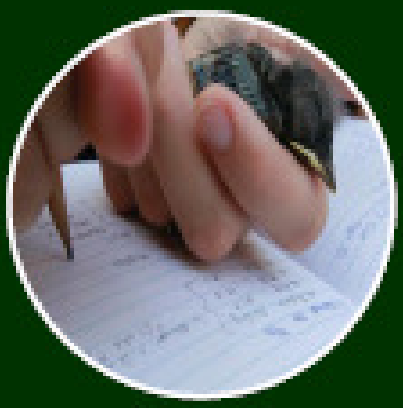
7th Annual

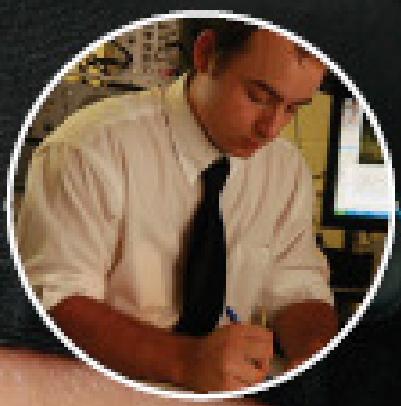
Graduate Research Symposium

March 28-29, 2008

The College of
William & Mary
University Center
Williamsburg, Virginia



"Preparing Scholars, Presenting Excellence"



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Schedule at a Glance

Friday, March 28 2008 -- University Center

7:30 am - 8:30 am	Registration *2nd Floor Lobby*
8:30 am - 7:00 pm	Poster Displays *2nd Floor Lobby*
8:30 am - 9:30 am	Concurrent Sessions *Tidewater A, Tidewater B, James Room, and York Room*
9:45 am - 10:45 am	Concurrent Sessions *Tidewater A, Tidewater B, James Room, and York Room*
11:00 am - 11:50 am	Keynote Lecture & Book Signing *Commonwealth Auditorium*
12:00 pm - 1:15 pm	Lunch & Welcoming Remarks *Chesapeake A*
1:30 pm - 2:30 pm	Concurrent Sessions *Tidewater A, Tidewater B, James Room, and York Room*
2:45 pm - 3:45 pm	Concurrent Sessions & General Interest Lectures *Tidewater A, Tidewater B, James Room, and York Room*
4:00 pm - 5:00 pm	Concurrent Sessions *Tidewater A, Tidewater B, James Room, and York Room*
5:15 pm - 7:00 pm	Networking Reception *Chesapeake A*

Saturday, March 29 2008 -- University Center

7:45 am - 8:30 am	Registration *2nd Floor Lobby*
8:30 am - 12:00 pm	Poster Displays *2nd Floor Lobby*
8:30 am - 9:30 am	Concurrent Sessions *Tidewater A, Tidewater B, James Room and York Room*
9:45 am - 10:45 am	Concurrent Sessions & General Interest Lectures *Tidewater A, Tidewater B, James Room and York Room*
11:00 am - 12:00 pm	Poster Presentations with Q&A *2nd Floor Lobby*
12:00 pm - 1:30 pm	Luncheon and Awards Ceremony *Chesapeake B & C*

Dear Members of the William & Mary Community and Guests,

Welcome to Williamsburg, Virginia, and the Seventh Annual Graduate Research Symposium. The Symposium Planning Committee has worked hard to organize our biggest and best Symposium yet, and we look forward to sharing it with you.

We hope that you will attend several of the more than 80 engaging presentations and poster sessions that will both challenge and broaden your knowledge. A unique event, the Symposium encourages interdisciplinary exchange, bringing together graduate students from the sciences and the humanities. This is an exciting opportunity to share experiences common to students in all graduate school communities.

The Symposium is delighted to share the meeting with colleagues from prominent regional institutions. We welcome to our campus the thirty-three visiting presenters, which include representatives from the following schools: Arizona State University, Duke University, George Mason University, the George Washington University, Hampton University, Johns Hopkins University, Marshall University, Old Dominion University, the University of Maryland Baltimore County, the University of North Carolina at Charlotte, the University of North Carolina at Wilmington, Virginia Commonwealth University, the University of Virginia, and West Virginia University.

In addition to the various graduate presenters, this year's Symposium features our own, Dr. Mitchell Reiss, William & Mary Provost for International Affairs, U.S. Ambassador, and former Director for Policy Planning at the U.S. Department of State, who will give the keynote address titled, "Bridging the Gap: From the Ivory Tower to the Corridors of Power". Further information on each presentation is available in the following pages of the program. We thank all of the speakers for joining our event and helping to produce a truly extraordinary conference experience.

As always, we want to make this event the best that it can possibly be. Thus, we appreciate your feedback on our planning and execution of this two-day gathering. At your leisure, please take a moment to fill out the survey provided. We look forward to meeting all of you during the Symposium and hope that you enjoy the festivities.

Jonathan Holley
Chair

Jonathan Holley

Sucheta Jawalkar
Vice-Chair

Sucheta Jawalkar

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

Dear Students, Faculty, Friends, and Guests,

It is my great pleasure to welcome you to the seventh annual Graduate Research Symposium at the College of William & Mary.

This marvelous university has a rich history of excellence in graduate education, which is part and parcel of the academic prowess for which we are rightly known. The work done by our advanced scholars—whether in the arts and sciences or in the professional schools; whether conducted on the main campus or at VIMS—contributes not just to the expansion of academic understanding, but in very real and powerful ways to our lives as citizens of this Commonwealth, nation, and world.

I'm grateful for your presence here today, both those of you whom William & Mary can proudly claim as its own and those who are visiting us from other universities. Welcome, and congratulations on your fine work. You have my best wishes for an enjoyable and rewarding gathering.

Cordially,

W. Taylor Reveley, III
Interim President

The Arts & Sciences Graduate Studies Advisory Board at the College of William & Mary is a proud sponsor of the 2008 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 A&S financial resources
- Assisting in the building of a graduate A&S community
- Enhancing professional development opportunities for graduate students
- Advocating for graduate A&S within the W&M community

A&S graduate programs are critical to the mission of the College of W&M 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 W&M's faculty members in Arts & Sciences.

By sponsoring the 2008 Graduate Research Symposium, funding the Distinguished Thesis/Dissertation Awards in A&S, and providing recruitment fellowships to outstanding entering graduate students, the Graduate Studies Advisory Board is playing a vital role in advancing W&M's graduate programs in Arts & Sciences.

Members of the Graduate Studies Advisory Board, 2007-08

President: Patricia Barry '63 BS Chemistry
Vice-President: Larry McEnerney '76 BA English & History
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Chair, Student Professional Development Committee:
Diane Alleva Cáceres '87 BA Economics, '89 MA Government
Chair, Nominations Committee: Robert Bolander '62 BA Economics, '64 MA History
James Baroody '68 MS Physics
John Burton '89 MA History, '96 PhD History
Nelson Daniel '90 BS Geology & Economics
David Daugherty '69 BS Biology, '71 MA Biology
Ann Koch '83 BA Religion
Sherry Manning '67 MS Mathematics
Peter Martin '71 MS Physics, '72 PhD Physics
George Miller '67 BS Physics, '69 MS Physics, '72 PhD Physics
Cynthia Morton '77 BS Biology
Bradley (Lee) Roberts '70 MS Physics, '74 PhD Physics
Maciek Sasinowski '93 MS Physics, '95 PhD Physics
Kumiko (Jean) Takeuchi '76 MA Chemistry
William J. Tropf '68 BS Physics
Mark Washko '90 BA Government, '94 MPP Public Policy
Edwin Watson II '68 BA History, '70 MA History

Recruiting/Mentoring Opportunity for Science Students

APL
The Johns Hopkins University
APPLIED PHYSICS LABORATORY

A W&M alumnus and member of the A&S Graduate Studies Advisory Board, Dr. Bill Tropf, is available at the Graduate Research Symposium's reception, awards luncheon, and poster presentation 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 looking primarily for science, engineering, mathematics, and computer science graduates with bachelors, masters, or doctoral degrees.

Local Sponsor

Local Sponsor

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.

The corporate sponsored awards listed below were open to all students from The College of William & Mary and visiting institutions. 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. Among the many outstanding submissions, the following students were selected to receive an award, based on the merit of their research.

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

Market Access International, Inc. Award for Excellence in Scholarship in the Humanities and Social Sciences

ERIN KRUTKO

The College of William & Mary, American Studies. Advisor: Dr. Charlie McGovern

Public Memory and Racial Reconciliation in Little Rock

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

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

NINGFANG MI

The College of William & Mary, Computer Science. Advisor: Dr. Evgenia Smirni

Performance Impacts of Autocorrelated Flows in Multi-tiered Systems

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

William & Mary Scholars

Award for Excellence in Scholarship in the Humanities and Social Sciences

WENDY KORWIN
American Studies Advisor: Dr. Leisa Meyer
Spectacles of Breeding: Kinship and the American Dog Show

Honorable Mentions

NATALIE BRITO
Psychology Advisor: Dr. Peter Vishton
Influences of Motor System State on Ebbinghaus Illusion Magnitude

SHEREEN SINGER
Psychology Advisor: Dr. Jennifer Stevens
The Power of Imagery: Using Mental Imagery to Reduce Food Cravings

Award for Excellence in Scholarship in the Natural and Computational Sciences

JONATHAN HOLLEY
Biology Advisor: Dr. Randolph M. Chambers
Water Quality in Headwater Streams: A Test of Best Management Practices

Honorable Mentions

MARY LEVILLAIN
Psychology Advisor: Dr. Pamela S. Hunt
Can Nicotine Ameliorate Memory Deficits Found in Fetal Alcohol Syndrome?

MEGHAN REVELLE
Computer Science Advisor: Dr. David Coppit
How To Find a Needle in a Digital Haystack

Visiting Scholars

Award for Excellence in Scholarship in the Humanities and Social Sciences

AMANDA STUCKEY
American Studies, University of Virginia Advisor: Dr. Anna Brickhouse
Blending Texts, Blending Bodies: The American Mulatto in William Wells Brown's Clotel

Honorable Mention

JONGMOOK CHOE
Statistics, George Washington University Advisor: Dr. Reza Modarres
Income Inequality and Crime in the United States

Award for Excellence in Scholarship in the Natural and Computational Sciences

RICHARD S. GROOVER
Environmental Science & Policy, George Mason University Advisor: Dr. R. Christan Jones
Temporal and Spatial Aspects of the Colonization and Re-colonization in Lentic Habitats

Honorable Mention

MARK SHEPHERD
Anatomy & Neurobiology, Virginia Commonwealth University Advisor: Dr. Jeffrey Dupree
Nodes of Ranvier Undergo Molecular Reorganization with Age

Friday, March 28 PROGRAM SCHEDULE

Friday, March 28

7:45 AM - 8:30 AM REGISTRATION 2nd Floor University Center

8:30 AM - 9:30 AM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Jeanine Stefanucci	**Session Chair:**	**Session Chair: Dr. Qun Li**	
1. POND Jr., Richard S. (Psychology)	1. KORWIN, Wendy (American Studies)	1. WANG, Haodang (Computer Science)	
College of William & Mary	*College of William & Mary*	*College of William & Mary*	
2. SIEGEL, Erika (Psychology)	2. KAZIEWICZ, Julia (American Studies)	2. WU, Zhenyu & XIE, Mengjun (Comp. Science)	
College of William & Mary	*College of William & Mary*	*College of William & Mary*	
	3. MORRIS, Caroline (History)	3. REVELLE, Meghan (Computer Science)	
	College of William & Mary	*College of William & Mary*	

9:45 AM - 10:45 AM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Jennifer A. Stevens	**Session Chair:**	**Session Chair: Dr. Jeffrey R. Groff**	**Session Chair: Ms. Celine Carayon**
1. LEVILLAIN, Mary (Psychology)	1. KRUTKO, Erin (American Studies)	1. PATTERSON, Jennifer L. (Microbiol. & Immun.)	1. CARROLL, Fred (History)
College of William & Mary	*College of William & Mary*	*Virginia Commonwealth University*	*College of William & Mary*
2. SINGER, Shereen (Psychology)	2. STUCKEY, Amanda (American Studies)	2. TURNER, Lauren Senty (Microbiol. & Immun.)	2. STURTEVANT, Andrew (History)
College of William & Mary	*University of Virginia*	*Virginia Commonwealth University*	*College of William & Mary*
		3. REEVES, Megan (Pediatrics)	3. CAPANO, Fabio (History)
		Virginia Commonwealth University	*West Virginia University*

11:00 AM - 11:50 AM

Keynote Lecture & Book Signing - Commonwealth Auditorium

12:00 PM - 1:15 PM

Lunch & Welcoming Remarks - Chesapeake A

1:30 PM - 2:30 PM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Jan Chaloupka	**Session Chair: Mr. Nelson Daniel**	**Session Chair: Dr. Xipeng Shen**	
1. PAQUETTE, Jay (Physics)	1. GROOVER, Richard (Env. Sci. & Policy)	1. VASCONCELOS, Jorge (Computer Science)	
College of William & Mary	*George Mason University*	*Johns Hopkins University*	
2. HARRIS, Peter (Physics)	2. HOLLEY, Jonathan (Biology)	2. XIA, Tian (Computer Science)	
College of William & Mary	*College of William & Mary*	*Johns Hopkins University*	
3. AMEDZAKE, Peter (Physics)	3. HOWIE, Mikaela (Biology)		
Hampton University	*College of William & Mary*		

2:45 PM - 3:45 PM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Hans C. von Baeyer	**Session Chair: Dr. Stewart Ware**	**Session Chair: Dr. Jean Takeuchi**	
GENERAL INTEREST LECTURES	1. CHESNEY, Sarah (Anthropology)	1. LI, Hai (Chemistry & Biochemistry)	
1. GODIN, Eric (Education)	*College of William & Mary*	*Old Dominion University*	
College of William & Mary	2. HODKINSON, Brendan (Biology)	2. ZESTOS, Alexander G. (Chemistry)	
2. DASHIELL, Steven (Applied Sociology)	*Duke University*	*College of William & Mary*	
University of Maryland Baltimore County	3. GLAZENER, Jason (Public & Int. Affairs)		
	University of North Carolina at Wilmington		

4:00 PM - 5:00 PM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Ms. Barbara Monteith	**Session Chair: Dr. George W. Gilchrist**	**Session Chair: Dr. Lawrence Leemis**	**Session Chair: Mr. Dave McCarthy**
1. GOODALL, Suzanne H. (Curriculum & Instr.)	1. JACKSON, Allyson (Biology)	1. CHOE, Jongmook (Statistics)	1. JACOBS, Matt (History)
West Virginia University	*College of William & Mary*	*George Washington University*	*University of North Carolina at Wilmington*
2. JORNS, Whitney (Sociology)	2. LAMMONS, Louise (Biology)	2. LULI, Dori (Mathematics & Statistics)	2. CLARK, Keith A. (History)
George Mason University	*College of William & Mary*	*Arizona State University*	*University of North Carolina at Wilmington*
	3. KIGHT, Caitlin (Applied Science)	3. TREXLER, Daniel (Clinical Lab Sciences)	3. GLOCK, Earl Ferdinand (History)
	College of William & Mary	*Virginia Commonwealth University*	*College of William & Mary*

5:15 PM - 7:00 PM

Networking Reception - Chesapeake A

Saturday, March 29 PROGRAM SCHEDULE

Saturday, March 29

7:45 AM - 8:30 AM REGISTRATION 2nd Floor University Center

8:30 AM - 9:30 AM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Paul Heideman	**Session Chair: Ms. Barbara Monteith**	**Session Chair: Dr. R. Ale Lukaszew**	
1. HUBBARD, Joanna (Biology)	1. DEVLIN, Sean (Anthropology)	1. SKUZA, Jonathan (Physics)	
College of William & Mary	*College of William & Mary*	*College of William & Mary*	
2. MINTON, Kelly (Biology)	2. MAHONEY, Shannon (Anthropology)	2. NOVICK, Jaison (Physics)	
College of William & Mary	*College of William & Mary*	*College of William & Mary*	
3. ROOK, Megan (Biology)	3. SIKES, Kathryn (Anthropology)		
College of William & Mary	*College of William & Mary*		

9:45 AM - 10:45 AM

Tidewater A	Tidewater B	James Room	York Room
Session Chair: Dr. Patricia Barry	**Session Chair: Mr. Larry McEnerney**		
GENERAL INTEREST LECTURES	1. GAINES, Mikal (American Studies)		
1. PATTERSON, Jennifer L. (Microbio. & Immun.)	*College of William & Mary*		
Virginia Commonwealth University	2. GERHOLD, Emily (Art History)		
2. HITCHCOCK, Adam (Computer Science)	*Virginia Commonwealth University*		
College of William & Mary			

11:00 AM - 12:00 PM

Poster Presentations - 2nd Floor Lobby

1. BARR, Maggie (Biology)	9. COLEMAN, Stephan (Physics)	17. KERWIN, Olivia (Applied Mathematics)	25. SPAETH, Andrea (Psychology)
College of William & Mary	*College of William & Mary*	*Hampton University*	*College of William & Mary*
2. BLUE, Randall E. (Biology)	10. EL-DANAF, Rana (Phys., Anat., & Neurobio.)	18. KREISEL, Sara E. (Biology)	26. UNDERHILL, Lara R. (Clinical Lab Sci.)
College of William & Mary	*Virginia Commonwealth University*	*College of William & Mary*	*Virginia Commonwealth University*
3. BOICE, Emily (Microbio. & Immun.)	11. FLYNN, Brian (Graduate Liberal Studies)	19. LAIR, Elicia C. (Psychology)	27. VASCONCELOS, Jorge (Comp. Science)
Virginia Commonwealth University	*University of North Carolina at Wilmington*	*College of William & Mary*	*Johns Hopkins University*
4. BOSCHEN, Karen (Psychology)	12. FREEMAN, Gillian (Psychology)	20. McCONNELL, Gretchen (Biology)	28. VEITS, Gina (Psychology)
College of William & Mary	*College of William & Mary*	*College of William & Mary*	*College of William & Mary*
5. BOYD, J. LOMAX (Biology)	13. HANLEY, Craig (Physics)	21. McGLAUGHLIN, Frost (Higher Ed./English)	29. WILSON, Laura C. (Psychology)
College of William & Mary	*Hampton University*	*George Mason University*	*College of William & Mary*
6. BRADFORD, J. Cortney (Physical Therapy)	14. HYKES, Sabrina (Theatre)	22. MI, Ningfang (Computer Science)	30. XIAO, Yanli (Physics)
Virginia Commonwealth University	*West Virginia University*	*College of William & Mary*	*College of William & Mary*
7. BRITO, Natalie (Psychology)	15. JONES, Matt (Chemistry)	23. RADWAN, Farah (Chemistry)	
College of William & Mary	*College of William & Mary*	*Virginia Commonwealth University*	
8. BURNETT, Evie N. (Physical Therapy)	16. JONES, Morgin (Mathematics)	24. SHEPHERD, Mark (Anat. & Neurobio.)	
Virginia Commonwealth University	*Hampton University*	*Virginia Commonwealth University*	

12:00 PM - 1:30 PM

Lunch & Awards Ceremony - Chesapeake B & C

The College of William and Mary

The College of William and Mary is the nation's second oldest university and noted as the best small public university in the nation. Founded in 1693 by Royal Charter from King William III and Queen Mary II of Great Britain, the College is rooted in history and tradition. The Sir Christopher Wren Building is the oldest academic building in continuous use in the United States, constructed between 1695 and 1699. Phi Beta Kappa, the nation's oldest premier academic honor society, and the student honor code were founded at William and Mary. The College also maintains the historic post of Chancellor- currently held by former Supreme Court Associate Justice, the Honorable Sandra Day O'Connor. Although traditions are strong on the historic campus, William & Mary is a center for innovation and research. As our President, W. Taylor Reveley, has remarked, "The work done by our advanced scholars contributes not just to the expansion of academic understanding, but in very real and powerful ways to our lives as citizens of this Commonwealth, nation, and world." The work of our scholars can be seen now at the 7th Annual Graduate Research Symposium.

