke, Michael Stavola, Lynn A. Boatner, Lanlin Wen
Advisor: Gunter Lüpke
College of William & Mary, Physics

Proton conduction in solids is a fundamental process that has attracted considerable attention based on important developments and applications in hydrogen energy research. Particularly in the case of solid oxides such as TiO_2, this phenomenon is usually observed at high temperatures in the range of 700-1000 °C which can limit the practical application of devices. For example, in solid oxide fuel cells high temperatures cause slow startup times, reduce operational lifetimes due to thermal stress, and require the use of expensive catalytic electrodes. Therefore, it is of great interest to develop mechanisms that can promote a high conductivity without the drawbacks associated with high-temperature operation. In this work, measurements of the O-H and O-D vibrational lifetimes show that the room-temperature proton diffusion rate in rutile TiO_2 can be enhanced by nine orders of magnitude when stimulated by resonant infrared photons. We find that the local oscillatory motion of the proton quickly couples to a wag-mode-assisted classical transfer process with a jump rate of >1 THz and an energy barrier height of ~0.3 eV. Such an increase in proton transport rate at moderate temperatures is significant for renewable energy applications ranging from hydrogen fuel cells to water splitting by photocatalysis.

Dry etching of Nb SRF cavity

Presenter: Janardan Upadhyay
Co-Authors: M. Rašković, L. Vušković, S. Popović, L. Phillips , A.-M. Valente-Feliciano
Advisor: Lepsha Vušković
Old Dominion University,
Physics

We are pursuing the use of eco friendly dry etching to treat niobium SRF cavity surfaces in an Ar/Cl_2 discharge. Plasma based surface modification provides an excellent opportunity to eliminate non-superconductive pollutants in the penetration depth region and to remove the mechanically damaged surface layer. It also improves the surface roughness. A specially designed single cell cavity is used to study the asymmetric discharges in order to achieve uniform plasma etching in single cell geometry. The single cell contains 20 sample holder holes symmetrically placed over the cell. These sample holder holes can be used for both diagnostics and sample etching purposes. We are studying the radially and spectrally resolved profiles of optical intensity of the discharge with variable electrode geometry with the goal to obtain the optimum cavity treatment. Important plasma parameters have been evaluated at different points of cavity geometry to relate the effect of Nb etching with plasma conditions.

Localized Surface Plasmon Resonance enhanced magneto-optical activity in core-shell Ag-Fe and Ni nanorods

Presenter: Lei Wang
Co-Authors: K. Yang, C. Clavero, A.J. Nelson, K.J. Carroll, E. Carpenter, R. Ale Lukaszew
Advisor: R. Ale Lukaszew
College of William & Mary,
Physics

Metallic nanoparticles (NPs) are suitable platforms for miniaturized bio-sensing based on their optical and magneto-optical properties. It is possible to enhance the sensitivity of specific kinds of NPs by exploiting their optical and magneto-optical properties under suitable external magnetic field modulation. Here, the magneto-optical properties of Fe-Ag core-shell ferromagnet-noble metal NPs and Ni nanorods have been investigated as a function of the incident light frequency. For Fe-Ag NPs with a concentration ratio around 25:75 an optical absorption band centered at 3 eV due to Localized Surface Plasmon Resonance (LSPR) excitation is observed. A strong enhancement of the Faraday rotation is also observed, greatly exceeding the value estimated for pure Fe NPs, also associated with the LSPR excitation. For Ni nanorods an optical absorption band centered at 2.85 eV and an associated maximum in the Faraday rotation are observed due to the LSPR excitation. Our findings open up the possibility of highly sensitive miniaturized magneto-optically modulated bio-sensing.

The Qweak Experiment

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

The weak interaction is one of the four known fundamental interactions in nature. It can be seen or detected mostly in beta decay due to the exchange of the heavy W and Z0 bosons. The proton, as one of the building blocks of atomic nuclei, is an important target to study in particular to understand its nature during the weak interaction. The weak charge of the proton, called q_weak, which describes the strength of the coupling of the electrically neutral Z0 boson to the proton, is precisely predicted in the "Standard Model" of particle physics. Because this value is very small, any deviation from this predicted value would give us information about new physics, namely new forces or new fundamental particles in nature. An experiment is being constructed at Jefferson Lab to determine q_weak by measuring the parity-violating asymmetry in the elastic scattering of polarized electrons from the proton at very low momentum transfer. This small asymmetry, which arises due to the electroweak interference, will allow us to determine the weak charge to a 4% combined statistical and systematic error level, which will probe new physics at the energy scale of several TeV, which is competitive with the energy scale probed by the highest-energy particle accelerators. The basic apparatus of the experiment, including the target, main detectors, toroidal magnet and the tracking system will be detailed. The toroidal magnet will focus the scattering electrons from the hydrogen target onto eight Cerenkov main detectors and the tracking system will precisely determine the momentum transfer Q2, which will be essential to reduce the uncertainties in extracting q_weak.

Apparatus for Production and Manipulation of Ultracold Atoms

Presenter: Austin Ziltz
Co-Authors: Jim Field, Megan Ivory, Yudistira Virgus, Seth Aubin
Advisor: Seth Aubin
College of William & Mary, Physics

To create and manipulate ultracold quantum gases, such as Bose-Einstein condensates (BEC) and degenerate Fermi gases (DFG) elaborate optical and magnetic trapping and cooling techniques are required. We present an apparatus for production of ultracold bosonic and fermionic Rb and K isotopes, consisting of a magneto-optical trap (MOT), magnetic transport system, atom chip and optical dipole trap. The apparatus will be used for atom interferometry and atomtronics experiments. The apparatus requires the careful control of multiple tailored magnetic fields for production, trapping and transport of ultracold atoms. Fast turn on and off of magnetic fields requires dedicated high current power supplies and custom high voltage switching circuitry to drive high inductance coils. We will discuss the design and capabilities of magnetic coils both in trapping and Feshbach resonance operation, as well as transport of the ultracold sample to an atom chip micro-magnetic trap via transfer coils. The atom chip consists of photo-lithographically deposited wires on a substrate which will be used to generate localized DC, RF and microwave micromagnetic potentials. We have designed a support structure on which to mount and heat sink the atom chip, as well as to provide multiple microwave and electrical connections. Once at the chip, the atoms will be evaporatively cooled to quantum degeneracy using a 1064 nm dipole laser and magnetic traps. When quantum degeneracy is achieved, we will use RF and microwave potentials to study atomtronic devices and construct BEC and DEF atom interferometer for precision measurements of inertial forces and atom-surface interactions.

Development of Prosocial Behaviors in the Context of Risk in Middle Childhood

Presenter: Lauren Aaron
Co-Authors: Danielle Dallaire, Janice Zeman
Advisor: Danielle Dallaire
College of William & Mary,
Psychology

Studies show that exposure to risk factors (such as poverty and living in a single-parent family) is associated with maladjustment (Raviv, Erel, Fox, Leavitt, Raviv, Dar, et al., 2001). Little is known about how cumulative risk effects positive adjustment, such as helping behavior. The present study examines the roles of risk experience in children's development of naturally-occurring prosocial behavior. Participants were recruited from second- through fifth-grade classrooms in a high-crime, low-income area. Children were interviewed individually and had the opportunity to help and comfort the experiementer. Children also had the opportunity to share with a peer at the end of the interview. Parents reported income, the number of children at home, their education history, if they were a single-parent or had been incarcerated, if the child witnessed the parent's arrest/sentencing, and if they had been a teen parent. Children reported exposure to violent events. Preliminary analyses show that sharing occurs more in older children than younger children ($t(211) = -2.39$, $p < .05$), but there were no main effects of risk experience. The effects of risk and age interacted so that high risk-exposed and low risk-exposed children helped differently with respect to age (Wald = 7.63, $p < .01$). Future analyses are expected to show that children's overall risk experience will predict general prosocial behavior and that age will mediate this relation. Policy implications are likely from such results, as empathy training may be needed in schools attended by high-risk children.

Teen Dating Violence: A Public Health Concern

Presenter: Janna Bonesteel
Co-Authors: Audrey Gottheimer, Kristi Blust, Mindy Gutow, Elizabeth Katz
Advisors: Mindy Gutow, Elizabeth Katz
Towson University,
Psychology

The purpose of this poster presentation is to call for continued research in the area of teen dating violence. The poster will aim to highlight the ambiguities in existing research surrounding the definition of teen dating violence and prevalence rates. In addition, the poster will summarize the effects and consequences of teen dating violence victimization. A description of what the community can do to identify and prevent teen dating violence will also be provided. Lastly, the poster will examine gaps in existing literature and offer ideas for future research.

Gender differences in relational styles and strivings via the Influence Matrix

Presenter: Chauncy Brinton
Co-Authors: Molly Reams, Gregg Henriques
Advisor: Gregg Henriques
James Madison University,
Psychology

The present study seeks to examine whether gender differences in relational styles and strivings, conceptualized as agency and communion, can be understood via the Influence Matrix. The Influence Matrix (Henriques, 2005, 2007) is a comprehensive model of social motivation and affect that attempts to assimilate and integrate many different lines of psychological theory and research into a single model. Research has shown that that men tend to be more agentic or self-oriented whereas women tend to be more communal or other-oriented (Ely, Gigliana, & Hadge, 1998). From the vantage point of the Matrix, agency and communion are represented by a self-other dimension. Given reported gender difference in agency and communal strivings, we hypothesized that males should score higher on the self-quadrant, whereas women should score higher on the other-quadrant. Data from two separate samples of college students at a midsized mid-eastern university were included in this study. Participants were administered the Influence Matrix-Social Motivation (IM-SM) Scale. The first sample consisted of 312 students (232 Females and 80 Males). The second sample consisted of 243 students (193 Females, and 50 Males). Results from both samples largely confirmed our hypothesis. Our findings provide more empirical support for the IM as a unified framework by which psychologists from different schools of thought can communicate ideas and better understand one another. Future directions for the IM will be reported.

Impulsivity, Outcome Expectancy, and Alcohol Problems Among College Students

Presenter: Jonathan Freedlander
Co-Authors: Eugene Dunne, Samantha Lookatch, Laura Turner, Elizabeth Katz
Advisor: Elizabeth Katz
Towson University,
Psychology

Research has shown that alcohol outcome expectancies form the final pathway yielding drinking behavior. Impulsivity has been associated with many risky behaviors, including drinking. However, few studies have examined impulsivity as a predictor of outcome expectancies. Thus, the present study examined the impact of impulsivity on alcohol outcome expectancies and whether these expectancies mediated the association between impulsivity and drinking. Participants were college students (n=201; 44% male) who completed measures of impulsivity (Urgency, Premeditation, Perseverance, and Sensation seeking, UPPS), alcohol outcome expectancies (Comprehensive Effects of Alcohol, CEOA), and risky alcohol consumption (Rutgers Alcohol Problem Index, RAPI). Mediation was tested with an SPSS macro by Preacher and Hayes (2008). Negative urgency (impulsive responding when experiencing negative emotions) predicted RAPI total score (total effect $t = 4.72$, $p < 0.001$). This effect was mediated by Global Positive Expectancy (indirect effect $Z = 2.60$, $p < 0.01$), Global Negative Expectancy (indirect effect $Z = 1.92$, $p < 0.05$), and Sexual Expectancy (indirect effect $Z = 2.65$, $p < 0.01$). Lack of perseverance (inability to persist in finishing jobs or duties) predicted RAPI total score (total effect $t = 3.89$, $p < 0.001$), which was mediated by Sexual Expectancy (indirect effect $Z = 2.72$, $p < 0.01$). These results support the hypothesis that outcome expectancies mediate the association between impulsivity and risky drinking behaviors. Future research should investigate this relationship further, as well as the role of outcome expectancy as a mediator of other alcohol risk factors.