Historic Williamsburg

Come see where America began — Virginia's Historic Triangle: Williamsburg, Jamestown and Yorktown. Visit Jamestown, established in 1607, and site of the first permanent English settlement in the "New World." 2007 marked the 400th anniversary of our nation's birthplace and an 18-month long slate of events that began in fall 2006 and continued through the spring of 2008 to commemorate this milestone in our nation's history. For more information on attractions, events, accommodations, and things to do while in our area go to, http://www.visitwilliamsburg.com/index.aspx.

2008 Graduate Research Symposium Special Event
Barnes & Noble Book Lecture and Book Signing

Ambassador Mitchell B. Reiss

W&M Vice Provost for International Affairs, U.S. Ambassador, and former Director for Policy Planning, U.S. Department of State

Bridging the Gap: From the Ivory Tower to the Corridors of Power

Friday, March 28, 2008
11:00am – 11:30am
Commonwealth Auditorium

Abstract:

The foundations of critical thinking and analysis, developed and honed through graduate studies, has become exceedingly essential in allowing present and future leaders to innovate and implement strategies to combat the domestic and foreign policy challenges that threaten our global society. In an increasingly complex world, genocide, climate change, mass starvation, poverty, and civil unrest are the humanitarian challenges that threaten the security of the United States and our global neighbors. These challenges can and must be confronted by leaders in the Ivory Tower, the business world, and in various levels of government, armed with the wisdom to apply their knowledge of their discipline.

Scholar, diplomat, and peace negotiator Dr. Mitchell Reiss will discuss how students can take their academic and professional ambitions to make an impact on the global stage from a college classroom to a negotiating table halfway across the world. He will also share his own experiences of closely working with elected officials on the highest level of the United States government, charged with the responsibility of running the world.

Biography:

Dr. Mitchell Reiss is currently Vice Provost for International Affairs at the College of William & Mary in Williamsburg, Virginia, with appointments in the School of Law and the Government Department. From 2003-2005 he served as Director of the Office of Policy Planning at the U.S. State Department, where he provided Secretary Colin L. Powell with independent strategic advice. In December 2003, he was asked to serve concurrently as the President's Special Envoy for the Northern Ireland Peace Process with the rank of Ambassador; in January 2005 Secretary Condoleezza Rice asked Reiss to continue in this position, which he did until February 2007. During this period, Northern Ireland registered historic progress towards ending "the Troubles" and realizing the full promise of the Good Friday Agreement.

Prior to coming to William & Mary in 1999, Reiss helped manage the start-up and operations of the Korean Peninsula Energy Development Organization (KEDO), a multinational organization designed to deliver $6 billion of energy (500,000 tons of heavy fuel oil/year and two 1,000 MW nuclear power stations) to North Korea. He served as KEDO's Chief Negotiator with the North Koreans and its first General Counsel.

Reiss has a law degree from Columbia Law School, a D.Phil. from Oxford University, a Master's degree from the Fletcher School of Law & Diplomacy, and a B.A. from Williams College. He has written two books on international security, contributed to fifteen others, and published over 80 articles and reviews. He has testified frequently before Congress, appeared on television and radio in the U.S. and overseas, and has delivered numerous talks before academic, military, and civilian audiences around the world.

Growth and Spectroscopic Characterization of Pr3+ and Dy3+ doped KPb2Cl5 and KPb2Br5 Crystals for Mid-Infrared Laser Applications

Presenter: Peter Amedzake,
Hampton University, Physics

We report on the purification, crystal growth, and spectroscopic properties of Pr3+ and Dy3+ doped KPb2Cl5 (KPC) and KPb2Br5 (KPB) for possible applications as mid-infrared (MIR) solid-state gain media. KPC and KPB crystals are non hygroscopic and can readily incorporate trivalent rare earth ions. The low phonon energies (<200cm-1) of KPC and KPB crystals provide the advantage of smaller non-radiative decay rates compared to common laser hosts using oxide and fluoride crystals. In this work, synthesized KPC and KPB materials were purified through a combination of zone-refinement and directional freezing. Following purification, Pr3+ and Dy3+ doped KPC and KPB crystals were grown by the vertical Bridgman technique. Room-temperature mid-IR emission bands centered at ~ 4.6 µm (3H5à 3H4) and ~ 4.3µm (6H11/2à 6H13/2) were observed from Pr: KPC/KPB and Dy: KPC/KPB, respectively. The absorption and mid-IR emission properties of Pr3+ and Dy3+ doped KPC and KPB crystals were evaluated in terms of transition line strengths, radiative decay rates, and absorption and emission cross-sections. A detailed discussion of the potential of these novel materials for applications as MIR laser materials will be presented at the conference.

B Cell Proliferation in the Rainbow Trout

Presenter: Maggie Barr,
College of William & Mary, Biology

There is little information known about the immune system of the rainbow trout, Oncorhyncus mykiss. Research has shown that the trout lack bone marrow and normal lymph nodes and rely on the kidney, spleen, and blood as the immune organs. This project plans to look at the development of the trout immune system, focusing on B cell proliferation. The primary goals of this project are to determine the immune tissue location of both activated and proliferating B cells, and to look at the levels of certain transcription factors, mainly those involved with proliferation and differentiation, to aid in our determination of the locale of the various B cell subsets. Western Blot analyses will be performed on B cell samples from the trout immune tissues to look for activation of B cells. ELISA assays will look at the levels of antibody production in serum samples from the kidney, spleen, and blood. If high levels of antibody production are seen, then the B cells in those tissues must be either plasmablasts or plasma cells. When determining if B cells are proliferating, flow cytometry will be used with either BrdU or tracking dye as a means of measuring proliferation. Understanding the trout immune system will allow for development of vaccines for juvenile trout, which are susceptible to many disease-causing pathogens. By looking at the developmental and synthetic pathways of the trout immune system, we may be able to take this knowledge and apply it to the human immune system, focusing on cell proliferation and its involvement in the development or sustainability of different types of cancer.

In Vivo Imaging of Mammary Tumors Using Murine Models

Presenter: Randall Eric Blue,
College of William & Mary, Biology

In vivo imaging has emerged as the next cutting edge tool for research. This technology would ultimately equip labs for longitudinal studies as well as analyze previously obscure biological processes in a real time fashion. The gamma camera, developed at the College of William and Mary for this new wave of research, is a novel in vivo imaging system that detects the gamma radiation emitted from a radioiodide ligand (Na125I). Our lab has selected a murine model expressing the mouse mammary tumor virus (MMTV) which contributes to spontaneous mammary tumor development. The gamma camera detects the radiation emitted from Na125I as it is metabolized by MMTV tumors to which this metabolic pathway is subject to a transmembrane protein called the sodium iodide symporter (NIS). Gamma camera images have demonstrated unique incorporative patterns of injected radioiodide within MMTV tumors. Our research has tried to validate the efficacy of the gamma camera by localizing the NIS in tumors to assess whether the incorporative patterns reflect where the NIS protein is expressed. Using antibodies against the NIS protein, the data indicate positive results that the locality of the NIS strongly reflects the pattern the gamma camera generates of the MMTV tumor. This research is geared toward an applicable way to image and detect mammary tumors in a safe and expeditious manner. The ultimate goal of our research is to provide a reliable way to predict where a tumor will manifest and the morphology of the tumor based on metabolic patterning.

In Vitro Renaturation of an Active Elastase by its Intramolecular Chaperone

Presenter: Emily Boice,
Virginia Commonwealth University,
Microbiology & Immunology

Pseudomonas aeruginosa secretes several proteases associated with pathogenesis, but the most abundant and active protease among them is elastase, a metalloendopeptidase of the thermolysin family (M4). Elastase is encoded by lasB and is secreted into the medium by the Xcp type-II secretion apparatus. Elastase is first synthesized as a preproenzyme, with a signal peptide, a central 18-kDa propeptide, and a 33-kDa mature domain. The propeptide functions as an intramolecular chaperone and is required for the secretion and activity of elastase. In vivo studies show that the propeptide as a separate protein will still permit efficient secretion of an active protease. To understand the mechanisms involved in the propeptide-mediated folding of elastase, in vitro studies were performed on the ability of purified recombinant propeptide to fold a denatured form of wild-type elastase. Propeptide was produced from a pET vector in E. coli BL21(DE3) and included a cleavable N-terminal H6 tag. The propeptide was purified from cell lysates by affinity Ni-chromatography. Elastase was over-produced by a lasB mutant of strain PAO1 (i.e., PDO240), with lasB expressed from a plasmid under an IPTG-inducible tac promoter. Elastase was purified from the supernatant by 60% ammonium sulfate and ion exchange chromatography. Purified propeptide and elastase were then denatured individually in a guanidine-HCl / glycine buffer, and then renatured together by dialysis treatment. The samples were treated with trypsin to release the propeptide from elastase, and elastolytic activity was analyzed by elastin congo red and azocasein assays. To better understand the protein-protein interactions between the propeptide and mature domain, we are testing mutant propeptides on the ability to properly fold elastase, which included an N-terminal 12 amino acid tag. The results show that both wild-type propeptide and C-terminal tagged propeptide were capable of refolding a denatured elastase into an active enzyme. This suggests that a C-terminal extension did not prevent the propeptide from refolding its mature enzyme. Other experiments are in progress, using site-directed mutagenesis of the propeptide, to determine the role of conserved residues in the propeptides of other thermolysin-like neutral proteases and their role in folding and secretion.

Effects of Systemic Administration of the Orexin-1 Receptor Antagonist, SB-334867, on Attentional Performance in Rats

Presenter: Karen E. Boschen,
College of William & Mary, Psychology

Orexin A and B (also known as hypocretin 1 and 2) are neuropeptides originating in the lateral hypothalamus, and have been implicated in the regulation of feeding behavior, emotional arousal, and sleeping and waking behaviors. The absence of orexin neurons within the cerebrospinal fluid is a characteristic of the neurological disorder narcolepsy. Previous research has indicated that orexin neurons projecting from the hypothalamus excite basal forebrain cholinergic neurons, resulting in increased awakefulness. The basal forebrain cholinergic system has been implicated in the regulation of attention. Collectively, these results suggest that orexins might play a role in attentional processing. In the current study, subjects were trained on an attention task that required discrimination between visual signals (500 ms, 100 ms, and 25 ms in length) and non-signals. The rats were each given three injections: a vehicle solution and two levels of orexin-1 receptor antagonist SB-334867, 1.0 mg/kg and 5.0 mg/kg, counterbalanced across subjects. The results revealed an interaction for signal duration and dose. Visual detection at the 500 ms signal duration was impaired at the highest dose; in addition, performance at the 25 ms signal duration improved at the 1.0 mg/kg dose. The data suggest that orexins do play a role in regulating attention, though the link might be more complicated than previously thought.

Functional and Evolutionary Characterization of the Cis-Regulatory Elements Directing Glycine Transporter 2 Expression

Presenter: J. Lomax Boyd,
College of William & Mary, Biology

The determination of neurotransmitter phenotypes is a principle component in the specification of a neuron's physiological identity. Currently, the transcriptional regulation of glycine transporter 2 (glyt2), a major component in the inhibitory neurotransmitter system, remains uncharacterized. We propose to identify the regulatory region of glyt2 that is necessary and sufficient for the correct spatial and temporal expression pattern observed during embryonic development. We have identified three conserved non-coding (CNC) regions upstream and intergenic of glyt2 that demonstrate considerable sequence homology among distantly related vertebrate taxa. We propose to evaluate whether these CNC regions are mediating the conserved expression pattern of glyt2 observed in many vertebrate systems by generating transgenic Xenopus laevis embryos with each putative regulatory element driving an EGFP reporter. The identification of the principle regulatory elements of glyt2 would establish the primary transcriptional target of a major component in the inhibitory neurotransmitter system. The conservation of three non-coding regions across the zebrafish to mouse evolutionary time scale suggests that purifying selection could be occurring with genes implicated in specifying neural phenotypes. We propose to evaluate whether these elements have undergone selection (i.e. negative, neutral, or positive) by employing several tests of neutrality. Methods have been developed that enable the detection of selection in non-coding regions by determining the neutral rate of substitution sustained in synonymous substitutions in the coding region. We will apply these methods to three putative regulatory elements and determine whether these elements have undergone positive selection during vertebrate evolution.

Toward Real-Time, Image Guided Neuro-Surgery Using Distributed and Grid Computing

Presenter: J. Cortney Bradford,
Virginia Commonwealth University,
Physical Therapy

The mechanical design of elliptical trainers often creates a foot position that is less than optimal when compared to normal gait.
Purpose: To investigate performance differences in subjects using a standard elliptical trainer and a modified version that provided controlled gait-like ankle articulation. Methods: Eight healthy adult subjects (4 male, 4 female; mean age 28.6 ± 5.2) participated in this study. Subjects were asked to ambulate on the elliptical trainer with and without the ankle modifications at two metronome paced speeds (1Hz and 1.5Hz). Video based motion analysis techniques were used to collect sagittal plane kinematic data at a rate of 30Hz. Oxygen consumption (VO2) was measured using ventilatory expired gas analysis. Digitized video data were low-pass filtered using a 4th order zero phase lag Butterworth filter with a cutoff frequency of 6Hz. Total mechanical energy was determined via a summed segmental analysis that included translational and rotational kinetic energy and potential energy. Results: The articulation of the footplate in the sagittal plane on the modified elliptical trainer correlated with normal ambulation ($r2=0.83$, $p<0.001$) while the elliptical trainer without modification had a weaker correlation ($r2=0.62$, $p<0.001$). Lower joint angle correlations were found at the hip and knee ($r2=0.72$ and $r2=0.66$ respectively, $p<0.001$) for the modified elliptical trainer compared to normal gait. These did not differ significantly from the non-modified elliptical trainer. No statistically significant differences were found between the mechanical energy required by the modified and the non-modified elliptical trainer (1Hz, $p=0.163$, 1.5Hz, $p=0.304$). VO2 was higher with the modified elliptical trainer (1Hz speed: modified 16.79 +/- 3.18 ml/kg*min, non-modified 12.87 +/- 1.81 ml/kg*min, $p=0.001$, 1.5Hz speed: modified 19.87 +/- 2.97 ml/kg*min, non-modified 16.38 +/- 2.98 ml/kg*min, $p<0.001$) Conclusions: The modified elliptical trainer provided an ambulation pattern more like normal gait at the ankle but was no different from the non-modified elliptical trainer at the hip and the knee. These changes did not effect the mechanical energy required for ambulation, but did require increased metabolic energy.

Influences of Motor System State on Ebbinghaus Illusion Magnitude

Presenter: Natalie Brito,
College of William & Mary, Psychology

A growing number of studies have examined how a person's action or intended action can influence the visual system. These studies have relied on pictorial illusions or matching tasks to understand the complex processes of perception. The Ebbinghaus illusion is commonly used to understand the processes underlying the perceptual system. This effect is found when two circles of identical size are placed against a background of small and large circles where adults will consistently perceive the target circle surrounded by the smaller circles as 10% larger than the one surrounded by larger circles. Researchers have found that the illusion affects some response tasks more than others and recent work has discovered that preparing to reach for an object causes a significant reduction in the magnitude of the Ebbinghaus illusion on size judgments. This study presents evidence that engaging in a simple motor interference task of squeezing a foam ball interferes with this shift in visual processing. Participants began by verbally judging the relative sizes of two disks where they stated which of the two disks appeared to be larger. Then the participants repeated the process but half of the participants indicated their choice by grasping the disk that looked larger; others were instructed to squeeze a foam ball before indicating their choice by grasping the larger disk. We find that the squeezing task causes a significant increase in the effect of the illusion on grasping. This experiment refines our understanding of the influence the motor system has upon perception. We interpret the results as consistent with the theory that preparing to grasp a target results in a shift in the mode of visual processing that affects all behaviors, not just the grasping itself.

Is There A Relationship Between Pelvic Motion, Torque, and Metabolic Energy in Running?