Mu Rhythm Desynchronization and Coalition Membership: An evolutionary and embodied approach to race relations

Presenter: Kyle Gagnon
Co-Author: Cheryl Dickter
Advisor: Cheryl Dickter
College of William & Mary,
Psychology

Examples of racial biases are abundant in the scientific literature, yet the underlying nature of racial biases remains to be discovered. Recently, mirror neurons in the sensorimotor cortex have been implicated in social understanding processes. Research has demonstrated that mirror neurons fire when one completes a goal-directed action and when one perceives that same goal-directed action being performed by others. The current experiment will test the hypothesis that there exists a fundamental lack of social understanding during racial outgroup perception. Electroencephalography (EEG) will be recorded as participants view videos of racial ingroup and outgroup member hands performing goal directed actions. The mu rhythm, an 8-12 Hz oscillation over the sensorimotor cortex, will be isolated from the EEG recordings as an index of baseline neuronal activity. During the perception of a goal-directed action, desychronization of the mu rhythm is often associated with mirror neuron activity. As such, it is expected that there will be less mu desynchronization during racial outgroup perceptions. Next, novel coalitions will be established, using wristband colors not associated with racial ingroups and outgroups. It is hypothesized that more mu desynchronization will occur during the perception of wristband ingroup members, regardless of race. These results will suggest that underlying racial biases reflect a lack of social understanding that is not specific to race per se, but to any salient outgroup.

Friendship Characteristics and Cross-Race Friendships Among Racial Minority and White Adults

Presenter: Kirsten Gonzalez
Co-Author: M. Paz Galupo
Advisor: M. Paz Galupo
Towson University,
Psychology

The present research investigates the importance ratings of friendship characteristics for individuals with and without cross-race friendships. Previous research on friendship has emphasized that people form friendships with individuals similar to themselves on the basis of sex, race, and social economic status (Duck, 1991). The present research is the first to directly explore the relation between cross-race friendships and attitudes regarding desired friendship characteristics. Participants included 1414 adult women and men (1018 white individuals, 396 racial minorities). Participants completed a friendship profile including demographic information about themselves and close friends and rated the importance of 12 friendship characteristics on a five-point scale where higher numbers indicated greater importance. Overall results indicated that individuals with at least one cross-race friendship rated similar lives & experiences and emotional support as less important ($p < .05$) than those who reported no such friendships. Distinct patterns across race, however, emerged for other friendship characteristics. For racial minority participants, individuals with at least one cross-race friendship rated known for a long time as significantly less important ($p < .01$) than those with no cross-race friendships. For white participants, individuals with at least one cross-race friendship rated similar values as significantly less important ($p < .05$). The present findings suggest that cross-race friendship “choices” for whites and racial minorities may be made in different contexts. Implications of these findings and directions for future research will be discussed.

Expectancy Violation and Personality Traits

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

Social psychological research on person perception has shown that perceivers quickly form impressions of others by automatically placing targets into social categories and activating relevant stereotypes. People are likely to form impression of others as soon as they see them. Furthermore, studies have shown that when perceivers face stereotype-inconsistent information during the impression formation process, they engage in more neural activity to resolve this inconsistency, reflected in the P300 component of the event-related brain potential (ERP; Cacioppo *et al.* 1993; Bartholow & Dickter, 2007). The current project will further investigate these working-memory processes by examining how perceivers with specific personality traits may neurally process expectancy-violating information differently, reflected in P300 amplitude differences. Participants with different inter-racial attitudes, authoritarian tendencies, and need for closure (as assessed by questionnaires) will complete a reaction time task. In each trial of the computer task, participants will be presented with a sentence describing the behavior of a fictitious target. Participants will be asked to form an impression, after which they will see a picture of a target whose race will either be stereotype-congruent or -incongruent with the previous sentence. Participants' task will be to indicate whether this person could be the subject of the preceding sentence. Reaction time and ERP responses will be recorded, and it is expected that expectancy violating trials will yield larger P300 amplitudes, and that the need for cognitive closure will moderate these effects.

Effects of long-term exposure to distracters on sustained attention task performance and concurrent new discrimination learning

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

Acute exposure to distracters is known to decrease attention task performance in rats but little is known about the effects of long-term exposure to distracters on attention task performance or on subsequent learning. In the present experiment male Long-Evans rats (N = 15) were trained in a sustained attention task that required discrimination of brief visual signals (500, 100, 25 ms) from trials with no signal presentation. After reaching criterion, the animals continued to train in the same task (n = 7) or in the same task with a houselight in the back of the chamber flashing throughout the session (n = 8). Animals exposed to the houselight showed an initial decrease in accuracy, but their performance improved with subsequent training. All animals were then tested with trials inserted within the sustained attention task that required acquisition of a new visual discrimination. Animals exposed to the flashing houselight showed faster acquisition of the new visual discrimination task compared with animals that had not been exposed to the distracter. The present findings suggest that long-term exposure to a distracter may increase cognitive flexibility to support new learning. Future experiments will examine the neural basis of this increase in cognitive flexibility.

Cognitive Aging: Influences on Attention and Response Switching

Presenter: Kathryn Holt
Co-Author: Paul Kieffaber
Advisor: Paul Kieffaber
College of William & Mary, Psychology

Past research indicates attentional switching deficits in the elderly; however, early experimental designs confound measures of attentional- and response-selection processes. Our study addresses this limitation by introducing a new task-switching paradigm. While recording EEG, student and elderly participants categorized pairs of figures according to one of three rules: shape, size, or color. Rules "shape" and "size" required a judgment about whether the figures were the "same" or "different." "Color" required a decision about the color of the figure-pair. Participants relayed decisions by pressing one of two buttons. Because the meanings of these buttons changed depending upon the current rule, participants frequently updated their attentional -selection (shape, size, or color) and/or their response-selection (same/different or red/blue) processes. Types of conflict generated by the stimulus also varied. The attentional dimension could generate conflict (same shapes of different sizes) or the response dimension could cause conflict (color choice was inconsistent with size/shape choice). Behavioral results and event-related brain potentials reveal significant age-related differences. Whereas both younger and older participants were slowed for stimulus conflict trials, older participants were selectively vulnerable to response conflict. In the stimulus -locked epoch, the N2 component, an index of conflict processing, revealed decreases in amplitude at frontal electrode sites for the elderly. The results suggest that response-conflict processing contributes to attention deficits found in older populations as they may have difficulty filtering irrelevant response information.

Emotion Processing Deficits in Psychometrically-Measured Schizotypy

Presenter: Nicole Karcher
Co-Authors: Jeri Kent, Jennifer Stevens, Glenn Shean
Advisor: Glenn Shean
College of William & Mary, Psychology

Schizotypy, the personality characteristic of psychosis proneness, is associated with a broad range of emotional deficits, including emotion processing. While previous research has established the existence of these emotion processing deficits, few studies have delved into the basis of these deficits. The current study aims to use event-related brain potentials in order to explore the neural correlates of emotion processing deficits in schizotypal individuals. Undergraduates were selected to participate based off of scores from the Magical Ideation Scale. These scores revealed a group of participants who indicated high levels of schizotypy (n=18), as well as a control group with low levels of schizotypy (n=20). Participants viewed neutral, positive, negative, and emotional valenced images while EEG was recorded. The results indicate that differences between the two groups as measured by additional schizotypy questionnaires were statistically significant. There were also significant differences between the two groups in the P300 amplitude response to emotional images. Specifically, there was a trend of a decreased P300 amplitude in individuals scoring high in measures of schizotypy. There also appears to be preferential emotional processing in the right parietal hemisphere in these individuals. The results indicate that schizotypal individuals display a complicated combination of attenuated attentional allocation to emotional stimuli as well as an increased vigilance towards threat. The P300 amplitude deficits also indicate the possibility that these results may have been obtained due to a broader information processing deficit in individuals high in schizotypy.

Gender differences in the mediating role of emotion dysregulation in the relation between violence exposure and internalizing symptoms

Presenter: Priscilla Khuanghlawn
Co-Authors: Debra Brown, Janice Zeman, Danielle Dallaire
Advisor: Janice Zeman
College of William & Mary,
Consortium Program in Clinical Psychology

This study examined the role of emotion regulation in mediating the relationship between exposure to violence and internalizing symptoms in children. Participants were 247 elementary school-age, African-American children (97 boys, 150 girls; M age = 9.5 years). The children completed questionnaires investigating violence exposure, worry and sadness dysregulation, and internalizing symptoms. Specifically, depressive symptoms on the Children's Depression Inventory (CDI) and anxiety symptoms on the Multidimensional Anxiety Scale for Children (MASC) were measured. To examine this relationship, meditational regression analyses were conducted. Findings indicated a significant, partial mediation of the relationship between exposure to violence and depressive symptomatology on the CDI, through girls' management of worry. In addition, analyses indicated full mediation of the relationship between girls' exposure to violence and anxiety symptomatology on the MASC, through girls' management of worry. Thus, findings indicate that worry dysregulation mediated the relationship between exposure to violence and depressive and anxious symptomatology for girls. However, the relationship between exposure to violence and internalizing symptoms was not mediated by difficulties in regulating sadness, indicating the importance of examining individual emotions rather than global negative affectivity. Findings were not evident for boys in this sample; therefore, gender is an important determinant of the relationship.

The interaction of structural and conceptual information determines object confusability

Presenter: Daniel Kinka
Co-Authors: Kathryn Roberts, Cindy Bukach
Advisor: Cindy Bukach
University of Richmond,
Psychology

The current study examines the impact of conceptual information on competition from shared structural features during an object recall task. Previous studies with category specific visual agnosia patient ELM show that structural dimensions such as tapering and pinching are stored in a distributed fashion, and that integration of these dimensions can fail during recall due to competition from objects that share values on these dimensions (Dixon *et al.*, 1997). Visual similarity is therefore determined not only by proximity among distributed diagnostic structural dimensions, but also by the number of values shared by objects within a category. ELM was able to use distinctive conceptual information to resolve structural competition during recall. This interaction between structural similarity and conceptual relatedness was replicated in normal recall of newly learned attributes to known objects (Bukach *et al.*, 2004). However, it is difficult to define the relevant diagnostic features of real objects. In the current study, we use novel stimuli to manipulate both the number of shared features and conceptual relatedness of objects while controlling for similarity due to proximity. Participants associated either conceptually related or unrelated labels to object sets that shared few or many values on diagnostic structural dimensions. Participants in the conceptually related and shared structural values condition made more errors than any other group. These results are consistent with the pattern of errors from ELM and provide strong evidence for the influence of conceptual information on resolution of competition from shared values on structural dimensions during normal recall.

Perceptions of risk in intimacy in online relationships

Presenter: David Kovaz
Co-Author: Constance Pilkington
Advisor: Constance Pilkington
College of William & Mary,
Psychology

The extent to which people see intimate relationships as risky has significant implications in their social interactions. The Internet is a relatively new and increasingly prevalent forum for social interaction and relationship formation. The aim of the current research is to examine how people perceive risks in online relationships compared to traditional face-to-face relationships. Specifically, we want to know if individuals who perceive greater risk in intimacy (high-RII's) see online relationships as more or less risky than those who perceive less risk in intimacy (low-RII's). We also want to know if high-RII's differ from low-RII's in their cognitive processing of online relationship risks. To examine this, we will present participants with a number of online situations and relationship risks and record their reaction times as they respond to these items. We expect an interaction effect of RII and gender on the reaction times to the online situations. High-RII females should have the fastest reaction times and should have faster reaction times for online situations compared to face-to-face situations. The results of this study may provide valuable insight into perceptions of risk in intimacy within a new social context.

Humor & Conformity

Presenter: Caitlin Lamm
Advisor: Larry Ventis
College of William & Mary,
Psychology

Humor is known to be a social phenomenon, but the nature of social effects are still being examined. Laughter from others affects the laughter of an individual, but the degree to which it affects the perception of humorousness and enjoyment is still being looked into. In this study, participants are being asked to listen to jokes with or without hearing laughter from others and rate those jokes for humorousness and enjoyment while their laughter is being recorded. They also complete several personality inventories including SHQ-6, HSQ, Social Desirability Scale, and a measure of the Big Five. We hypothesize that laughter from those with affiliative humor styles, high social desirability, and high agreeableness will strongly correlate with laughter from others. Participants scoring high in extraversion and personal liking of humor will have higher scores in general. Those scoring high in emotional permissiveness are expected to be affected more by judged humorousness of the jokes than by laughter from others.