Presenter: Evie N.Burnet,
Virginia Commonwealth University,
Physical Therapy

PURPOSE: To investigate the relationship between frontal plane pelvic angle, gluteus medius muscle (GM) torque, and changes in metabolic energy demands while running. **METHODS:** Five healthy, female subjects (mean age 22.8 ± 2.2) were obtained from a sample of convenience. Subjects were recreational runners who ran ³ 5 miles per week (mean 28.0 miles ± 15.2). Subjects were asked to run on a treadmill for 30 minutes at a self-selected speed (6.52 mph ± 0.2). *Torque* – GM isometric strength was determined prior to the run with the subject side lying using a hand-held dynamometer (Lafayette Instruments), and converted to torque. *Kinematics* – Three-dimensional data on pelvic position was sampled at a rate of 60 Hz using an electromagnetic kinematic tracking system (MotionMonitor™, Innovative Sports Training) with sensors (Polhemus Fastrak) secured over the posterior superior iliac spines. *Metabolic Energy* – Oxygen consumption (VO_2) was obtained through ventilatory expired gas analysis (SensorMedics, Inc., Yorba Linda, CA) during rest, exercise and five minutes into recovery. The change in VO_2 between 25-30 minutes (average value) was determined (delta VO_2) as was the time constant of VO_2 recovery kinetics. MatLab v 7.1 was used for kinematics analyses. A Pearson's Correlation was calculated using SPSS v 14.0; statistical significance was defined as $p<0.05$. **RESULTS:** The rate of change in maximum pelvic drop was significantly correlated with GM torque ($R^2=0.942$) and VO_2 recovery kinetics ($R^2=0.939$). A positive trend between torque and recovery kinetics existed ($R^2=0.785$). However, delta VO_2 was not correlated with pelvic motion, torque, or kinetics. **CONCLUSION:** It appears that subjects with an increased GM torque could tolerate a larger degree of pelvic drop. VO_2 recovery kinetics were not influenced by delta VO2, rather by biomechanical factors. These findings suggest that increased pelvic motion during running results in metabolic inefficiency, and could therefore adversely affect running performance.

Totalitarian Ideologies in the Twentieth Century: Nazism and Communism in Comparative Perspective

Presenter: Fabio Capano,
West Virginia University, History

Labelled as a fictitious Cold War concept, totalitarianism has lost its former status as a modern ideology. My work rejects this assumption and analyzes totalitarianism as a complex ideology whose presence shaped specific governmental systems in twentieth century Europe. Totalitarianism strove to forge a new classless society based on foundations of Darwinist and Marxist interpretation of history. In my work I have discussed the origins of totalitarianism, specifically stressing the breach between the Marxist and Communist thought. Both Nazism and Communism claimed to embody the myth of infallibility and bear the historical truth of human progress. I define a "totalitarian minimum" by treating totalitarianism as a six points system, which works toward the annihilation of human personality in order to attain its utopian goal. Totalitarian regimes were historical phenomena that took place between 1938 and 1945 in Nazi Germany and 1929 and 1953 in the Soviet Union. During these years, both regimes were characterized by the absence of alternative sources of power to the ruling elite and were driven by a leader endowed of an undisputed and unrestricted power, epitomizing the idea of "cult of personality". Authoritarian and dictatorial regimes deeply differed from the totalitarian regimes under consideration. It is imperative to draw attention to the similar political and social systems that resemble Nazism and Stalinist communism, but do not fulfil the requirement of a true totalitarian system: Fascist Italy as well as Leninist and post-Stalinist communism. A striking feature of totalitarianism is that it took place in the age of mass democracy and modern technology. Even if the realization of a true totalitarian society remained utopian, evidence by Carl Friedrich and Zbigniew Brzezinski idea of "island of separateness", this study remarks that totalitarian ideology remains far more than a mere myth of the Cold War.

The Racial Politics of Place: Jim Crow and New Deal Housing on the Virginia Peninsula

Presenter: Fred Carroll,
College of William & Mary, History

Two New Deal housing developments built on the Virginia Peninsula in the late 1930s challenged Jim Crow strictures on race, space, and class by providing working-class black families from Newport News, a bustling industrial city, an opportunity to own homes in neighboring rural counties. The prospect of black homeownership disturbed local race relations. Controversies engulfed both projects, revealing the near impossibility of reconciling tentative federal experiments in racial uplift, expanding black demands for empowerment, and a hardening white resistance to the amelioration of black life. The disputes illustrated the social fractures sapping Jim Crow segregation before the launch of the Civil Rights Movement. Swantown was a 41-unit housing development built in 1935 in Warwick County mostly for black shipyard workers and their families. The Federal Housing Administration assisted the families with obtaining mortgages. Newport News Shipbuilding and Dry Dock, the region's leading employer, supplied the homebuyers and sold undeveloped land to the builder. Aberdeen Gardens was a 158-unit subsistence homestead built "by Negroes, for Negroes" in 1936 in Elizabeth City County. Several federal agencies, most notably the Resettlement Administration, planned and paid for construction. Hampton Institute, a nearby black college, assisted with planning and secured interracial support from local community leaders. Attempts were made to convert both projects to white occupancy. Swantown succumbed, but Aberdeen Gardens prevailed. I propose to examine how the construction of Swantown and Aberdeen Gardens challenged the Virginian way of managing race relations in three areas: occupancy status, expense, and location. I then propose to explain the role of federal agencies, local sponsors, and black tenants in determining the success and failure of each development.

The Economy of Plants: Greenhouses in the Eighteenth-Century Chesapeake

Presenter: Sarah Chesney,
College of William & Mary, Anthropology

Historical archaeologists have argued that the elaborately landscaped gardens of the eighteenth-century Chesapeake were conscious attempts by the elite governing class to reassert their control over a society that was slipping away from them during the years immediately preceding the American Revolution. The gardens and landscapes they created reified their ability to manipulate nature and architecture on a vast scale, and thus legitimized their political, social, and economic power. The entire landscape of trees, natural topography, and architecture formed part of a consciously-created master plan aimed at sending specific messages to all who came across it that elite control was stable and entrenched in the Chesapeake (Leone 1984; Ross 1998). On some eighteenth-century Chesapeake estates, these formal gardens were made even more dramatic statements of power by the addition of a greenhouse. Such buildings not only emphasized their owner's control over the natural landscape, but also their owner's ability to further subvert nature by raising exotic plants not native to the Chesapeake region. However, these buildings were not simply imposing additions to formal estate gardens, but in fact, they stood as physical reminders of the prevailing economic system as the basis of power of elite Chesapeake planters. Greenhouses in the eighteenth-century Chesapeake were more than just overt status symbols of elite control; they also functioned as specific reminders of an economic world dependent on overseas imports that, like the elite planters who depended on it, was fast becoming a relic of the past.

Income Inequality and Crime in the United States

Presenter: Jongmook Choe,
George Washington University, Statistics

Does income inequality affect the crime rate? There are numerous studies on the relationship between income inequality and crime. Many of these studies found that relative income inequality, usually measured by Gini ratio or Top/Bottom income ratio, strongly impacts crime. However, some works suggest otherwise. In light of these contradicting results, I investigate the relationship between income inequality and crime with data from 50 states and the District of Columbia for the period 1995 - 2004. Using relative income inequality measurement and absolute poverty rate, I provide analyses of all seven crime categories, classified under the Uniform Crime Report (UCR) from the Federal Bureau of Investigation (FBI). I used a multiple regression method, which is available on most statistical computer packages. The major findings are as follows. Relative income inequality measured by Gini ratio has a strong impact on burglary and robbery. However, the relationship between income inequality and robbery seems to be a little fragile. I failed to find a meaningful link between income inequality and the other six crime categories. In addition, income inequality does not seem to have a strong relationship with overall violent crime or overall property crime. Absolute poverty does not have an effect on crime.

To the Brink and Back: United States Strategy in the Quemoy-Matsu Crisis of 1954-1955

Presenter: Keith A. Clark II,
UNC Wilmington, History

The role of the Quemoy-Matsu Crisis of 1954-1955 in shaping the Eisenhower administration's Cold War policies rewards close analysis. The fact that the president and his advisers contemplated the use of nuclear weapons during the crisis highlights the level of tension that arose between the United States and the Peoples Republic of China. The conflict, ostensibly over the fate of several small islands off of the Chinese mainland, escalated into a test of Washington's resolve to defend its allies and Beijing's determination to continue its policy of revolution and liberation. The clash was exacerbated by misunderstandings, specifically the United States' perception of communism as a global monolith and the PRC's inability to discern competing voices in American political rhetoric. Additionally, the bellicose rhetoric of the Taiwanese government and its allies in the U.S. Congress heightened fears that a showdown between Communism and Capitalism was going to unfold in East Asia, over a pair of islands that all parties agreed were fairly insignificant. Documents from the White House, State Department, Joint Chiefs of Staff, and the U.S. intelligence community reveal that President Dwight D. Eisenhower's response to the crisis was complicated. He had to act in a manner that would be acceptable domestically, particularly on Capitol Hill, and internationally, in the halls of the United Nations and in councils of America's allies. Eisenhower succeeded in preserving the status quo and keeping the United States out of a general war, but in the process he sacrificed Taiwan's position on many of the offshore islands.

MINOS Observation of Neutrino Oscillations

Presenter: Stephen Coleman,
College of William & Mary, Physics

Neutrinos are subatomic particles that travel at speeds close to the speed of light and exist in three types, called flavors. Recent experiments have confirmed that neutrinos change flavor, or oscillate, in flight. The Main Injector Neutrino Oscillation Search (MINOS), an experiment based at Fermi National Accelerator Laboratory (Fermilab) near Chicago, is designed to study neutrino oscillations. MINOS consists of two detectors: the Near Detector, to characterize a muon neutrino beam generated by the Main Injector accelerator at Fermilab, and the Far Detector in Soudan, Minnesota. We measure the energy spectrum of muon neutrinos in both detectors, so any neutrino oscillation that occurs between the two will show itself as an energy-dependent deficit of muon neutrinos in the Far Detector. Our predicted Far Detector neutrino energy spectrum is extrapolated from simulations of neutrino interactions in both the Near and Far Detectors, as well as the observed Near Detector spectrum. By fitting the data we obtain two parameters: the mass splitting between the two most massive neutrinos and the mixing angle between them.

Warcrack: Examinination of Social Isolation Contructs in Players of Massively Multiplayer Online Role Playing Games (MMORPGs)

Presenter: Steven Dashiell,
University of MD Baltimore County,
Applied Sociology

The phenomena of Massively Multi-Player Role Playing Games (MMORPGs) continue to sweep the country, with an amazing demographic spending inordinate amounts of time online to participate in an online fantasy world. Many of these games producers theorize their players spend no less than 20 hours average online. If such is the case, how socially connected are they? The presenter is engaged in online survey research to gauge the social isolation of the individuals who play one particular game (World of Warcraft). The tool is designed using a collaboration of social science measurement tools examining Internet involvement and social involvement. The presenter is using a myriad of methods to recruit 150-200 persons to participate in the survey. The guiding thesis postulates that individuals who spend more than 20 hours online will have fewer consistent social contacts (excluding the game) and will be more than likely to define the interactions during the game as social contact. Collection of this data could lead to more substantive studies regarding the value of social interactions of MMORPG participants and the comparative nature of online interrelationships and their traditional counterparts.

Contending Strategies of Education at Emancipation

Presenter: Sean Devlin,
College of William & Mary, Anthropology

In historical analyses of the transformation of slave to free societies, the institution of education as expressed through public and religious schooling has been interpreted as an instrument used by the white elite to maintain their control over African descendent labor. Archaeological research conducted within a historically informed context offers a new interpretation, whereby self-help education is seen as an actively chosen strategy deployed by former slaves to advance their own and their families' interests in the new free labor market. This paper examines archaeological evidence derived from the refuse of a tenement household occupied during the decades surrounding Emancipation on the island of Barbados. This study seeks to demonstrate the way Afro-Barbadians attempted to maximize their control over their own lives within a system that was structured against them.

Morphological Development of Dorsal Lateral Geniculate Neurons in the Mouse

Presenter: Rana El-danaf,
Virginia Commonwealth University, School of Medicine,
Physiology, Anatomy & Neurobiology

Much of our present understanding about the mechanisms underlying the development of sensory connections is based on work done in the mammalian retinogeniculate pathway. To date, studies have focused largely on the development and remodeling of retinal projections, and little attention has been given to their principal targets, the relay cells of the dorsal lateral geniculate nucleus. Here we asked two questions. First, how does the morphological maturation of relay cells contribute to the developmental remodeling of the retinogeniculate pathway? Second, how are retinal inputs from the two eyes distributed on the dendrites of developing relay cells? To address these issues, we used a combination of labeling techniques to separately and independently visualize developing relay cells and their retinal projections. All labeled material was examined using epifluorescence and confocal microscopy. Based on the dendritic morphology and soma size, we were able to distinguish subclasses of relay cells and interneurons as early as postnatal day 10. A 3-dimensional confocal reconstruction and morphometric analysis of labeled cells revealed that soma size and dendritic length increased with postnatal age (P10-34), but did so proportionally. We also analyzed the spatial location and distribution of retinal inputs onto the dendrites of relay cells by combining the anterograde labeling of retinal axons with the reconstruction of biocytin labeled LGN neurons. The amount of surface area retinal contacts occupied on dendritic trees decreased with age. Prior to eye opening (P11-P14), inputs tended to be binocular, were located more distally, and occupied far more dendritic territory. By the third postnatal week, inputs were monocular, located more proximally, and occupied far less surface area. Thus, many of these morphological changes parallel the anatomical segregation of retinal projections into eye specific territories as well as functional changes in synaptic connectivity that occurs during early postnatal development.

Visualizations of Social Change: Advertising and Shaping of the New Negro

Presenter: Brian Flynn,
UNC Wilmington, Graduate Liberal Studies

In this project, I will examine how visual rhetoric influenced the shaping of the "New Negro" during the first 30 years of the twentieth century. During this period, the rise of the NAACP, coupled with the growing influence of the black press, created the opportunity to form a national, concerted movement for the civil rights of African Americans. Images from the pages of black publications played a paramount role in helping African Americans reshape their identity. While many types of images were prominently used to shape identity, advertisements were the most widely produced and distributed images of African Americans during this time. While advertisements often reinforced racial stereotypes and fueled negative conceptions of blacks by whites, leaders in the black community took the myths of black inferiority head on by using advertisements to promote the "New Negro" and combat racism. By examining two nationally circulated black publications, the Chicago Defender and the NAACP's Crisis magazine, I plan to show that the advertisements in these publications helped shape the New Negro and change the way blacks were portrayed in advertising. Secondary research on the New Negro and black identity will be used to provide necessary background information and create a context for discussion of the advertisements in the Defender and Crisis. Relevant historical information on blacks in advertising will provide additional angles to discuss advertisements from these publications. Understanding early representations of African Americans in the mass media will help researchers better understand the issue of racial identity in the media, as this issue continues to be a magnifying glass for discussions of the larger role of African Americans in society.

Humor Styles and Retirement: The Impact of Coping Humor on Retirement Stress

Presenter: Gillian Freeman,
College of William & Mary, Psychology

Although many are able to make the transition into retirement with little or no problem, for a few, the transition is a period of disruption (Marshall, Clark, & Ballantyne, 2001). Coping responses are among the many predictors of retirement adaptation (Pinquart & Schindler, 2007; Wang, 2007), and humor has been identified as one such coping response (Kuiper et al., 2004; Martin, 2004; Martin, Phulik-Doris, Larsen, Gray, & Weir, 2003). In our current investigation, we are measuring the extent to which coping humor and other humor styles are employed by older adults to handle the everyday hassles and adjustments during retirement. Two-hundred male and female retirees will complete measures of humor that assess an individual's humor style and sense of humor, as well as several indices of retirement stressors, life stressors, and daily hassles. This study is primarily interested in measuring the four distinct humor styles identified in the Humor Styles Questionnaire (HSQ): Self-enhancing (coping humor), Affiliative, Aggressive, and Self-defeating (Martin, et al., 2003). The HSQ offers the opportunity to see whether differing styles of humor function the same for older adults as they do for younger people, given that one might expect increased stressors with continued aging and the emergence of retirement and its accompanying significant life changes. Multiple regression analyses, using humor variables as predictors of stress variables, will be conducted to assess the relation among humor styles, stressors, and hassles. We predict that high Self-enhancing humor and use of humor as a coping mechanism will be associated with lower stress ratings of both retirement stressors and life stressors. It is also anticipated that high Self-enhancing humor and use of humor as a coping mechanism will be associated with less severe hassle ratings, but not the number of daily hassles encountered.

The Devil and Mr. Baldwin: On the Sublimity of the Black Gothic Imagination

Presenter: Mikal Gaines,
College of William & Mary,
American Studies

James Baldwin's The Devil Finds Work (1976) is an illusive chronicle of his life at the movies. Whereas most memoirs would attest to the cinema's power to transport the audience to another world, or even its capacity to speak truth to this one, Baldwin's account of spectatorship is instead plagued by discord. The intrusive disturbances to his psyche are the result of a burgeoning awareness that many of the myths of nationhood (e.g. harmony, progress, perpetual regeneration) are at odds with black vernacular understanding. Baldwin's growing critical consciousness prompts him to question both the common narrative impulses of popular film and the core values of national identity. He essentially asks: How are the ethics that guide popular storytelling indicative of the same rhetoric that enables the nation to be called forth in service of particular systems of order? Who benefits? Who suffers? For Baldwin, the cinema becomes a demon that crafts lies with truth. Thus, while TDFW is, at once, a story of his engagement with the cinema and other cultural forces, it is also a story of his subjectivity in the making. What these two parallel strains — Baldwin the reluctant moviegoer and Baldwin the man — ultimately reveal is the constitution of a distinct black gothic imagination. Informing this worldview is an imminent sense of horror, the potential pleasure of corporeal intimacy, a willingness toward ambivalent identification with those outside his own race, class, or gender, and a fraught tradition of black spiritual practice. I argue that Baldwin's black gothic imagination offers a challenge to national origin myths that conceptualize American democratic ideals and race, as well as other subjugation, as dichotomous. Instead, the black gothic imagination is one that understands American "freedom" as innately dependent on specific relations of coercion and consent, subversion and recuperation, liberty and bondage.