The Self-Serving Bias Across the Lifespan and Domains of Functioning

Presenter: Courtney Lee
Co-Author: Jane Berry
Advisor: Jane Berry
University of Richmond,
Psychology

Self-knowledge can play critical roles in navigating physical, cognitive, and social changes as well as mediating negative declines in later life. To self-protect, individuals tend to self-enhance and self-serve in areas important to self-esteem (e.g. age-ecological domains). Participants ranging in age from 22 to 88 years completed a series of tests assessing the self-serving bias across a variety of age -relevant domains as well as an objective memory test. Results not only confirmed the presence of an overall self-serving bias but also demonstrated higher biases by young, middle-aged, and older adults on age-congruent domains. Older adults also overestimated their objective memory ability and exhibited high levels of the self-serving bias for memory. These results are consistent with aging adults' fears of memory loss, perhaps leading to a need to self-protect via self-enhancement. Findings suggest that individuals are differentially self-aware of their abilities throughout adulthood, and seem to be aware of their relative strengths. Late adulthood may not necessarily be a time of decline, but rather an opportunity to continue "self-making" and growing in self-knowledge.

Factor analytic decomposition of "the chills": Goosetingles and coldshivers

Presenter: Laura Maruskin
Co-Author: Todd Thrash
Advisor: Todd Thrash
College of William & Mary,
Psychology

"The chills" refers to a tingling, shiver-down-the-spine sensation often accompanied by visible pilo-erection (goosebumps). This is a well-known sensation, but the topic of little psychological research. 190 undergraduates participated in a 14-day diary study, during which they completed an online questionnaire each time they experienced the chills. Results indicate that on average participants experienced the chills three times over the 14-day period. A multi-level factor analysis showed that the chills consists of two distinguishable factors: "goosetingles" (goosebumps and tingling sensations) and "coldshivers" (feeling a chill and a shiver). Goosetingles and coldshivers were related to positive affect and negative affect, respectively. Individuals high in the trait of self-transcendence were particularly prone to experiencing goosetingles; in contrast individuals high in neuroticism were particularly prone to experiencing coldshivers. Whereas other researchers have conceptualized the chills as a unitary construct, the present findings provide strong evidence that the chills may be dissociated into two separable components. Additional research is needed to identify the neurological bases of these components.

Re-examining the Three Domain Disgust Scale

Presenter: Joseph Pochedly
Co-Author: Lee Kirkpatrick
Advisor: Lee Kirkpatrick
College of William & Mary,
Psychology

From an evolutionary perspective, emotions can be conceptualized as psychological mechanisms that help solve adaptive problems of survival and reproduction. Disgust is a universal human emotion (Ekman, 1972) and produces adaptive behaviors such as the avoidance of disease-carrying substances. Others have argued that disgust is evoked not only by disease-carrying substances, called core elicitors (e.g., rotten food, feces, vomit), but also in other evolutionarily significant domains. For example, sexual disgust may function to help avoid choosing poor mating partners, and moral disgust may be elicited by anti-social behaviors that impose costs in terms of survival and reproduction (Tybur, Lieberman, & Griskevicius, 2009). Thus, moral disgust may be a mechanism for avoiding costly interactions with anti-social individuals as akin to core disgust as a disease avoidance mechanism. This study will examine the validity of the Tybur et al. (2009) Three Domain (core, sexual, moral) Disgust Scale. Two groups will be given different versions the Disgust Scale, the original asking how 'disgusting' they find each item, and another asking how 'gross' they find each item. Nabi (2002) has shown that the genuine emotional construct of disgust is more specifically associated with the word 'gross' rather than with 'disgusting', which conveys negative emotions in general. We anticipate moral disgust will be rated lower in the 'gross' condition, consistent with evidence suggesting that although anti-social behaviors are verbally labeled 'disgusting', they elicit alternative adaptive emotions such as anger (Simpson, Carter, Anthony, & Overton, 2006).

Observations of Co-rumination Between Friends in Emerging Adulthood

Presenter: Teri Preddy
Advisor: Catherine Bagwell
University of Richmond,
Psychology

Although it is often assumed that individuals with supportive friendships are less vulnerable to depression and other problems, many people with close friends still experience significant levels of distress. Co-rumination, which involves excessive discussion of personal problems with a friend, has been proposed as one mechanism to explain the paradoxical findings about social support from friends and depression and anxiety. The current study extends prior research by observing friends while they discuss personal problems. We examine two hypotheses: (1) Co-rumination is associated both with positive friendship quality and with depression and anxiety among emerging adults. (2) Specific conversational processes are positively linked to co-rumination and to internalizing distress. For this study, 42 pairs of friends participated in a 10-minute problem discussion and also completed a self-report battery assessing friendship quality, depression, anxiety, co-rumination, and rumination. As expected, high levels of co-rumination predicted positive friendship quality. However, co-rumination was not associated with internalizing distress. Additionally, specific dimensions of conversation were associated with co-rumination and also with friendship quality and emotional adjustment. In particular, statements of support/agreement were associated with co-rumination and positive friendship quality. In contrast, statements of discouragement were associated with depression and statements of disagreement were linked to self-reports of anxiety and low friendship quality.

The Effects of Emotion Dysregulation in Borderline-Personality Disorder on Cognitive Performance

Presenter: Wesley Sanders
Co-Author: Glenn Shean
Advisor: Glenn Shean
College of William & Mary,
Psychology

Borderline-Personality is characterized by emotion dysregulation, with tendencies toward emotional swings, stormy relationships and impulsivity. Studies have shown those with BPD to have impaired facial recognition of emotion and a strong negativity bias. This research will be studying normal individuals who report characteristics that resemble aspects of BPD. The goal of the study is to further examine this negativity bias as evidenced in response to film content and its effect on cognitive performance using the digits backwards test. It is expected that those participants who report features of BPD will show greater interference in their ability to do the digits backwards task after viewing negative emotional film interactions, and higher levels of heart rate variability and GSR activity while viewing these clips. High scoring participants are also expected to rate the impact of the negative emotional clips higher than low scoring participants. The results of this study could provide insight into factors affecting emotional dysregulation, as well as implications this dysregulation might have for cognitive abilities in those with BPD.

Changes in Coping over Two Periods of Adolescence

Presenter: Katie Taylor
Co-Authors: Emily Wheat, Nikola Zaharakis
Advisors: Terri Sullivan, Wendy Kliewer
Virginia Commonwealth University,
Psychology

Adolescence represents an important transitional period, which is often accompanied by an increase in stress. Thus, the present analyses examined how individuals cope with stress across adolescence. Participants for the current study were divided into two age groups. Both groups consisted primarily of African American youth; 62 children (42.4% male) made up the younger group and 46 (39% male) were in the older group. The average ages of the younger adolescents were as follows: wave 1 (M = 10.80), wave 2 (M = 11.85), and wave 3 (M = 13.79). The ages of the older group were as follows: wave 1 (M = 13.67), wave 2 (M =14.70), and wave 3 (M = 16.74). At every wave adolescents were administered the Social Competence Interview (SCI), which assessed youth's experiences of and responses to a stressful event related to community violence. One-way repeated measures analyses of variance were used to assess the change in younger and older adolescents' coping over time. Results for the younger group indicated that adolescents reported a significant decrease in problem-focused coping between waves 1 and 2. Findings for the older group revealed a significant decline in avoidance coping and secondary control coping (i.e. optimistic thinking) between waves 1 and 2. Both groups showed a decrease in total coping strategy use between wave 1 and wave 2 and no significant changes in aggressive and support-seeking strategies over time. There were no significant changes between waves 2 and 3. Results provide support for the notion that coping behaviors change across development; therefore, coping should be examined within the context of age and developmental level.

In the Neighborhood: Universities, Community Engagement and Development

Presenter: Jose Alcaine
Advisors: William Bosher, Richard Huff
Virginia Commonwealth University,
Public Policy

Universities and colleges play a vital and important role in the communities they serve. Universities augment their primary roles in education, research and publication with projects that engage the communities around them. Many of these outreach programs may be born out of necessity for the normal and efficient operation of the universities themselves or may be born out of established curriculum programs. Increasingly, community service and outreach programs, as well as service learning activities have become part of the normal curriculum at many universities and colleges. Many of these university-based programs are supported and funded by state and federal agencies such as the Corporation for National and Community Service (CNCS). The appropriations enacted in Fiscal Year 2008 totaled over $856 million for CNCS programs. The purpose of this research is to explore the effectiveness of CNCS sponsored, university-based programs in Virginia. This study will use the mixed method approach for data collection and analysis. The trend seems to be for university-based, community programs to increase in number as student, community and governmental involvement, and attitudes change to recognize the importance and impact universities have on the communities around them. Public policies also exist that enhance these activities.

The Administration of Children: How We Care For and Think About Children

Presenter: Mariglynn Collins
Advisor: Lori Brainard
The George Washington University,
Public Policy and Public Administration

Sometimes the things closest to us are the hardest to examine because we take them for granted and assume that we know how we feel about them. Children are one of these things. Due to the fact that we all once fell into this category, there is an assumption that we have a basic level of agreement on the importance of children and the idea that how we care for them is one of our highest American values. In this research, I question what we really hold true about children and challenge the unspoken belief that we agree about their importance. In order to do this, I wrestle with foundational ideas of how we view children and how we care for and protect them, while making a normative statement that clarity within these basic ideas is central to a successful democracy. By searching media, history, law, policy and public philosophy, I identify various conflicting values regarding children and their care. Some of these conflicting values include: are children the future of our country or the product of their parents? Are they a public good or a private problem? Are they a family responsibility or a government responsibility? By wrestling with these and other conflicts, I attempt to explore and gather the collective ideas we have about children and their care as a way to understand how those views and beliefs shape all the other choices we make in public policy and public administration.

Guestworker Demand: Does the Availability of Domestic Workers Affect Employer Demand for Foreigners?

Presenter: Robin Ghertner
Advisors: Dylan Conger, Joseph Cordes
The George Washington University,
Public Policy and Public Administration

Policymakers often assume that temporary migration policies can maximize net economic benefit when visa limits are tied to macroeconomic indicators, in particular the unemployment rate. Such policies often assume, usually based on anecdotal evidence, that demand for temporary migrants, or guestworkers, is negatively correlated with the availability of domestic workers. Alternatively, network theory suggests that demand is affected by the size of the foreign-born population, though the effect's direction is ambiguous. On the one hand, existing networks of immigrants may facilitate the matching of foreign workers with employers, thereby increasing demand. On the other hand, networks may diminish guestworker demand by enabling employers to hire undocumented workers embedded in the network. Although common in the popular and academic literature, these theories have not been tested rigorously for low-skilled workers. I test these hypotheses using data on US employer requests for foreign labor certification by state, using a fixed-effects model to regress low-skilled guestworker demand on unemployment rates and the relative size of the foreign-born population. While significant, I find only a minor negative correlation between unemployment and demand, indicating that policymakers need to take into account the limitations of using general labor market indicators to define visa ceilings. The size of the foreign-born population is negatively correlated with demand, suggesting that high transaction costs to hiring guestworkers likely push employers to hire cheaper, more available undocumented workers, made accessible through immigrant networks.

Mitigating Elementary and Secondary Education Layoffs through the American Recovery and Reinvestment Act of 2009: Evidence from Virginia

Presenter: Aaron Hugeback
Advisors: John Gilmour, David Finifter
College of William & Mary,
Public Policy

Congress passed in February the American Recovery and Reinvestment Act of 2009. Of $787 billion, Congress set aside $54 billion as the State Fiscal Stabilization Fund (SFSF), to be spent primarily on education. This included Education Stabilization, a $40 billion allocation to maintain states' funding of public education. Beset by dwindling revenues, occasional balanced budget requirements, and an aversion to taxing, states predictably found supporting education during the recession difficult. In the summer of 2009, the Virginia Association of Counties, the Virginia Municipal League, and Fiscal Analytics, Inc, conducted a fiscal survey of counties and cities in the Commonwealth. The author of this presentation contributed to the survey as an intern for the Virginia Association of Counties. The survey asked localities how SFSF impacted school districts and local governments' budgets. School districts overwhelmingly responded that stimulus funds prevented or mitigated both layoffs and program cuts. Few school districts reported that stimulus funds enabled the expansion of programs. Nearly two-thirds of all local governments responded that SFSF did not impact the general government budget. Survey results support the claim that stimulus funding, intended to boost states' ability to support K-12 education in hard times, made a targeted, positive impact. This presentation will introduce the American Recovery and Reinvestment Act of 2009, SFSF, and Education Stabilization; review Virginia's Education Stabilization share; evaluate the survey of local governments in the Commonwealth; and examine the survey results.