Native Beauties: The 'Enbosoming' of Pocahontas

Presenter: Emily Gerhold,
Virginia Commonwealth University,
Art History

This paper will examine visual images made during the first half of the 19th century that illustrate moments from the story of the Powhatan Indian princess Pocahontas and her relationship with the English soldiers at Jamestown, Virginia. It will demonstrate the extent to which these images participated in the transformation of Pocahontas the historical figure into Pocahontas the romantic heroine, whose story played a crucial role in the crystallization of the discourse on ideal femininity in 19th century America. While there has been much scholarly inquiry into Pocahontas's depiction in 19th century texts, images of her have, to a great extent, been overlooked. This paper seeks to remedy this lacuna, providing support for an expanded interpretation of Pocahontas as a touchstone of the emerging 'cult of feeling.' The Pocahontas of early 19th century America was everything a young woman seeking to embody the feminine ideal should aspire to be: she was graceful, helpful, devoted, sentimental, appropriately modest, and, of course, exceptionally beautiful. Arbitrarily setting aside actual history, which reveals that Pocahontas would have been a child of 11 or 12 when the most illustrated episodes of her narrative actually occurred, the ideally feminine Pocahontas of the 19th century was endowed with the physical attributes most associated with feminine beauty and sentimentality, including a beautiful face, a noteworthy figure, and most significantly, lush breasts. In a very real sense, then, the Pocahontas of 19th century America was 'enbosomed,' a term which I invoke self-consciously in order to describe the process by which the attributes of ideal femininity were literally and figuratively overlaid upon the historical persona of Pocahontas, transforming her from a child into an adult romantic figure whose sexuality was simultaneously neutralized under the rubric of ideal femininity and 'sensibility' and exploited through her construction as the Native 'Other.'

Evaluating Beach Erosion Management Practices and Examining Policy Solutions

Presenter: Jason Glazener,
UNC Wilmington,
Public and International Affairs

Over the last few decades there has been a drastic increase in the coastal population of North Carolina. This has put increased pressure on our shoreline and substantially elevated the challenges facing our policy makers. Oceanfront development in the face of shoreline migration has led to the daunting challenge of beach "erosion". The management strategy of choice used with many beaches in Southeastern North Carolina regarding erosion has been beach nourishment. Beach nourishment is controversial. The subject involves issues ranging from property rights and public use, to the environment and economics. This research asks the question: How sustainable are North Carolina's beach erosion management strategies? During research, as potential problems with current practices were discovered, the question of how to address these problems was also raised. My research method primarily consisted of gathering information through a literature review, examining economic and survey data, and interviewing pertinent officials. As beach nourishment is incorporated into many coastal communities' long range management plans, there are strong indicators that it will not be sustainable as a long range solution. Collaboration is needed by a variety of stakeholders to work towards the formulation and implementation of sound policy solutions. These policy solutions should include a search for more cost-effective beach nourishment operations and also take the form of preemptive measures to maintain healthy recreational beaches should nourishment no longer be a feasible option in the coming decades. Strategies for issue framing and attaining sound policy in light of the findings are also addressed. There are significant economic impacts connected to the health of the recreational beaches of North Carolina. When completed, I believe my study will help serve as a guide to attaining improved beach erosion management practices.

The Invention of the Electric Street-car and the Escape from Old Richmond

Presenter: Earl Ferdinand Glock,
College of William & Mary, History

This paper examines the profound transformations of the city of Richmond, Virginia after it pioneered the use of the electric street-car in America. Although Richmond had previously been a laggard in applying the then common “horse-car” to its imposing hills, this somnolence made it an enticing prospect for investors desiring to demonstrate their revolutionary electric traction system, and it now makes the city a uniquely relevant and important case study in the effect of new transportation technology on urban form. My research demonstrates that this new technology changed Richmond from a compact city in 1880, where almost all citizens lived within two miles from the center and where races and classes lived in relative propinquity, to a modern metropolis in 1920, where suburbs and diverse settlements extended far beyond the city limits. The most important change, however, was not in the extent but in the composition and social life of the city. Sections of the city became distinct and identifiable, with the white middle class escaping to the suburbs, African-Americans left in an increasingly segregated inner city ring, and merchants concentrated in a vertically-imposing downtown where all the street-cars converged. I investigated these changes using several methods. Diaries and journals of the era demonstrated a remarkable awareness of the changing social life occasioned by the street-car. Newspapers discussed the new car lines, and the real estate advertisements in those newspapers could be connected with those lines to discover their impact on building. Sanborn Fire Insurance Maps could also be connected with city directories and census records to examine particular neighborhoods in detail. The overall importance of this investigation is to demonstrate that the modern sprawl and segregation we associate with the automobile-dependent city actually emerged in a recognizable form by 1920, much earlier than is commonly assumed.

Senior, Tenured Faculty: Deadwood or Productive?

Presenter: Eric Godin,
College of William & Mary, Education

Since 1970, the American professoriate has undergone considerable expansion. At the same time, the overall percentage of faculty receiving tenure has decreased as the general public and legislators have called for increased accountability among colleges and universities. A common concern is whether senior, tenured faculty are as productive as their younger colleagues. Critics of the tenure system portray images of decaying professors in dusty offices that have lost their motivation to either teach or research. Although some scholars argue that deadwood professors represent at most 2% of the professoriate, many faculty also acknowledge the professoriate's inability to accurately communicate what faculty do to those outside academia. Using data from the 2004 National Survey of Postsecondary Faculty (NSOPF), the following presentation will illustrate the work patterns of full-time faculty, and evaluate the differences between non-tenured, tenure-track, and tenured faculty. More specifically, this presentation will show that senior, tenured faculty (faculty who have had tenure for over 20 years), are just as productive as other faculty cohorts. In order to illustrate these differences, we first must understand faculty productivity. How is faculty productivity defined? What constitutes high productivity? What is the relationship between the three pillars of faculty work: instruction, research, and service? The failure of the professoriate to effectively defend the tenure system, and their profession in general, is a critical concern in an age when higher education is increasingly being viewed in terms of cost-benefit analysis. Academics may live in the Ivory Tower, but if they don't properly defend the tenure system, tenure may not exist for much longer. This presentation serves to defend senior, tenured faculty and show that they are productive members of the professoriate.

Perceptions of Leadership and School Climate Through Eyes of Principals and Teachers of Appalachian No Child Left Behind Blue Ribbon Schools, (NCLBBRS)

Presenter: Suzanne H. Goodall,
West Virginia University,
Curriculum & Instruction

The major question was: Is there a relationship between principals' leadership frame(s) and school climate in public elementary or middle school level NCLBBRS located in the Appalachian Region States? The population included principals and teachers from all 245 NCLBBRS between 2003 - 2006 in Appalachia who were invited to participate. The sample consisted of principals and teachers from 35 schools. Each state had at least one NCLBBRS represented. Three questionnaires, the Bolman and Deal Leadership Orientations (Self), (B&DS), for principals, the Bolman and Deal Leadership Orientations (Other) questionnaire, (B&DO), for teachers, and the Charles F. Kettering Ltd. School Climate Profile, (CFK), for principals and teachers were used. The CFK instrument items were rated twice to obtain "What Is" and "What Should Be" scores. Pearson product-moment coefficient of correlation was used to determine the correlation between frame mean scores, (B&DS and B&DO), and the two sets of climate mean scores, (CFK). Presentation of data also included frequency distributions with graphical illustrations of the two climate scores. In addition, both principals and teachers completed demographic surveys, PDS and TDS, respectively to determine whether demographic variables affected results. Graphical illustrations for both the PDS and the TDS consisted of plots of demographic components against frequency. The major question is anticipated to have a positive response. Demographic variables are also anticipated to affect results. There may be a tendency for a type of leadership frame(s) used to affect a positive or a negative school climate. The perceptions of the principals and teachers may vary on the type of frame(s) a principal uses and the school climate that exists.

Temporal and Spatial Aspects of the Colonization and Re-colonization in Lentic Habitats

Presenter: Richard S. Groover,
George Mason University,
Environmental Science & Public Policy

Our understanding of aquatic ecosystems, especially for important systems like functioning wetlands, expands as we know more about the populations of species that inhabit those ecosystems. Public policies and the implementation of them will continue to address the dynamics occurring in aquatic ecosystems. The ecological role that dragonflies play in aquatic systems will have relevance to public policy and the reestablishment of wetlands. My presentation will discuss my current research which addresses the local dispersal of dragonflies from one lentic patch to another. Specifically, I wish to answer several questions:

- Which species will colonize first at new or reconstructed impoundments?
- Is there a preference of direction taken when colonizing species migrate?
- Will the first colonizer species (Pioneer Species) maintain dominance?

Thus far, I have surveyed dragonfly species in Hanover County, Virginia, generally, and I am currently surveying several new and several reconstructed habitats with data on first colonizer species. Studies of these impoundments will continue to determine dominance over time or population shifts that might occur. Further research will involve capturing larvae of some species, raising them to adult stage, tagging them, releasing them from their origin pond, then recapturing them at a suspected new pond as they disperse. I will also test my hypothesis, regarding what I determine the Pioneer Species to be, by constructing new impoundments, capturing the dragonfly species who arrive, and comparing these results to predictions based on the earlier studies.

Spectroscopic Studies on the 1.5 um Emission Properties of Ceramic Er: YAG, Er: Er: KPb2Cl5, and Er: KPb2Br5

Presenter: Craig Hanley,
Hampton University, Physics

There exist a significant current interest in the development of a new generation of long-wavelength eye-safe bulk solid-state lasers with resonance diode laser pumping. Applications of laser sources that operate in the eye-safe wavelength regime near 1.5-1.6 um include remote sensing, ranging and material processing, long distance telemetry, and optical communications. Eye-safe laser wavelengths can be achieved by using trivalent Er3+, a rare-earth ion that has an emission transition at ~1.5 um. Trivalent erbium Er3+ (4f11) has been considered an important activator ion in many infrared solid-state lasers. For eye-safe laser operation Er: YAG continues to be the main material under consideration. In this investigation, other materials were evaluated as potential gain media for the 1.5 um spectral region including ceramic Er: YAG, Er: KPb2Cl5, and Er: KPb2Br5. Results of a comparative spectroscopic study of these materials will be presented at the conference including infrared absorption and emission studies, lifetime measurements, and calculations of 1.5 um transition cross sections.

Delayed Electron Extraction

Presenter: Peter R. Harris,
College of William & Mary, Physics

We are developing a unique source for time of flight mass spectrometry, using a room temperature ionic liquid (RTIL). Our laser induced process provides a quality, high resolution time of flight mass spectra, however we also report an unusual delay in the launch time of electrons and ions. The expected transit time for electrons in our system is ~20ns (at -2kV), we report multiple electron arrival peaks all with arrival times exceeding 100ns. Only at extremely high laser powers can we produce prompt (20ns) electrons. To explain this discrepancy in travel times, we propose that a delayed extraction of ions through our RTIL is occurring. This delayed extraction culminates in ions being freed through the surface layer of our RTIL, yielding our unique, stable electron peak structure.

The Rising Threat of Energy as a Vulnerability for Computer Security

Presenter: Adam Hitchcock,
College of William & Mary,
Computer Science

As computing moves forward we find ourselves limited more often by our batteries running low than by the power of our computers. This new concern has driven many companies to develop energy efficient hardware at the expense of security. These new vulnerabilities, dubbed Energy Attacks, can allow attackers to remotely drain the battery of your laptop or cell phone or they can drive up Google's operating costs by millions a day. In my talk I will give an intro to modern security concerns such as Denial of Service attacks and bot nets and how they relate to this emerging area of Energy Security.

A Molecular Survey of Lichen-Associated Bacteria

Presenter: Brendan P. Hodkinson,
Duke University, Biology

According to common knowledge, a lichen is formed solely by a fungus (mycobiont) in symbiosis with an alga and/or cyanobacterium (photobiont). However, many lichens are able to grow on extremely nutrient-poor substrates, raising the question of how they are able to maintain themselves without a substantial source of nitrogen and other crucial nutrients. Though non-photobiont bacteria have never been accepted as an essential part of the lichen symbiosis, the metabolic processes that they perform may play a vital role in providing the mycobiont and photobiont with necessary nutrients and facilitating interactions between them. As part of this study, both culture- and PCR-based surveys were conducted on lichens. Culture-based studies were conducted in the absence of molecular nitrogen in order to isolate nitrogen-fixing bacteria for identification and characterization. PCR-based studies were conducted in a manner that more accurately shows the microbial diversity associated with each lichen, using a fast method known as RHAPSA-D (Ribosomal Heterogeneous Amplicon Pool Sequence Analysis using DOP-PCR bias). These analyses have revealed a number of interesting and potentially important bacterial lineages associated with lichens. These include a number of bacteria that are closely related to documented bacterial symbionts. These findings lend support to several hypotheses concerning the role of certain non-photosynthetic bacteria in the development, maintenance, and evolution of the lichen symbiosis.

Water Quality in Headwater Streams: A Test of Best Management Practices

Presenter: Jonathan Holley,
College of William & Mary, Biology

Urban stormwater runoff carries many types of pollutants that affect both the diversity and abundance of aquatic organisms. Stormwater best management practices (BMPs) were developed to temporarily retain and treat urban runoff before entering nearby streams. Stormwater retention ponds are the most common type of BMP, with nearly 500 ponds throughout James City County, VA. Stormwater management, however, has outpaced the science: the level of water quality improvement associated with retention ponds is for the most part unknown in this region. Our studies determining water and pollutant budgets for retention ponds during storms have documented 1) underperformance with respect to water retention, and 2) variable pollutant removal efficiencies, leading to observed differences in macroinvertebrate communities downstream. Retention pond performance can be improved with specific attention to both structural and functional design criteria.

The Infiltration of Aquatic Mercury into a Terrestrial Ecosystem

Presenter: Mikaela G. Howie,
College of William & Mary, Biology

An ongoing study of mercury contamination has identified elevated levels in terrestrial insectivorous birds foraging adjacent to the mercury-contaminated South River in western Virginia. This suggests that mercury can leave the contaminated aquatic source and enter the terrestrial food web, impacting wildlife not directly associated with the river itself. Traditionally, aquatic mercury has been thought to threaten only fish-eating wildlife species. However, there are two possible routes for exposure of terrestrial wildlife to aquatic mercury pollution. Aquatic invertebrates are exposed to aquatic mercury because they spend part of their lives in the water column and river sediments, where they accumulate mercury. Once these invertebrates emerge, they may be preyed upon by terrestrial predators such as spiders, insects, and larger vertebrates that accumulate higher loads of mercury via the process of biomagnification. Therefore, terrestrial insectivorous songbirds are at high risk of mercury exposure from eating predatory terrestrial invertebrates. A second route of exposure is transfer of mercury-laden sediments to the terrestrial ecosystem during historical flood events. My first objective is to determine the maximum distance from the contaminated South River that terrestrial insectivorous birds are still at high exposure risk. This past summer I addressed this objective by collecting blood samples from adult and nestling birds foraging at known distances from the river. Blood mercury levels drop off with distance from the river. However, the slope of the decrease varies with species, which may be related to the varying foraging strategies and territory sizes of the different species. To follow up this finding, I will be using stable isotope analysis to determine the contribution of aquatic carbon and nitrogen to riparian spiders, which constitute more than 25% of my study species' diet. Using this information, I will be able to better predict exposure risks of species feeding near other contaminated rivers.

Male Mate Choice and the Function of Female Coloration in Eastern Bluebirds, *Sialia sialis*

Presenter: Joanna Hubbard,
College of William & Mary, Biology

The evolution of bright animal coloration is often explained by sexual selection on males, and more specifically by female mate choice or male-male competition. Female choice and male competition for access to mates has been demonstrated in many organisms; however, sexual selection mechanisms should not be limited to these classical mechanisms. Many species of birds demonstrate biparental care and among-individual variation in the quality of both sexes. In such species, it is likely that both sexes will be choosy and competitive as they are both significantly investing in their offspring. Additionally, it is likely that sexual selection is acting on both male and female coloration. Eastern bluebirds, Sialia sialis, are a monogamous passerine that demonstrates biparental care. Females, as well as males, possess colorful plumage patches, a blue rump patch and a chestnut breast patch. I examined the function of female coloration in eastern bluebirds. First I compared female coloration to individual quality and reproductive quality. While females with brighter rumps are not in better condition than females with duller rumps, brighter females lay eggs earlier in the season, lay larger eggs, and produce chicks in better condition. I am also testing whether males prefer more colorful females through a series of mate preference trials. I expect that males will prefer the more colorful females and therefore females of higher reproductive quality. The results of this study indicate that female coloration provides information about individual females and their reproductive quality, which suggests that female coloration may be a sexually selected trait. This would be further supported by the results of the male preference trials if males do prefer more colorful females. If males prefer brighter females, female coloration is likely a sexually selected trait driven my male mate choice.

Green Room: A Guide to Sustainable Theatre

Presenter: Sabrina Hykes,
West Virginia University, Division of Theater

This study sets out to analyze the sustainability of theatrical scene shops in the hope of discovering steps feasible for these often small and underfunded entities to reduce their environmental footprint. The scene shop at West Virginia University was used as a model and the scope has been limited to the paint shop and the materials specific to scenic art in this initial survey. The most commonly used paints, adhesives, sealers, solvents and stains were catalogued, the specific environmental issues with each set identified, and alternatives suggested based on impact, cost, performance and availability. The researcher had anticipated that many of the substances currently used would prove harmful to the external ecology, such as the watershed, as chemicals were washed down the drain or dumped in landfills. The ongoing research suggests that those most strongly impacted by these substances are those using them or working in the places where they are stored. Many products used in theatre give off large numbers of chemicals even when they are dry or while sitting on a shelf. Alternatives exist to most of the commonly used substances such as latex paint, but as they get more user-friendly they tend to become less available and more costly. In most cases some compromise exists, but theatres have to know what is available in order to choose an alternative based on their specific shop, budget and the training of their personnel. The long range goal of this project is to produce a guide that helps to educate professional and amateur practitioners alike and overall reduce the negative environmental impact of the theatrical industry.