"Tartarstan and Chechnya: The Russian Question"

Presenter: Alana Romanella
Advisor: Tim Luke
Virginia Tech,
Public and International Affairs

How can we explain the variation in Russian state policies, diplomacy vs. violence, regarding its treatment of the Muslim dominant republics of Chechnya and Tatarstan during their attempts at secession through the present? I investigate causal explanations for why the variation in Russian policies differed so drastically regarding Chechnya and Tatarstan, including geographical location, Chechnya as the gateway to the Middle East, oil and natural gas resources, and Yeltsin's policies. I hypothesize that the leadership styles of Dudayev and Shaymiyev and the historic conflicts between Chechnya and Russia were the most important factors in laying the scene for violence vs. diplomacy, whereas the other proposed reasons were of diminished importance. I will demonstrate these variations through social and political legislation, geography, first hand accounts, natural resource competition, leadership styles, Yeltsin's terms in office, and Putin's "war on terror."

Faith Based Environmental Stewardship in the Christian Churches of the Eastern Shore and Northern Neck of Virginia

Presenter: Paoula Sehannie
Advisor: Cliff Fox
Virginia Commonwealth University,
Public Policy

Lynn White presented the argument that western Christianity "bears a huge burden of guilt" for the environmental crisis. Despite his criticisms, White argued that since the problem was inherently religious, the solutions must be religious. White's article spurred great interest in questions of faith and the environment. Churches, seminaries and religious organisations now devote much attention to the role of faith in protecting the environment. Yet, little is known about stewardship in local churches. Have environmental concerns among church leaders trickled down to local congregations? I will ask: Are the Christian churches of the Northern Neck and Eastern Shore of Virginia engaged in environmental stewardship activities? Given the modest size of the population I will conduct a census of the entire population, using quantitative, survey methods. The literature indicates that numerous denominations and religious bodies support religious stewardship, are local churches aware of and following these directives? What form do these activities take, practical, educational or some other? What do participants feel the church's and individual Christians' roles should be in the environmental movement. I hypothesize that environmental concerns have largely not been incorporated into local congregations. Further, it is expected that liberal churches will be more involved in stewardship activities. The literature is expansive but little is known about local congregations. This research will contribute to the larger question of religion in the environmental movement, but specifically will address the dearth of knowledge of environmental practices in churches across the country.

Governance of U.S. Public Diplomacy toward Lebanon: an Exploratory Study of U.S. – Transnational Civil Society Relations

Presenter: Deborah Trent
Advisor: Kathryn Newcomer
The George Washington University,
Public Policy and Public Administration

Public diplomacy is a government's effort to understand, inform, engage, and influence foreign publics. The proposed paper will address the question: How do relevant U.S. public diplomacy and legislative staff, and Lebanese and Arab Americans, make sense of the challenges of public diplomacy toward Lebanon? Lebanon is a small Arab nation but has strong cultural ties to the U.S. and is considered a strategic partner by the U.S. government. The study is framed as government-transnational citizen relations, a process of collaborative governance with transnational Lebanese and Arab Americans and civil society diaspora organizations in the U.S. to which many belong. A relational framing of public diplomacy is an emerging area of inquiry that intersects with sensemaking theory. Sensemaking is used to interpret individual and group identity making processes that constitute relationships, power, and action-taking by organizations. The paper will consist of a brief review of relevant literature and preliminary insights from interviews to be conducted with government and civil society actors engaged in U.S. public diplomacy toward Lebanon. Literature review to date reveals no study that qualitatively analyzes U.S. public diplomacy toward Lebanon or any other Arab nation from a public administration-theoretic orientation of cross-sector governance. In this era of increasing need for government-civil society partnership, a cross-sector governance framing of U.S. public diplomacy is timely. The study is also timely as a new government forms in Lebanon.

Notes

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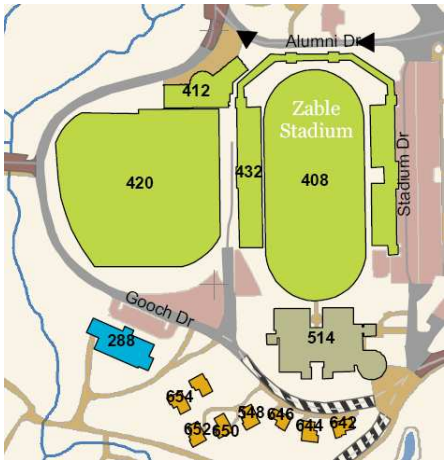