Golf Courses as Replacement Habitats: Effect on Fledgling Survival?

Presenter: Allyson Jackson,
College of William & Mary, Biology

The overwhelming shift from natural to urban land use occurring across the country reduces the amount of habitat available for wildlife. Golf courses ostensibly offer replacement habitat for wildlife, especially birds, that are displaced during the urbanization of natural environments. A golf course provides both positive (increased open space, plant productivity and water availability) and negative (high levels of pesticides, disturbance and fragmentation) environmental aspects. To understand how these factors interact to affect birds, previous research has focused on diversity counts and nesting success while widely ignoring the juvenile life stage. Fledglings—birds that have just left the nest—may be more heavily affected by the golf course environment as they are already handicapped by their poor flying and foraging ability. Increased fledgling mortality will impact the overall reproductive success of the parents and so will indicate that golf courses provide a suboptimal replacement habitat for birds. Eastern bluebird (Sialia sialis) fledglings will be tracked using radio telemetry on golf course and reference sites to determine whether the golf course environment affects fledgling survival, dispersal, or age of independence. Bluebird fledgling mortality rates will then be applied to other threatened or difficult to study bird species.

Unforeseen Consequences: The Eisenhower Administration and Fidel Castro's Revolutionary Nationalism in Cuba, 1959-1961.

Presenter: Matt Jacobs,
UNC Wilmington, History

Fidel Castro's relationship with the United States has been a long and tortuous one. He has outlasted nine presidential administrations, and today at the age of eighty-one he is still a driving force in Cuba and a revered figure in much of Latin America. How could Cuba and the United States, two countries so close geographically and with so many historical ties, remain so far apart ideologically? To an important degree, the answers may be found in the policies established by the Eisenhower administration soon after Castro's seizure of power. U.S. policy towards Cuba and Latin America during the late 1950s must be examined in the context of the American-orchestrated coup against Guatemalan President Jacobo Arbenz in 1954. The successful overthrow of Arbenz set an important precedent for the Eisenhower administration's policies towards the revolutionary government in Havana. The years from 1959 to 1961 were critically important in shaping U.S.-Cuban relations for the next four decades. Using documents from Eisenhower's White House, the U.S. State Department, and the American intelligence community, this paper examines Fidel Castro's April 1959 trip to the United States and meeting with Vice President Nixon, Cuban and Soviet diplomatic overtures to one another, and the Eisenhower administration's nascent plans to topple Castro's government in a Guatemala-style coup. In doing so, it places Cuba within the larger context of the United States' attempts to come to grips with the complex phenomenon of revolutionary nationalism on the Cold War's periphery. I believe it is vital to attempt to understand the early relationship that developed between the United States and Castro's Cuba, and by doing so, make it possible to understand the overall relationship. With the changes that are soon bound to occur on the island of Cuba. it is necessary to review the relationship that developed between the governments in Washington D.C. and Havana at the onset of the Cuban Revolution.

Xanthate Deprotection Using the Vilsmeier Reagent

Presenter: Matt Jones,
College of William & Mary, Chemistry

The purpose of this study is to determine the viability of xanthate deprotection/transformation by use of the Vilsmeier reagent. Xanthates, ROC(S)SR, are ethers of xanthic acid, and serve in a variety of chemical processes including elimination reactions, radical polymerization reactions, and purification and processing of minerals. Recent work in xanthate chemistry has indicated that the xanthate functionality may be a potentially useful tool in selectively protecting alcohol groups. Previous work by the Abelt lab at William and Mary has shown that xanthates, when reacted with a Vilsmeier reagent, may be removed to produce the halogenated derivative of the original alcohol. The major question in this study is how readily the group is removed in the presence of other potentially interfering functional groups. Results of the project have proved to be very interesting. After synthesizing a variety of model xanthate compounds, the group discovered that treating glycolic acid xanthate with a Vilsmeier Reagent gave a unique and reactive byproduct that has not been reported in literature. Furthermore, the byproduct, if isolated, could potentially offer a new single step method for xanthate synthesis. The study includes both the findings from the initial work as well as multiple attempts to synthesize and isolate the reactive byproduct.

Effect of Elongation in Divertor Tokamaks

Presenter: Morgin Jones,
Hampton University, Mathematics

Method of maps developed by Punjabi and Boozer [A. Punjabi, A. Verma, and A. Boozer, Phys.Rev. Lett. 69, 3322 (1992)] is used to calculate the effects of elongation on stochastic layer and magnetic footprint in divertor tokamaks. The parameters in the map are chosen such that the poloidal magnetic flux χSEP inside the ideal separatrix, the amplitude δ of magnetic perturbation, and the height H of the ideal separatrix surface are held fixed. The safety factor q for the flux surfaces that are nonchaotic as a function of normalized distance d from the O-point to the X-point is also held approximately constant. Under these conditions, the width W of the ideal separatrix surface in the midplane through the O-point is varied. The relative width w of stochastic layer near the X-point and the area A of magnetic footprint are then calculated. We find that the normalized width w of stochastic layer scales as W-7, and the area A of magnetic footprint on collector plate scales as W-10.

Learning to Work: The Student Organization as a Workplace

Presenter: Whitney Jorns,
George Mason University, Sociology

The purpose of this study is to revisit Rosabeth Kanter's (1977) Men and Women of the Corporation and her theory of the workplace through a modern qualitative study. The study focuses on a co-ed student organization at a large public university. The study examines how these students are given opportunities for leadership and how peer acceptance is critical to their overall success within the organization. The study examines the questions; In what way is the student organization similar to Kanter's researched workplace? How are senators restricted from leadership opportunities? What role do peer interaction and social conformity play in the greater hierarchy? Data were collected in face-to-face interviews from September 2006 to May 2007, resulting in ten semi-structured interviews, four focus groups, and twenty-two senate meeting observations. At the time of data collection all participants were full-time undergraduate students between the ages of eighteen and twenty-three who were active student senators at the university. While access to the senate is not limited to any students, opportunities for advancement are only given to those senators who are socially accepted and fast-tracked into such positions. Pressure for social conformity and limited access to leadership roles results in a closed group often referred to as 'cliques' creating an unwelcoming environment for members who are less socially desirable. Opportunities are given to some senators, but not to others. While some senators are given access to knowledge and mentors, others are discouraged or ignored completely. Kanter claimed that the closed circles at Indsco made it difficult for 'outsiders' to break in, and the only way to reduce this limitation is to reduce pressure for social conformity (68.) This great effort of reducing peer pressure will demand a change in the greater culture of the senate and the university as a whole.

ARTS & SCIENCES

From Fragments: Recovering Personal Narratives in Toni Morrison's Tar Baby

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

In her important book of literary theory, Playing in the Dark: Whiteness and the Literary Imagination, Toni Morrison writes "[S]cholarship that looks into the mind, imagination, and behavior of slaves is valuable. But equally valuable is a serious intellectual effort to see what racial ideology does to the mind, imagination and behavior of masters."[1] Unlike Morrison's previous novels, Tar Baby examines the destructive nature of hierarchical and racial Western thought on its black and white characters.[2] Morrison's rewriting of the tar baby myth – a narrative created both by, and in opposition to, a master narrative – examines the multiplicity of stories long hidden within the totality of a single dominant narrative. In this paper I suggest that a postmodern reading of Morrison's Tar Baby reveals the novel as commenting on what happens to a society no longer confined by a single euro/ameri-centric narrative. Consideration of the novel's ensemble cast sheds light on Morrison's ideas about the personal and political effects of the fracturing of white Western hegemony and also suggests that, although the binding forces of the hegemony may be asymmetrical, they are never one-sided. Application of the basic tenets of postmodernism and feminism allows for a move away from traditional readings of Morrison's work to larger conceptions of difference and power struggle. In addition, a postmodern examination of Tar Baby confronts the reader with the problem of defining a postmodern subjectivity as new, especially in relation to the novel's black characters.

[1] (Cambridge: Harvard UP, 1992) 12.
[2] The Bluest Eye (1970), Sula (1973), Song of Solomon (1977)

Stochastic Broadening Near the Separatrix of the Simple Map

Presenter: Olivia Kerwin,
Hampton University, Applied Mathematics

The simple map is the simplest map that has the topology of a divertor tokamak. The simple map has three canonical representations: (i) the natural coordinates - toroidal magnetic flux and poloidal angle (ψ,θ), (ii) the physical coordinates - the physical variables (R,Z) or (X,Y), and (iii) the action-angle coordinates - (J,Θ) or magnetic coordinates (Ψ, Θ). All three are canonical coordinates for field lines. The simple map in the (X,Y) representation has been studied extensively [1, 2]. Here we analytically calculate the action-angle coordinates and safety factor q for the simple map. We construct the equilibrium generating function for the simple map in action-angle coordinates. We derive the simple map in action-angle representation, and calculate the stochastic broadening of the ideal separatrix due to topological noise in action-angle representation. This work is supported by the following grants US Department of Energy - OFES DE-FG02-01ER54624 and DE-FG02-04ER54793 and National Science Foundation - HRD-0630372 and 0411394. [1] A. Punjabi, H. Ali, T. Evans, and A. Boozer, Phys Lett A, 364 140-145 (2007). [2] A. Punjabi, A. Verma, and A. Boozer, Phys.Rev. Lett. 69, 3322 (1992).

Variations in Bluebird Communication Across a Disturbance Gradient

Presenter: Caitlin Kight,
College of William & Mary, Applied Science

For many avian species, vocalization is an integral part of breeding activities such as mate attraction and territory defense. Any events which reduce the efficacy of vocalizations, and communication as a whole, can therefore decrease individuals' fitness. This is especially true of anthropogenic disturbance, which has been shown to effect changes in a variety of bird song parameters (e.g. frequency, amplitude, rate). Although these studies have illustrated the ways in which many species attempt to overcome anthropogenic noise, there is currently a lack of research addressing the fitness implications for these birds. To investigate potential communication-mediated impacts of human disturbance on avian fitness, I have utilized a 400-box eastern bluebird (Sialia sialis) trail positioned across a disturbance gradient in southeastern Virginia to measure differences in sound propagation, ambient noise, male song characteristics, and fitness across a variety of habitats along the disturbance gradient. I will be presenting the preliminary results of this research (collected during the breeding season of 2007). This study is the first that explores not just whether species are responding to disturbance, but why, how much, and to what end. These are the quantifications that are necessary for understanding how species and ecosystems will persist in the face of human disturbance, as well as for drafting the management and conservation plans required to protect the animals most likely to suffer negative consequences of living in disturbed environments.

Spectacles of Breeding: Kinship and the American Dog Show

Presenter: Wendy Korwin,
College of William & Mary,
American Studies

For the past six years, NBC has broadcast the Purina-sponsored National Dog Show on Thanksgiving Day. The National Dog Show approaches us as a benign affair, ideal for family consumption. At the same time, however, the traditional "conformation" dog show comes to its viewers freighted with a history of spectacular entertainment. Livestock shows, antebellum slave auctions, and the twentieth-century "fitter families" movement all speak to an American preoccupation with racial lineage – a preoccupation that, I will argue, has translated itself into the dog show ring from the late nineteenth century onward. On Thanksgiving Day, today's American family (perhaps even the dog) can direct its attention to a world in which breeding and lineage are "perfected." This paper examines the rhetoric of family that circulates in the televised dog show. I look for the reassuring and potentially problematic ways that commentators present the dogs on display as family members and consumer products, real animals and engineered subjects. This contradictory language simultaneously speaks to the desires of the modern American family and connects its members to a tradition of buying, training, and breeding that remains largely hidden.

Coastal Clean-Up in Little Cayman in 2007

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

This study examined the annual accumulation rate of anthropogenic marine debris in the coastlines of Little Cayman. An initial clean-up was carried out in the summer of 2006 and was repeated in July 2007 to measure the rate of debris accumulation. Two undeveloped beach sites with no regular cleaning or maintenance were selected for this study; both were 200 meters long and 10 meters wide (2000 m^2), one is on the south (windward) side and the other is on the north (leeward) side of the island. Trash was collected from each site and separated in five categories: plastic, glass, shoes, Styrofoam, and ropes and nets. All bags were weighted and the volume was estimated. A total of 117.8 kilos or 1986.4 liters of trash was found, with plastics comprising nearly 60%, ropes and nets about 20%, and shoes 12%. By both weight and volume, there was nearly four times more garbage recovered from the windward side of Little Cayman than from the leeward side. This difference was probably due to the stronger winds and currents on the south side bringing more material to shore. Since the initial 2006 study, in which no previous clean-ups were known to have taken place in the selected sites, 56% as much weight and 73% of the volume of anthropogenic debris had re-gathered on the studied areas. Across the 32 km that makes up the coastlines of Little Cayman, we estimated 9.5 tons or 160 thousand liters of garbage accumulated over a one-year period. This type of coastal pollution is a serious issue and trash removal projects such as this one can contribute to decrease its effects on local communities.

Public Memory and Racial Reconciliation in Little Rock

Presenter: Erin Krutko,
College of William & Mary,
American Studies

Little Rock, Arkansas struggles under the burden of its history. In 1957, the city became the center of national approbation when Governor Faubus used the Arkansas National Guard to prevent nine African American students from integrating the city's flagship school. In a few searing weeks, Little Rock lost its reputation as a racially "progressive" city. Over the last five decades, a vocal portion of the city's population has argued that the images blazed across American television screens in the 1950s were not of their own making. Rather, they were the product of the political machinations of Governor Faubus's race-bating re-election team, or the result of the outside agitation from groups such as the NAACP and the segregationist Citizens' Councils of America. In this version of the events of 1957, "Little Rock did not bring on disaster. Disaster was deliberately thrust upon a majority of progressive and law-abiding citizens by extremists and outsiders seeking to serve their own ends." In recent years, this narrative has been publicly challenged and contested, as community leaders, civil rights veterans, eye-witnesses, and historians have called upon Little Rock to take responsibility for the school desegregation crisis at Central High. These observers argue that the only path toward true racial reconciliation and progress begins with sincere acknowledgment of and atonement for the city's segregated past. Examining archival records, oral histories, commemorative ceremonies, published memoirs, and media accounts, this paper will illuminate the struggle to define the local community of Little Rock's responsibility for the crisis at Central High, and explore the ramifications this debate has for the problems which continue to plague the city's educational system in the present.

Friend or Foe: The Effect of an Interviewer's Conduct on Political Perceptions

Presenter: Elicia C. Lair,
College of William & Mary, Psychology

The increasing prevalence of politically-based news programs has created a need to study the effects of such content on the political perceptions of the public. The main goal of this study was to determine if political interviewers bias an audience with their verbal conduct during an interview. A secondary aim of this project was to explore potential effects between the interviewer's behavior and both the politician's sex and the interviewer's sex. Participants listened to a radio interview of a politician with questions that were either friendly, neutral, or hostile in nature. Although the tone of the questions differed between the conditions, the politician's responses were standardized. The interviews were also arranged so that there was a male and female interviewer for both the female politician and the male politician conditions. The first hypothesis of this study is that an effect will be found between the different interview conditions, with participants reporting a politician in the hostile condition less favorably than a participant in either the neutral or friendly conditions. A second hypothesis is that the friendly condition's politician might be perceived as most likeable, but perhaps less competent than the neutral condition. The main hypothesis is that both the friendly and hostile conditions will be different from the neutral condition, but potentially in different ways. An additional question that this study will attempt to answer will be whether the gender of either the interviewer or the politician interacts with a participant's perception of the politician.

How do Fish Select More Nutritious Food Particles?

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

By a poorly understood process, suspension-feeding fish consume food particles too small to be sensed and engulfed individually, capturing the suspended particles as water flows past their feeding structures. Do suspension-feeding fish select for more high quality food particles through external methods by altering behaviors, through internal mechanisms (e.g., morphological, fluid dynamic) or through a combination of the two? This complex question is tied to a basic understanding of the behavior, morphology, and ecology of suspension-feeding and detritivorous fish. Aquatic detritivores feed on small dead and decaying organic matter that has settled to the bottom, and may use suspension-feeding as the mechanism for particle capture. The model organism for this study is the gizzard shad, Dorosoma cepedianum (Clupeidae), a suspension feeder and facultative detritivore. To determine the selective abilities of this fish, I will use a series of laboratory experiments comparing the nutrient content of food particles suspended in the aquarium to the nutrients that the fish actually ingest when feeding on these particles. The main objective of this study is to determine whether particle selectivity is achieved through internal and/or external mechanisms. The significance of this research rests in the fact that so little is understood about the selective mechanisms of suspension-feeding fish, which can be found in large numbers in lakes and reservoirs where they feed on small prey low on the food chain and then serve as prey for larger fish. Elucidating some of the potential mechanisms for particle selectivity by gizzard shad may identify pathways of nutrient cycling within aquatic ecosystems and improve the understanding of how suspension feeders and detritivorous fish function at both the organismal and ecosystem levels.

Can Nicotine Ameliorate Memory Deficits Found in Fetal Alcohol Syndrome?

Presenter: Mary Levillain,
College of William & Mary, Psychology

Fetal alcohol syndrome (FAS) is associated with a number of cognitive deficits. Specifically, both animals and humans with FAS have been shown to have impaired performance in memory tasks that are dependent upon the hippocampus. In contrast, nicotine has been shown to improve performance on some of these tasks. Interestingly, humans with FAS have a significantly higher rate of smoking than the general populations. Thus, some researchers speculate that smoking could be a form of self-medication used to ameliorate cognitive deficits induced by FAS. The purpose of the present study is to investigate nicotine's ability to compensate for these deficits. Adolescent rats with FAS were given intermittent administration of nicotine during early adolescence (postnatal days 28, 30, 32, and 34). Six days later, on postnatal day 40, these animals were trained in a hippocampal memory task. Testing occurred in a novel context on postnatal days 41, 42, and 43. If nicotine is able to at least partially reverse the learning deficits induced by FAS, animals that received nicotine will show a stronger memory than animals in the control group.

Investigating the Folding of a Death Domain Protein and Hydrophobic Core Formation

Presenter: Hai Li,
Old Dominion University,
Chemistry and Biochemistry

The Death Domain Superfamily has four families: Death Domain (DD), Death Effector Domain (DED), Caspase Recruitment Domain (CARD), and Pyrin Domain (PYD). They function in either intracellular signaling of apoptosis (DD, DED, and CARD), or inflammation (PYD). The Death domain is an á-helical bundle protein with a Greek-key topology. Bioinformatic tools such as PSI-BLAST and MUSCLE were utilized to construct a sequence and structure alignment of the superfamily. Entropy and hydrophobicity studies identified nine highly and seven moderately conserved hydrophobic amino acids, which we propose to be important in the formation of the hydrophobic core during refolding, as well as six hydrophilic amino acids, which we propose to be essential in the interaction with the other death domains. Human Fas-associated death domain protein (Fadd-DD) was selected as our model system to investigate the role of the conserved residues in folding and stability. Equilibrium unfolding and refolding monitored by intrinsic fluorescence indicates that the process is cooperative, two-state, and reversible. A steady-state, far-UV circular dichroism study shows that the ellipticity of this protein has the typical double minima at 208 nm and 221 nm. Stopped-flow fluorescence and stopped-flow circular dichroism have been conducted to study the refolding kinetics. Detailed results will be presented at the meeting.

An Epidemic Model of HSV-1 with Vaccination

Presenter: Dori Luli,
Arizona State University,
Mathematics and Statistics

The most common type of herpes is Herpes Simplex Virus type 1 (HSV-1), and it is commonly known to cause oral herpes—cold sores and fever blisters. Recent studies show that an HSV-1 vaccine was successful in the lab for animals such as guinea pigs and mice. It is estimated that the vaccine will be available for human use in the next few years. Encouraged by those studies, we have formulated a simple SVID model studying the disease transmission dynamics with treatment and vaccination. In this project we find the vaccination-treatment reproductive number, the equilibrium solutions, and their stability. We conduct sensitivity and uncertainty analysis for the reproductive number. We estimate the parameters based on previous works and perform numerical simulations. Finally, we compare different types of treatment and vaccination strategies to find an optimal combination of them and their relative cost in reducing the prevalence of HSV -1 infection in the population.

Community Building in Charles' Corner, Virginia, 1862-1919

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

The half-century between the Civil War and World War I was a critical period of cultural, social and economic transition for African Americans in the southern United States. Archaeological testing at Charles' Corner, a post-bellum residential community on the Lower Virginia Peninsula, provides a compelling account of African American landholders during this period. By embracing anthropological concepts of community-building and using multiple lines of evidence including oral histories with descendants, documents, and artifacts, we have begun to examine gradual change in post-Emancipation communities. Reexamination of this time period should also lead us to ask what implications this analysis may have for modern American society.

JAK/STAT Regulation of Germ Cell Sex Determination

Presenter: Gretchen McConnell,
College of William & Mary, Biology

Germ cells are the only cells in the body that develop into sperm or eggs. Correct germ cell sex determination is essential for healthy gonads and fertility. In Drosophila, this process is regulated by both germ cell autonomously and by signals from somatic cells in the somatic gonad. Within the germline, genes such as ovarian tumor (otu), sans fille (snf), and ovo promote female development, and loss of function of these genes results in formation of ovarian tumors. Additionally, initiation of male germ line development is controlled by activation of the JAK/STAT signaling pathway from the male somatic gonad. However, the extent to which the JAK/STAT pathway controls germ cell sex has not yet been determined. Ectopic expression of the JAK/STAT activating ligand upd in adult Drosophila melanogaster females leads to unrestrained proliferation of germ cells causing ovarian tumors. As this phenotype is similar to tumors formed due to loss of function of ovo, otu, and snf, this suggests that the JAK/STAT pathway is sufficient to induce a masculinized phenotype of genetically female (XX) germ cells. To directly test whether these tumors are in fact masculinized, we are examining whether they express male-specific germ cell markers including the LacZ enhancer trap M5-4 and escargot-GFP. We are also testing whether these tumors initiate spermatogenesis by examination for spermatogenic markers. To continue examination of genetic interactions between JAK/STAT and genes that may promote female germ cell sex determination, we have designed and tested a gain of function screen with the JAK/STAT pathway being our first test. These studies may help determine the extent to which JAK/STAT signaling regulates germline sexual identity. This would be an important step in establishing groundwork for testing the impact of both cell autonomous and somatic factors on the process of germ cell sex determination.

Oral Feedback on Writing

Presenter: Frost McLaughlin,
George Mason University,
Higher Education and English

Instructors of freshman composition often spend long hours commenting on student essays, trying to communicate what works well and what doesn't in each essay so that students can improve their writing skills. Far too often this labor appears to be of little consequence in terms of student learning because students either do not read the comments or do not understand them. An alternative to giving written feedback on student writing is giving oral feedback in one-on-one conferences with the student. Although in the past writing conferences have been considered too time consuming to be used as the predominant method of instruction, this form of individual instruction is now a more viable option with the widespread availability of electronic instructional formats like Blackboard and WebCT as supplementary tools. Based on a pilot study of conference feedback, this qualitative study examines student-teacher dialogue in writing conferences used to provide feedback on writing in freshman composition courses. To determine the effectiveness of oral feedback in writing instruction, the following three aspects of writing conferences will be measured: survey answers from participating students, writing conference dialogue from videotapes, and evaluation of pre- and post-conference writing.

Performance Impacts of Autocorrelated Flows in Multi-tiered Systems

Presenter: Ningfang Mi,
College of William & Mary,
Computer Science

This paper presents an analysis of the performance effects of burstiness in multi-tiered systems. We introduce a compact characterization of burstiness based on autocorrelation that can be used in capacity planning, performance prediction, and admission control. We show that if autocorrelation exists either in the arrival or the service process of any of the tiers in a multi-tiered system, then autocorrelation propagates to all tiers of the system. We also observe the surprising result that in spite of the fact that the bottleneck resource in the system is far from saturation and that the measured throughput and utilizations of other resources are also modest, user response times are very high. When autocorrelation is not considered, this underutilization of resources falsely indicates that the system can sustain higher capacities. We examine the behavior of a small queuing system that helps us understand this counter-intuitive behavior and quantify the performance degradation that originates from autocorrelated flows. We present a case study in an experimental multi-tiered Internet server and devise a model to capture the observed behavior. Our evaluation indicates that the model is in excellent agreement with experimental results and captures the propagation of autocorrelation in the multi-tiered system and resulting performance trends. Finally, we analyze an admission control algorithm that takes autocorrelation into account and shows benefit in reducing the long tail of the response time distribution.

Effect of Previous Mating Experience on Subsequent Mate Preference in Female Zebra Finches (*Taeniopygia guttata*)

Presenter: Kelly C. Minton,
College of William & Mary, Biology

The success of a mate choice can determine whether an individual has high or low fitness; therefore, it is important that individuals use information available to them to make the best choice possible. I am investigating mate preference plasticity of female zebra finches (Taeniopygia guttata) in response to mating experience. This will be accomplished by assessing leg band color preferences of virgin females in a mate preference chamber, allowing them to breed with either a male with a leg band color that they prefer or do not prefer, and then reassessing preference. Previous work has shown that, while a plastic leg band is, of course, not a heritable trait, zebra finches prefer certain leg band colors over others and these color preferences influence mate choice decisions. For this study, the females will be choosing between red leg bands, which are often preferred over other colors, and green leg bands, which are often not preferred. Female zebra finches exhibit plastic preferences in other contexts; it is reasonable to expect to see it here. I expect to see that females who have a successful mating experience will subsequently show a preference for their previous mate's leg band color, whether or not that color was initially preferred, and that females who have an unsuccessful mating experience will subsequently prefer the leg band color opposite their previous mate's. Evidence of preference plasticity would suggest that mate preferences, and therefore the strength and direction of sexual selection, vary between life stages, and this would help to explain why variation in sexually-selected traits remains in wild populations.

Smoking the Competition: Lewis Ginter, Cigarettes, and Advertising in Late Nineteenth-Century America

Presenter: Caroline Morris,
College of William & Mary, History

At the time of Lewis Ginter's death in 1897, contemporaries speculated he was the richest man south of the Potomac. A native of New York City, Ginter had emigrated to Richmond, Virginia, in his youth and worked his way from a shop clerk to the managing partner of Richmond's largest cigarette-manufacturing firm. Along the way, he fought in a war that literally destroyed his home and business, made and lost a couple of fortunes, and became a hometown hero in a city renowned for its distrust of "outsiders." Ginter made his final and greatest fortune through a combination of keen fashion sense and advertising. On his journeys between Richmond and Boston as a traveling salesman in the 1870s, Ginter encountered new-fangled European products called "cigarettes," and realized that Southern tobacco manufacturers could make them cheaply and in large quantities using local tobacco. But Ginter had to make the cigarettes palatable to Americans before he could manufacture and sell them in large quantities. To do so, he pioneered an aggressive form of advertising; all his cigarette packages included a color lithograph that was one of a thematic set. Card sets had themes such as "Indian Chiefs" or "Boxers," and consumers were encouraged to collect and display them, which they did in large numbers. This presentation places the cigarette cards within contemporary discourses of reunion, masculinity, and immigration. Why were customers – mainly northeastern men – drawn to the cigarette cards? What about the images of half-naked male athletes and swarthy privateers appealed to them? How was Ginter using national symbols and heroes to sell a Southern product? The life and career of Lewis Ginter serve as a window into the complicated reconstruction of Southern business after the Civil War, debates over ideal manhood, and the contested growth of a new leisure culture in the late nineteenth century.

The Chaotic Escape of Particles From a Vase-Shaped Cavity: in Theory and Practice

Presenter: Jaison Novick,
College of William & Mary, Physics

We study the escape of particles from a two dimensional, specularly-reflecting open cavity having the shape of a vase. The narrowest point of the neck of the vase defines a dividing surface between particles that escape without return, and those turned back into the cavity. We find stable orbits trapped forever, trajectories hugging the bowl-shaped part of the vase or so-called whispering gallery trajectories, but most importantly, we see trajectories whose path displays a sensitive dependence on launch angle. For our analysis, we consider a point source emitting a burst of particles in all directions and record the time to reach a line segment forming the mouth of the vase. We find that this escape time, as a function of the launch angle, displays a complex fractal structure. First, we briefly outline a topological theory that predicts a subset of the fractals seen in numerical simulations. We perform a numerical simulation of classical trajectories and compare the simulated fractal to that predicted by the theory. Through a collaborative effort we have experimentally verified the early fractal structure in the escape time. Our collaborator constructed the vase out of Teflon and used an ultrasound transmitter as the point source. To study the escape times, a microphone was placed at a point along the vase's mouth. The signal was then recorded for about 17 ms at equally spaced time intervals and then repeated for different detector positions each 1 cm apart. For comparison to classical mechanics, we computed a large family of trajectories and counted the number of trajectories falling within bins centered at each detector position and recording time. The number of trajectories falling within a bin then approximates the signal strength recorded at the bin center. We find excellent agreement with the experimental results.

The Effect of Birth Location on Non-Sequential Double Ionization Yield

Presenter: Jay Paquette,
College of William & Mary, Physics

Atoms in an intense laser field can become doubly ionized through a direct process known as rescattering, where a single electron is liberated through tunnel ionization and is driven back to the ion core by the laser field, leading to impact ionization and release of a second electron. In this quasi-classical description, the trajectory of the first electron will have a strong influence on the probability of release of a second electron, as evidenced by the reduction in yield with elliptical laser polarization. Even with linear polarization, the first electron can avoid a re-encounter with the ion due to the vxB term or the longitudinal electric field component (Ez) in the laser focus. Since the Ez term is given from the requirement of zero divergence of the electric field, its magnitude will vary as a function of position within the laser focus. Using completely classical 3-D simulations, we demonstrate how longitudinal electric field variations affect electron trajectories, how the ion yields from various regions within the focus are affected, and the likelihood of observing this effect experimentally.

Biofilm Formation and its Role in Infectious Disease

Presenter: Jennifer L. Patterson,
Virginia Commonwealth University,
Microbiology and Immunology

It is well recognized that planktonic growth of bacteria in vitro does not accurately represent the phenotypic state in nature or in infectious diseases, where most bacteria grow as biofilms. Biofilms are communities of microorganisms that are surrounded by an extracellular polymeric matrix composed of polysaccharides, proteins and/or nucleic acids, which promote intercellular adhesion and attachment to a surface. The biofilm mode of growth imparts on its constituent bacteria resistance to antimicrobial agents, drying, pH changes, ultraviolet light, acid exposure, phagocytosis and sheer stress. This increased resistance is due to many factors including: restricted penetration of antibiotics/disinfectants, production of antimicrobial destroying enzymes, altered growth rate of some cells, and overexpression of stress response genes. The medical community has progressively recognized biofilms as important aspects of disease, especially in patients with indwelling medical devices. The biofilm phenotype is associated with chronic, indolent, and relapsing infections. Examples of widely studied and well-recognized biofilms include those found in catheter infections, pulmonary infections, urogenital infections and endocarditis. An important step in the pathogenesis of these infections is biofilm formation; therefore, identification and characterization of the gene or genes responsible for biofilm formation could lead to novel treatment modalities.

The Effect of Social Exclusion on Future Affiliation

Presenter: Richard S. Pond, Jr.,
College of William & Mary, Psychology

Research has been inconsistent as to how social exclusion affects affiliative behaviors. As well, little research has examined the possible sources of social reconnection for excluded individuals, though theory seems to suggest that a person will form groups with others that are similar to him/herself. The present investigation was conducted to explore the affiliative tendencies of socially excluded individuals. Specifically, the present study examined whether socially excluded individuals prefer to affiliate with other excluded individuals. Study participants received information from the experimenter that they have either been included or excluded from a laboratory group. They were informed that the decision was based upon the preference of the group members. Participants were then asked to interact with another individual from a different lab group. This individual was a confederate of the experimenter who acted as an accepted other, an excluded other, or a complete stranger. All participant-confederate interactions were recorded with the use of a hidden camera. The ensuing interactions will be analyzed for differences in conversational content and duration. It is expected that excluded participants will affiliate with both strangers and other excluded individuals equally. Though it is anticipated that affiliation with strangers will be merely for replenishing the belonging need, while affiliation with other excluded individuals will be for reasons of cognitive clarity and emotional similarity. It is not expected that excluded individuals will affiliate with accepted individuals. On the other hand, included individuals will likely affiliate most with accepted others and least with excluded others. Such results would imply that when socially excluded individuals seek affiliation with other excluded individuals, it is because they are seeking information about the exclusion experience and not merely for replenishing social connection.

Comparative Study of Dopamine, 2-amino -1,3- propane diol and Prussian Blue in a Search for Stable Functionalized Nanoparticles

Presenter: Farah Radwan,
Virginia Commonwealth University, Chemistry

The stability and functionalization of magnetic nanoparticles is an extremely critical issue due to their many applications. In the last decade, these particles have shown an encouraging potential to be used in the areas of medicine and biomedicine specifically. For instance, iron nanoparticles experience an increase in their magnetic moment on the nanoscale, as a result, they can be used as MRI contrast agents.(1) In addition, their superior magnetics provide higher specific absorption rate and greater heat conductivity, based on that, these particles can be used in cancer research, such as in the treatment of hyperthermia.(2) The use of nanoparticles in medicine requires stable functionalized nanoparticles since many of these applications require the injection of these particles in the human body. Recently, dopamine was used as a robust anchor to functionalize the surface of iron oxide (Fe-Ox) nanoparticles due to the stability of its planar five member metalocycle structure.(3) However, dopamine itself is reactive towards iron, creating cytotoxins and leading to the degradation of Fe-Ox nanoparticles. (3) This leads to the search of more stable functionalization ligands. 2-amino-1,3-propane diol (APD) was found to be a good robust coating on the surface of Fe -Ox nanoparticles which is unreactive but can be further functionalized. The kinetics studies show that the Fe-Ox nanoparticles coated with APD are stable over 24 hours, which is more stable than dopamine coated (Fe-Ox) nanoparticles. Another robust coating that has the potential of being yet more stable is ferro (ferri cynide) that has the advantage of having a strong field ligand between iron (II) and the cyanide which ensures its stability. This work will provide a comparative study of these three coatings, their characterization using TEM, XRD, IR, XPS, MALDI, VSM and UV-VIS to have good insights of which will provide better stable functionalized Fe-Ox nanoparticles. References

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(3) (3) Shultz, M. D.; Reveles, J. U.; Khanna, S. N.; Carpenter, E. E. Journal of the American Chemical Society 2007, 129, 2482-2487.

Potential Role of Guinea Pig Cytomegalovirus (GPCMV) MHC Class I Homologs in Innate Immune Evasion

Presenter: Megan Reeves,
Virginia Commonwealth University,
Pediatrics

Development of a vaccine to prevent birth defects caused by human cytomegalovirus (HCMV) is a national priority. HCMV blocks surface expression of MHC I, which would activate natural killer (NK) cells to release IFN-g; however, viral “NK-evasins” serve to block this activation. As NK activation has been linked to development of robust adaptive responses, removal of NK-evasin genes from live attenuated vaccines might potentiate long-term adaptive immunity. GPCMV is a valuable model to study congenital transmission. Like HCMV, GPCMV down-regulates MHC I and encodes three MHC I homologs that may function as NK-evasins. We constructed a recombinant GPCMV (3DX) lacking all three MHC I homologs. 3DX grew with wild-type kinetics in vitro but was highly attenuated in vivo. Following vaccination, 3DX DNA was undetectable in the blood of female seronegative guinea pigs (n=8), whereas $1x10^5$ genome copies/mL were detected in 4/7 animals vaccinated with the same dose of parental wild-type vaccine (WT) (n=7). Despite this attenuation, GPCMV-specific antibody responses evaluated by quantitative ELISA, avidity, and immunoblot were comparable between 3DX- and WT-infected animals. Interestingly, ELISA titers were significantly higher in 3DX vs. WT groups (3.74±0.3 vs 3.1±0.4, p=0.01). These animals were mated and challenged during the third trimester with a GPCMV dose sufficient to cause 70% pup mortality in seronegative animals. Immunity to 3DX reduced mortality to 22%, vs. 23% for WT-immunized animals. Average live pup weight was comparable (95.3 g for 3DX vs. 98.2 g for WT). We conclude that deletion of potential immune evasion genes did not impair humoral responses or vaccine efficacy. Studies are in progress to determine if 3DX enhances NK activation and if so what downstream effects this has on adaptive immunity. The results suggest that the safety of an HCMV live-attenuated vaccine could be enhanced by deletion of NK-evasin genes without loss of efficacy.