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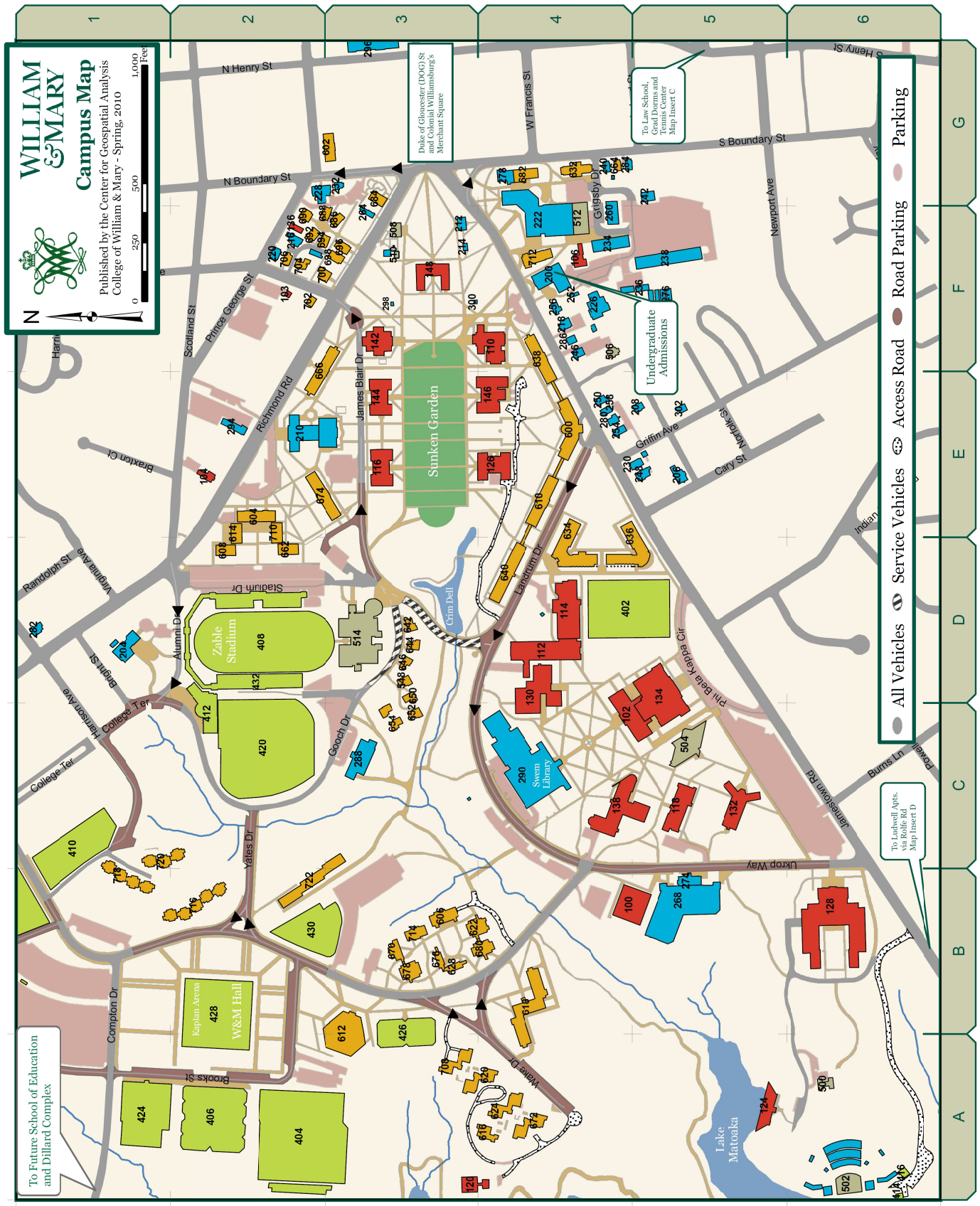
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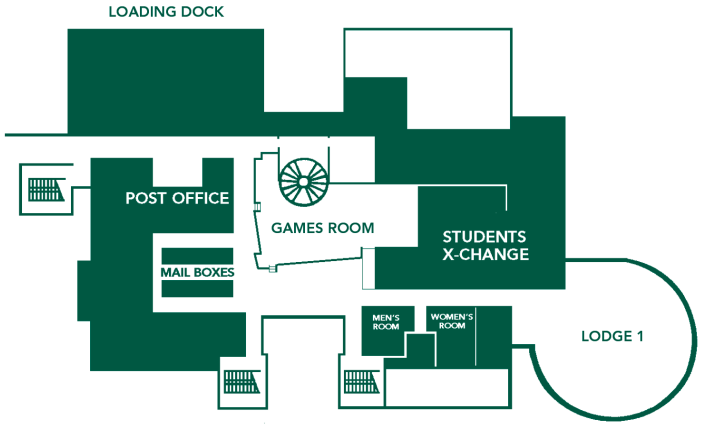
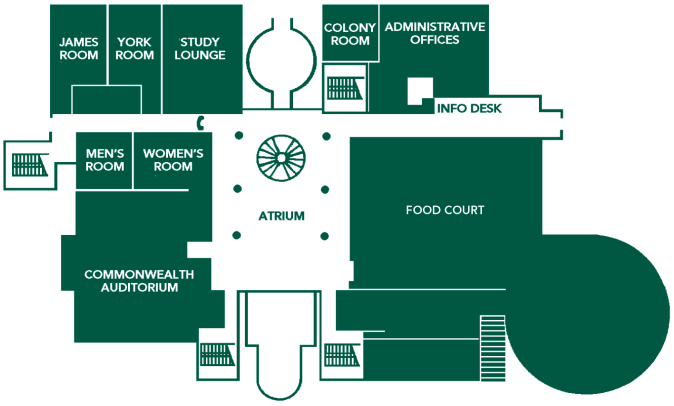
Griffin Ave
Cary St
Newport Ave
Jamestown Rd
Ukrop Way
Compton Dr
Yates Dr
Gooch Dr
Stadium Dr
Alumni Dr
College Ter
Brooks St
Wake Dr
Burns Ln
Duke of Gloucester (DOG) St and Colonial Williamsburg's Merchant Square
To Law School, Grad Dorms and Tennis Center Map Insert C
To Ludwell Apts. via Rolfe Rd Map Insert D
To Future School of Education and Dillard Complex

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

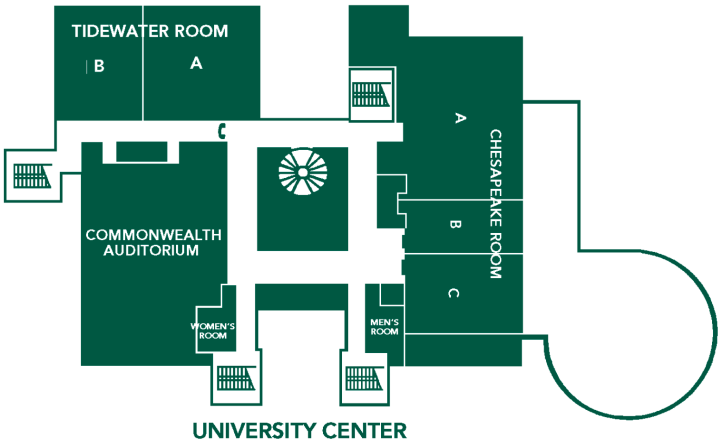
Meeting Space at the Sadler Center



UNIVERSITY CENTER
1ST LEVEL



UNIVERSITY CENTER
2nd LEVEL



UNIVERSITY CENTER
3rd LEVEL

ARTS & SCIENCES

Office of Graduate Studies and Research

757-221-2467 | Stetson House, 232 Jamestown Rd.