How To Find a Needle in a Digital Haystack

Presenter: Meghan Revelle,
College of William & Mary,
Computer Science

The software development life cycle at a typical company goes something like this. A group of programmers design a piece of software to meet their client's requirements, implement their design, test the software to make sure it works correctly, and send the finished product to their client. After a while, the client will inevitably find a problem with the software or request changes to how the software works. It is often the case that the original software programmers are not the ones to make these changes, meaning the programmers asked to do the job have no idea where to start because they are unfamiliar with the software and its implementation.

Our research has developed a new approach that can be used by programmers who are unfamiliar with a piece of software and need to understand how parts of it are implemented. Our approach makes use of code coverage, formal concept analysis, and static and dynamic analysis to locate the code that implements features that a programmer wishes to know about, essentially helping them find a needle in a digital haystack. Preliminary results have found that our approach can find accurate and near complete implementations of features automatically, without the programmer having to struggle and search for that code manually.

Comparison of Phenotypic Characteristics of Diamondback Terrapins (*Malaclemys terrapin*) Inhabiting Sites With and Sites Without Crabpots

Presenter: Megan Rook,
College of William & Mary, Biology

The diamondback terrapins of Virginia are suffering high rates of mortality from a major threat to terrapins throughout their range: drowning as bycatch. Specifically, the waters in which terrapins spend most of their lives are littered with crabpots from the blue crab industry. Terrapins are easily caught in these traps in which they subsequently drown. Due to the sexual size dimorphism exhibited by this species, crabpot mortality affects males and females differently. Females eventually grow so large that they can no longer fit through the gape in the crabpot whereas males never attain this “safe” size. Terrapins were captured, measured, weighed, and tagged at two locations, one with and one without crabpots, throughout the summer of 2007. At the crabbed study site, the Goodwin Islands, females appear to be larger and show less phenotypic variation than females at a site where crabbing is illegal, the Yorktown Naval Weapons Station. No such apparent size differential was found for males between sites. Therefore, the blue crab industry may be selecting for fast-growing, large females while substantially decreasing the male population. Replicating this study with two additional sites, one crabbed and one crabpot-free will help to determine if females show differences in size structure due to selective pressure imposed by mortality in crabpots. It will also help to determine the extent to which crabpot mortality is affecting the age structure of the male portion of the population.

Nodes of Ranvier Undergo Molecular Reorganization with Age

Presenter: Mark Shepherd,
Virginia Commonwealth University,
Anatomy and Neurobiology

Myelinated axons facilitate action potentials at specialized regions along the axon called nodes of Ranvier. The node of Ranvier is a myelin-bare region between two adjacent myelin segments that maintains a high concentration of sodium channels required for proper nervous system communication. On each side of the node is a paranode, or region of close contact between the myelin and axolemma that provides a separation of sodium channels in the node and potassium channels in the juxtaparanode. This separation is important for the maintenance of quality action potentials along the axon. Several nodal and paranodal structural changes have been observed in myelinated axons of aged mice resulting in the disruption of impulse conduction. These changes include the loss of the myelin sheath, formation of redundant myelin and myelin balloons. Using electron microscopic analysis, we show that aged mice exhibit disrupted specialized paranodal junctions as evidence by the loss of transverse bands. We hypothesize that this structural defect results from a molecular reorganization of the protein Neurofascin 155, a myelin protein known to participate in transverse band formation. Analyzing double-immunolabeled longitudinal sections of the ventral column, cervical spinal cord in aged C57/BL6 mice, our data reveals a decrease in Neurofascin 155 paranodal localization with age. We also observe in 17 and 22 month old mice neurofascin 155 accumulating in the juxtaparanode and internode. These results suggest that age results in a molecular reorganization of the paranodal region, potentially compromising myelin stability and axonal function.

Emotional Heights: The Influence of Affect on Behavior and Perception

Presenter: Erika Siegel,
College of William & Mary, Psychology

The aim of this research was to investigate emotional influences on the perception of spatial layout. More specifically, how fear and anxiety influence the perception of heights and distances in naturalistic settings, where participants would experience more fear and anxiety than could be evoked in the laboratory. Previous research has shown that people overestimate height more from the top than the bottom, especially when they are afraid of heights (Stefanucci & Proffitt, 2007). Participants in this study were enrolled in an outdoor adventure course. At various points in the semester, participants flew across a zip line and rappelled off of a four-story parking garage. Before each outdoor element, participants filled out online surveys about their current emotions, their predicted emotions, and their emotions about heights. On site, before the element, participants completed a height matching task where they positioned an experimenter to be the same distance from them as they were from the height they were viewing. Participants also completed the Subjective Units of Distress Scale to assess their on-site excitement and fear. Finally, the time that it took participants to climb up the element was measured and, once on top, how long it took them to jump off of the element. After participants attempted the outdoor element, they completed online surveys about their current emotions, their memory for their emotions, and their current emotions about heights. These converging measures were used to assess participants' emotions, perception of social support, and overestimation of height. We replicated overestimation of height findings, found a relationship between behavioral measures and distress scores, and found correlations between multiple types of anxiety, which, surprisingly, also included social anxiety. This study, when combined with earlier laboratory research, bolsters our understanding of the relationship between emotion and the perception of heights.

Peripheral Vision: Considering the Capitalist Core from the Vantage of Early Colonial City Point, Virginia

Presenter: Kathryn Sikes,
College of William & Mary, Anthropology

Studies of colonial capitalism often rely upon a narrative that emphasizes the active role of European colonizers at the expense of non-European participants. This study proposes that an archaeological examination of capitalist trade that focuses upon meaning and historical precedent, rather than upon profit, decenters the agency of colonizers and clarifies the influence of the indigenous “periphery’s” contributions to a world economy. The paper seeks to address the ways in which global systems of capitalism framed the experiences of documented individuals associated with excavated 17th-century contexts at City Point, considering the ways in which laborers within Virginia’s tobacco-based economy interacted with the landscapes and material culture associated with tobacco production. It employs an economic emphasis to illuminate the broad scale at which objects and ideas were exchanged, while highlighting the ways in which material culture engaged communities, households, and individuals within the more intimate setting of the upper James River.

The Power of Imagery: Using Mental Imagery to Reduce Food Cravings

Presenter: Shereen Singer,
College of William & Mary, Psychology

Most people have experienced a food craving—a sudden, intense desire to eat a particular food. Food cravings are not usually pathological, but can become problematic for overweight individuals and people who have an eating disorder. Cravings have been linked to early drop out from weight loss programs as well as binging, purging, and guilt. Research has shown that mental imagery is a key component of cravings. As such, imagery techniques may be useful in reducing unwanted cravings. This study examines the effectiveness of imagery in reducing cravings and food consumption of chocolate, the most commonly craved food in Western cultures. Participants were female undergraduate students who were pre-screened for possible eating disorders, allowing us to examine two groups—a normal sample and a sample of people with eating disorders. Participants were randomly assigned to one of three conditions: imagining eating cake, imagining walking in the woods, or waiting in silence. Participants in the two imagery conditions listened to a recording that guided them through a scenario where they imagined eating a piece of cake or walking through the woods. After the recording, participants were given chocolate cake and allowed to eat as much as they wanted, with the amount of cake eaten serving as the dependent variable. Initial analyses show that for the normal sample, the amount of cake eaten did not differ based on condition. For the sample with eating disorders, however, there is a trend such that participants who imagined eating cake ate the least cake and those who waited ate the most cake. These results suggest that mental imagery may be effective at reducing cravings and food consumption for people with eating disorders; thus imagery may be an effective technique to reduce the binging and guilt that often accompany a craving.

Fabrication and Real Time Characterization of FePt Nanomagnets

Presenter: Jonathan Skuza,
College of William & Mary, Physics

The magnetic properties of some ordered phases in the FePt binary alloy system (i.e., L10 and L12) are of interest in magneto-optical and magneto-recording applications (e.g. ultrahigh storage density media). The chemical ordering of the alloy affects the crystallographic structure and hence the magnetic anisotropy, making the L10 phase a suitable candidate for next generation recording media. An important fabrication aspect for media applications is to achieve nanomagnets with the L10 ordered phase. Ion beam irradiations applied to FePt magnetic thin films have recently attracted strong interest to modify the magnetic properties in useful ways for this application. We present our approach for achieving FePt nanomagnets, along with combined magnetic and real time structural characterization studies. The samples were obtained by implanting Fe+ ions into Pt thin films at the Toledo Heavy Ion Accelerator, where the size and penetration depth of the resulting Fe nanoclusters in the Pt matrix were tailored by modifying the ion beam energy and implantation dose. X-ray diffraction (XRD) was used to track the structural evolution of these nanocomposite samples upon annealing. Our experiments revealed that the onset of the L12 phase occurs at ~400º C with further re-ordering and formation of the L10 phase at ~500º C. Analysis of the real time isothermal annealing XRD data, obtained at the Advanced Photon Source at Argonne National Laboratory, shows that the activation energy for the L10 phase in these samples is ~1.0 eV. Magnetic measurements after the annealing treatments show a strong out-of-plane component of the magnetic anisotropy consistent with the formation of the L10 phase.

Long-term Effects of Adolescent Nicotine Exposure on Learning in Rats

Presenter: Andrea Spaeth,
College of William & Mary, Psychology

Due to the extremely high prevalence of adolescent tobacco use, it is important to study how nicotine affects cognitive development and performance within this population. Animal models can be used to study the specific effects of nicotine exposure on learning under carefully controlled conditions. Previous research has focused mainly on the immediate effects of nicotine exposure rather than possible long term effects. However, the possibility exists that adolescent nicotine exposure can impair aspects of cognition in adulthood. In the current study, rats were exposed to nicotine during adolescence (28-42 days old) and learning was assessed during adulthood (65 days old). Nicotine was administered via an osmotic pump which provided a steady state of nicotine throughout the adolescent administration period. The impact of adolescent nicotine on later learning as adults was assessed in a context conditioning task. During training, rats were placed in a chamber and received mild electric footshock (or not). When the animals were placed back in the same chamber during the test session, amount of licking at a sipper tube was measured and was expected to be suppressed in animals previously exposed to mild footshock compared to animals not exposed to the footshock. Preliminary data analyses suggest that adolescent nicotine exposure can have long-term consequences on context learning, with ongoing analyses and future experiments aimed at understanding the exact nature of these effects. These data suggest that adolescent nicotine exposure can have long-term effects on learning, specifically about context, suggesting that the neural circuitry responsible for this type of learning is affected on a long-term basis by the present nicotine administration regimen.

Blending Texts, Blending Bodies: The American Mulatto in William Wells Brown's Clotel

Presenter: Amanda Stuckey,
University of Virginia,
English and American Studies

During the 1800s, Americans disturbed by the injustice of slavery frequently turned to literature to express their growing concern. Often such literature fell into the genre of the sentimental; authors such as Harriet Beecher Stowe used images of African Americans' bodily suffering to appeal to their readers' own bodily states. However, during the 1850s, William Wells Brown - often considered the first African-American novelist - introduced a new style and process of writing onto the scene of anti-slavery writing with his novel entitled Clotel; or, the President's Daughter. Living in England during the time of the novel's writing, Brown examined the condition of the American mulatto while simultaneously exploring the tenuous notion of citizenship in America. In my paper I explore Brown's investigation of American ideas of racial, gendered, and political divisions and how, in the inventive hands of a free African-American author, these categories are shaken and ultimately dismantled. Issues such as mulatto citizenship, cross-dressing, and the difference between the meaning of freedom in America and the meaning of freedom in England surface in Brown's novel to expose the instability of America's imposed divisions. Brown also calls into question the notion of American history itself; in Clotel, he weaves factual accounts with fictive characters and situations and with fictive "natural documentation" such as newspaper stories to enact an identity of his own: that of an African-American writer trying to legitimize his own voice in the world of anti-slavery writing. In researching Brown's work, I study ancillary historical accounts alongside Brown's own version of such accounts and find significance in Brown's revisions. Ultimately, I suggest that Brown uses the text itself to unveil his readers' notions of fact and fiction, of history and of storytelling, to call into question yet another category in American ideology: that of the truly “American” citizen.

Onontio's Children: Inter-Indian Relationships in French Détroit

Presenter: Andrew Sturtevant,
College of William & Mary, History

In 1738, the long-simmering hostility between the Huron and Ottawa natives settled at the French post of Détroit finally erupted into overt hostility. Claiming that the Hurons had aided the Ottawas' enemies, the Ottawas promised retaliation, forcing the Hurons to flee the area temporarily. This crisis testifies to the fractures and diversity within the polyglot assemblage of groups allied to the French. Focusing on this incident, this paper explores the complicated relationship between the Hurons and the Ottawas. Ultimately, the crisis demonstrates the vitality and durability of natives' "national" or "tribal" identities, and suggests that in addition to focusing on relationships between Europeans and natives, scholars need to understand how native groups interacted with one another culturally and politically. Détroit provides an especially appropriate laboratory to study such questions. The fort eventually hosted a few thousand natives settled in separate villages. Here, in the claustrophobic intimacy of the post, natives encountered foreign and sometimes unfriendly groups every day. In Détroit, more than anywhere else in the region, natives interacted with others. To access these interactions, this paper draws on notarial minutes, official correspondence, and ecclesiastical records, as well as material culture and cartography.

Validation Study of R-Mix Too Shell Vials for the Detection of Influenza A and B in Patients Presenting with Influenza-like Illness

Presenter: Daniel Trexler,
Virginia Commonwealth University,
Clinical Laboratory Sciences

Background: Validation of a sensitive and rapid method for the detection of influenza and sub-typing of influenza A is paramount from both a clinical and public health standpoint. Accurate administration of anti-influenza drug therapy directly affects patient care while the sub-typing of influenza A provides vital information to public health authorities for disease surveillance and vaccine development. The present study proposes to investigate a novel co-culture shell vial R-Mix Too (Diagnostic Hybrids, OH) that has elucidated the ability to propagate growth from shell vial when supernate is inoculated into a traditional tube culture cell line such as Rhesus Monkey Kidney (RMK) cells. Objective: To optimize and validate the influenza A and B shell vial cell culture (SVCC) method using R-Mix Too shell vials when compared to cell culture (CC) and real-time RT-PCR. Study Design: Consists of four specific aims: (1) compare the qualitative results of R-Mix Too, to CC, and real time RT-PCR using purified viral isolate stocks and clinical specimens; (2) evaluate and compare analytical sensitivity of R-Mix Too with conventional gold standard culture (CC) and real time RT-PCR method; (3) determine analytical specificity of R-Mix Too using a variety of viral and bacterial respiratory pathogens and flora; (4) evaluate the ability of R-Mix Too to propagate influenza virus in CC after 48 hours growth. Anticipated Results: It is hypothesized that R-Mix Too shell vials will be more sensitive and specific than CC but less sensitive and specific than real time RT-PCR. The ability of R-Mix Too to facilitate CC propagation would enable a laboratory to streamline their protocols for the detection of influenza. A specimen collected for seasonal influenza would only need to be inoculated to a single shell vial. If the screen is positive, then the supernate could be inoculated to CC for confirmation cell culture testing.

A Comprehensive Analysis of Streptococcus Sanguinis Cell Wall-Anchored Proteins in Experimental Infective Endocarditis

Presenter: Lauren Senty Turner,
Virginia Commonwealth University,
Microbiology and Immunology

In bacterial infective endocarditis (IE), bacteria that transiently enters the bloodstream adheres to and then grows on previously damaged heart valves. It is thought that cell wall-anchored (Cwa) proteins, which are attached to the bacterial cell surface by sortase enzymes, are required for this adherence. To address this hypothesis, a comprehensive analysis of Streptococcus sanguinis Cwa proteins and sortases in experimental IE was performed. Thirty-one putative Cwa proteins were predicted from the completed S. sanguinis SK36 genome sequence by bioinformatic analysis, and three sortase homologs were identified and named SrtA, SrtB or SrtC. A technique termed signature-tagged mutagenesis (STM) was used to knock out the genes for each of the thirty-one Cwa proteins, and the mutant strains were tested for their ability to cause disease in the rabbit model of IE. No single Cwa protein was required for establishing disease—a result that may be attributed to multiple Cwa proteins performing similar functions during the onset of infection. It is likely that SrtA is the enzyme required for anchoring the majority of the thirty-one S. sanguinis Cwa protein substrates, whereas SrtB and SrtC may have narrower substrate specificity. In consideration of these distinct sortase roles, S. sanguinis mutants were created with a knock-out mutation in the srtA, srtB, or srtC gene. The propensity of the sortase mutants to cause disease was then tested in the rabbit model. It was determined that neither SrtC nor SrtB was necessary for establishing disease, as both mutant strains retained pathogenesis. In contrast, the SrtA mutant showed reduced pathogenicity in the animal model, indicating that SrtA is necessary for typical disease progression. Therefore, it is likely that more than one Cwa protein dependent upon SrtA for cell surface localization is required for establishing IE, and such proteins may have similar functions in this process.

Evaluation of Cerebrospinal Fluid on the ADVIA 2120

Presenter: Lara R. Underhill,
Virginia Commonwealth University,
Clinical Laboratory Sciences

Laboratory analysis of cerebrospinal fluid (CSF) is vital when diagnosing subarachnoid hemorrhage, cancer, infection, or metabolic abnormalities. The role of the hematology laboratory in CSF analysis is to provide an enumeration of red blood cells, white blood cells, and a white blood cell differential. The standard protocol, a manual method, is tedious, time-consuming, and requires extensive and costly training hours. An automated method to perform cellular analysis of CSF would decrease these issues and establish more reproducible results, increase laboratory productivity, and lower costs. The ADVIA 2120, recently released by Bayer Healthcare, Diagnostics Division, is a bench-top analyzer designed for medium-to-large volume laboratories. A CSF assay is approved by the FDA for the ADVIA 2120 and uses direct cytometry to perform the hematological analysis. Current literature indicates that this automated CSF method is not used in the laboratory. The goal of this project is to validate a procedure to enumerate red blood cells and white blood cells and perform a white blood cell differential on CSF using the automated hematology analyzer ADVIA 2120. To evaluate the automated method, 100 consecutive samples with sufficient volume of CSF will be manually counted, processed by the ADVIA 2120, and the data sets compared. The accuracy, within-run precision, between-run precision, linearity, analytical specificity, and analytical sensitivity will be used to evaluate the automated method. The accuracy will be determined using method comparison statistics including the linear regression line, slope, Y-intercept, correlation coefficient, and a T-test. The hypothesis is that with the correct identification of white blood cells by the ADVIA 2120 and the high sensitivity of the instrument, the results will have a high correlation with the standard manual method. This will support implementation of the automated method into the clinical laboratory.

TAPSS 2.0: A Web-Based Survey to Monitor Problem-Solving Abilities Related to Computer Programming

Presenter: Jorge Vasconcelos,
Johns Hopkins University,
Computer Science

TAPSS 2.0 is a test for algorithmic problem-solving skills implemented as a web-based application, which aims to screen and monitor abilities fundamental to computer programming like reading comprehension, problem abstraction, arithmetic and logic skills, stepwise planning, and process analysis. The instrument comprises three innovative elements: (i) a questionnaire addressing 17 skills specifically related to algorithmic problem-solving, (ii) a surveying process allowing to skip questions and requesting the applicant to self-rate answer confidence, and (iii) a scoring model tracking skills throughout different questions and weighting answer correctness according to the respective confidence level. In addition, the testing of thinking skills like abstraction, attention to details, and critical thinking, involved designing new kinds of questions. This work has been driven by the educational need of understanding what prevents many college students from learning to elaborate programs, and was grounded in a constructivist theoretical framework. A hermeneutic approach was followed to understand and integrate common programming errors, programming-specific thinking styles, and problem-solving ability domains. The software tool, along with the methodological framework associated, are aimed to provide programming instructors with information and resources to differentiate instruction according to diverse levels of problem-solving abilities, as well as help students to reflect on their problem solving strengths, while gaining a deeper understanding of the knowledge, abilities, and cognitive processes needed to become skillful in creating algorithms and elaborate computer programs.

Peer Group and Friendship Influences on Children's Management of Anger and Sadness

Presenter: Gina Veits,
College of William & Mary, Psychology

Research has shown that close friendships and peer groups are significant vehicles for promoting emotional competence. Within a friendship, children can explore and appraise emotion experiences and support each other by learning new techniques to cope with strong emotional events (Gottman & Mettetal, 1986; Youniss & Smollar, 1985). This can contrast with peer group processes, which have been posited to more rigidly apply rules for maintaining peer norms. The goal of this study was to examine emotional development within two social contexts and understand how children express emotion in the unique social contexts of a friend versus the peer group. An investigation of the ways in which children manage anger and sadness in two different contexts (friend, peer group) may illuminate mechanisms underlying emotional development in social relationships; an area that the extant literature has not investigated. The study examined two age groups (grades 1-2 and grades 3-4) because they represent differing competencies with regard to emotion management skills. Data was collected on 134 children (72 male, 62 female) who ranged in age from 6 to 11 years and were predominately Caucasian and of middle class. There were equal numbers of older and younger children and gender distribution within age group. Children completed the Children Emotional Management Scales (CEMS): Sadness and Anger, (Zeman, Shipman, & Penza-Clyve, 2002), to evaluate methods that children use when responding to sadness - and anger-experiences within the context of their peer group and with a best friend. Results are discussed from within a peer socialization of emotion framework. This research adds to the literature by its unique focus on directly comparing emotion regulation efforts in friendship versus peer group social contexts and comparing younger and older elementary school age children's emotion regulation responses within these settings.

Snoogle: a Search Engine for the Physical World

Presenter: Haodong Wang,
College of William & Mary,
Computer Science

Hardware advances will allow us to embed small devices into everyday objects such as toasters and coffee mugs, thus naturally forming a wireless object network that connects the object with each other. This talk presents Snoogle, a search engine for such a network. Snoogle uses information retrieval techniques to index information and process user queries, and compression schemes such as Bloom filters to reduce communication overhead. Snoogle also considers security and privacy protections for sensitive data. We have implemented the system prototype on off-the-shelf sensor motes, and conducted extensive experiments to evaluate the system performance.

An Assessment of the Accuracy of Inmates' Reports of their School-Aged Children's Behaviors and Feelings

Presenter: Laura C. Wilson,
College of William & Mary, Psychology

An estimated one million American children with incarcerated parents are at risk for social, emotional, and behavioral difficulties. Researchers interested in studying the effects of parental incarceration on children face a number of unique challenges, such as assessing the accuracy of inmate-parent's reports of their child's behavior. There is a tendency to over-rely on inmate parents' reports of child outcomes, yet no known research has examined their accuracy. The goal of the present study is to assess the correspondence between inmate-parents' and caregivers' reports of children's behaviors. A meta-analysis based on 119 studies suggests correlations ranging from .22 - .60 among multiple informants of child behavioral and emotional problems (Achenbach, McConaughy, & Howell, 1987). This range depends partly on the context in which an informant observes the child, with higher correlations found when informants share similar informant and situational variables.

Participants and Instruments.
Twenty-nine inmates from a low-security county jail in a southern city, who are the parents of 36 children (ages 6-17; 50% female) participated in the current study along with the children's caregivers (n=29). Information was collected during an open-ended interview at the jail with the inmates and over the phone with the caregivers. Inmates and caregivers answered standardized questionnaires about the children's externalizing behaviors, academic competence, and emotion regulation.

Planned Analyses.
To examine the correspondence between inmates' and caregivers' reports of children's externalizing behaviors, academic competence, and emotion regulation, we will compute Pearson Product Moment Correlations. We hypothesize that the cross-informant agreement between incarcerated parents and caregivers will be low to moderate (e.g., .15 - .45), suggesting discrepancies in their reports due to situational differences in their exposure to the child's behavior.

Swift: Fast Dynamic Packet Filter

Presenter: Zhenyu Wu and Mengjun Xie,
College of William & Mary,
Computer Science

We present Swift, a packet filter for high performance packet capture on commercial off-the-shelf hardware. The key features of Swift include (1) extremely low filter update latency with a strong security model for dynamic packet filtering, and (2) Gbps high speed packet processing. Based on Complex Instruction Set Computer (CISC) Instruction Set Architecture (ISA), Swift achieves the former by employing Deterministic Finite Automata (DFA) as its pseudo-machine computational model, and the latter by utilizing SIMD (Single Instruction, Multiple Data) and hierarchical execution optimization. We implement Swift in the Linux 2.6 kernel for both i386 and x86_64 architectures, providing a BPF-like Application Programming Interface for compatibility as well as an object oriented API to simplify filter coding. We extensively evaluate the dynamic and static filtering performance of Swift on multiple machines with different hardware setups. We compare Swift with both BPF (the BSD packet filter)---the de facto standard for packet filtering in modern operating systems, and hand-coded optimized C filters that are used as the ceiling on performance. For dynamic filtering tasks, Swift is at least three orders of magnitude faster than BPF in terms of filter update latency. For static filtering tasks, Swift also outperforms BPF up to three times in terms of packet processing speed.

An Integrated System for Planning, Navigation, and Robotic Assistance for Skull Base Surgery

Presenter: Tian Xia,
Johns Hopkins University,
Computer Science

We have created an image-guided robot system to assist with skull base drilling by integrating a robot, a commercial navigation system, and an open source visualization platform. The objective of this procedure is to create a cavity in the skull base to allow access for neurosurgical interventions. The motivation for introducing an image-guided robot is to improve safety by preventing the surgeon from accidentally damaging critical structures during the drilling procedure. Our approach is to attach the cutting tool to the robot end-effector and operate the robot in a cooperative control mode, where robot motion is determined from the forces and torques applied by the surgeon. We employ “virtual fixtures” to constrain the motion of the cutting tool so that it remains in the safe zone that was defined by the surgeon, on a preoperative CT scan. This paper presents the system design and the results of phantom and cadaveric experiments. Both experiments have demonstrated the feasibility of the system, with average overcut error at about 1 mm and maximum errors at 2.5 mm.

Direct Comparison of Full-Wave and Ray-Tracing Methods for a Simple Model of Multi-Dimensional Mode Conversion

Presenter: Yanli Xiao,
College of William & Mary, Physics

Mode conversion can occur in a nonuniform plasma when two waves of different character are locally resonant. Jaun et al. have recently developed a numerical ray-tracing algorithm for realistic tokamak models that accounts for the ray splitting that occurs at conversions [1,2]. Here we present a comparison of ray-based and full-wave methods by considering a simple model consisting of a pair of coupled wave equations in two spatial dimensions. The two spatially-dependent wave speeds, $c_1(x,y)$ and $c_2(x,y)$ are distinct for almost all (x,y), and are equal only along a line where conversion occurs. We launch a WKB-type wave packet in channel 1. There is initially no excitation in channel 2. Absorbing boundary conditions are used in the full-wave simulations to avoid reflections which would complicate the interpretation of the results. From the full-wave output, we compute the initial energy density as a function of position and consider its evolution along a family of rays, including the ray splitting associated with conversion. These full-wave results are then compared to the ray-based predictions. [1] A.Jaun, E.R.Tracy and A.N.Kaufman, Plasma Phys. Control. Fusion {bf 49}, 43-67 (2007). [2] E. R.Tracy, A.N.Kaufman and A.Jaun, to appear in Phys. Plasmas. Supported by the NSF-DOE Program in Basic Plasma Physics and the DOE OFES.

Effects of Metal-Based Montmorillonite Clay Additives on the Fire Retardance and Smoke Suppression of Poly(vinyl chloride)

Presenter: Alexander G. Zestos,
College of William & Mary, Chemistry

Poly(vinyl chloride) (PVC) is the second most commonly used plastic produced by the chemical industry. Unfortunately, PVC can undergo thermal degradation relatively easily, a process which generates volatile organic compounds that are smoke producers in fires. This thesis attempts to understand the smoke suppression and fire retardance of poly(vinyl chloride) containing various metal compounds. Many metal-containing additives were blended with PVC and molded into plaques incorporating the resulting formulations. These plaques were burned in a cone calorimeter together with control PVC plaques that contained no metal compounds. By using a computer program, variables such as the time to ignition, specific extinction area, total heat released, total smoke released, etc., were measured and assessed in order to determine the effectiveness of the metal additives in smoke suppression and fire retardance.

Notes

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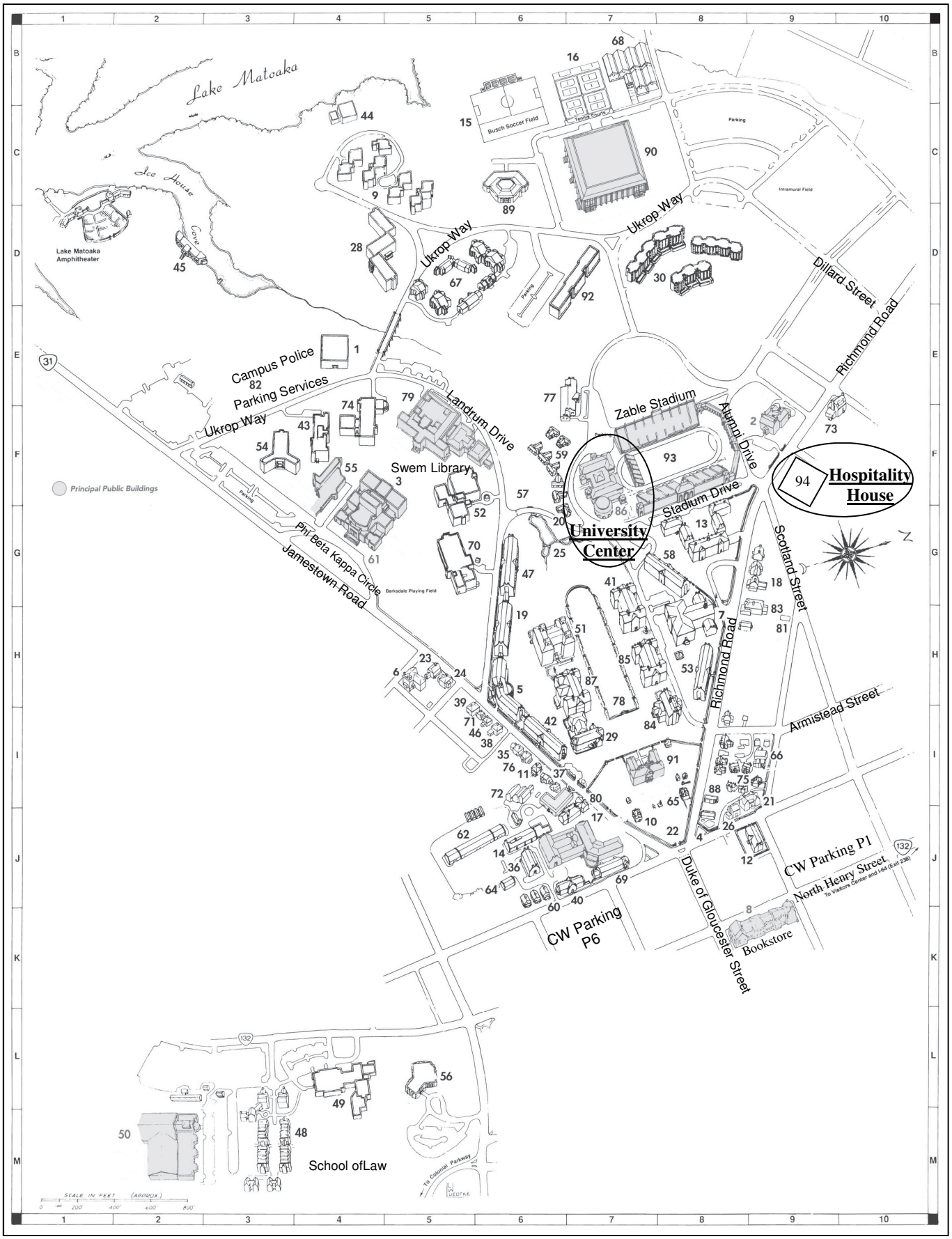

The College of William and Mary Campus

Key for Visitors

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

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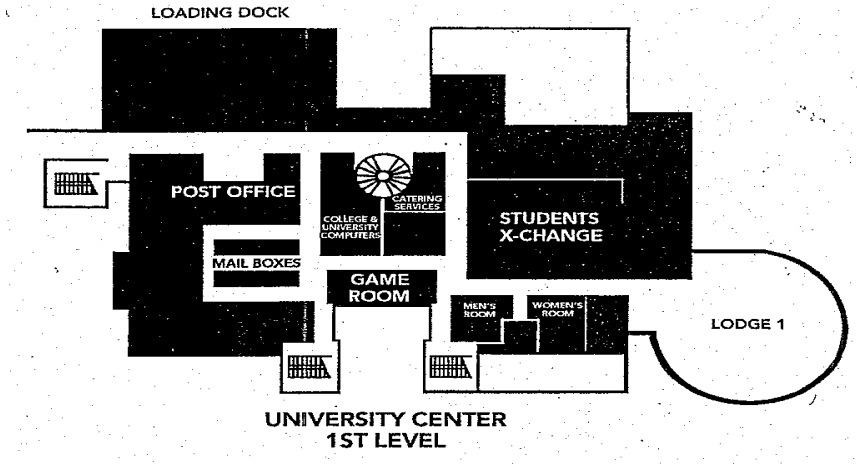

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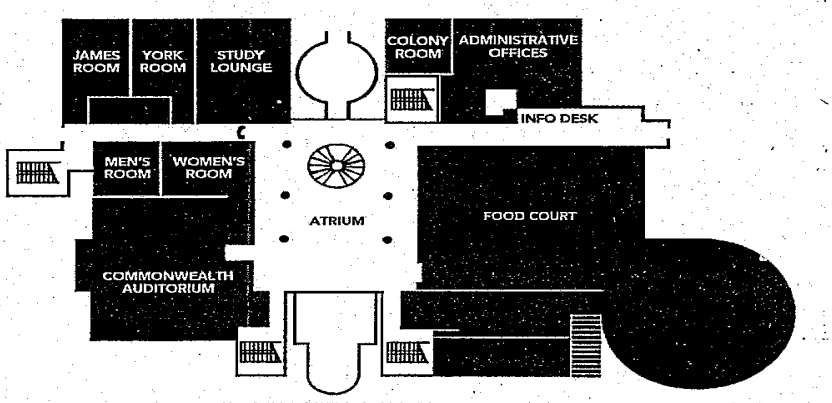

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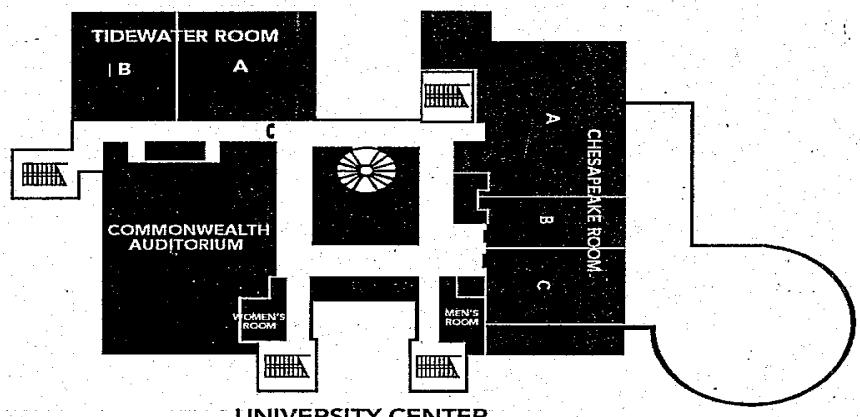

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