



The College of
WILLIAM & MARY

P.O. Box 8795
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ideation

RESEARCH & SCHOLARSHIP AT WILLIAM & MARY

this just in...

\$1 MILLION NSF GRANT WILL ESTABLISH A DEMOGRAPHIC 'GOLD MINE'



Salvatore Saporito

Salvatore Saporito is creating a gold mine of data that can be mined by researchers for studies on everything from obesity rates among children to the impact of school quality on housing prices.

Saporito, an associate professor of sociology at William & Mary, has received a \$1 million grant from the National Science Foundation to create a new database of school attendance boundaries for the country's largest school districts.

The grant funds two years of work on the School Attendance Boundary Information

System (SABINS). Saporito will build the SABINS database in conjunction with Stuart Hamilton, director of William & Mary's Center for Geospatial Analysis, and Petra Noble and Rob Warren of the Minnesota Population Center at the University of Minnesota. With the assistance of William & Mary undergraduate student researchers, the team will use Geographic Information Systems (GIS) technology to map school attendance boundaries for 800 of the largest school districts nationwide. Elementary, middle and high school attendance boundaries delineate the geographic areas from which schools draw their students.

Most of the grant money—approximately \$786,000—will come to William & Mary for the project. The data that will be collected—including digital GIS maps, demographic data and educational statistics—will be made available to the social science research community on line. The database will allow researchers to conduct large-scale studies that were never possible before.

"I am very excited about the opportunities this significant grant brings to our department and to our students," said Thomas Linneman, chair of William & Mary's Department of Sociology. "SABINS cements Sal's standing in an important field in the social sci-

ences, and it's great to have this expertise at William and Mary. As the College and the sociology department move further toward providing valuable research experiences for our students, this project and the research opportunities it provides could not have come at a better time."

Saporito's most recent project, in which he and fellow William & Mary sociology Professor Deenesh Sohoni analyzed the effect of school choice on economic segregation in schools, was based upon school attendance boundaries for the 22 largest school districts in the nation. Following the completion of that project, Saporito was encouraged by fellow demographers to create a new, publicly available database that included many more school districts.

Researchers will collect school attendance boundaries and process them in GIS. They will then devise a series of rules to ensure that all of the GIS information they collect from various districts is uniform and can be easily used by the social science research community. The initial SABINS data will describe the social and economic characteristics of roughly half of school-aged children living in over 10,000 elementary, middle and high school catchment areas. **i**

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FALL 2009

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RESEARCH & SCHOLARSHIP AT WILLIAM & MARY

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RESEARCH & SCHOLARSHIP AT WILLIAM & MARY

FROM THE PROVOST

The College of William & Mary is a *liberal arts university*, combining our traditional strengths in the liberal arts and the intense focus of a contemporary research university. *Ideation* readers are familiar with how this combination informs our unique learning environment. Two articles in this issue offer excellent examples. Through our Project on International Peace and Security, student fellows tackle real issues with security implications and then produce relevant policy briefs. One recent student project considered how Japan's aging population relates to U.S. security. Our Chesapeake Algae Project brings together corporate partners, other academic institutions and faculty at VIMS and in our departments of chemistry, physics and applied science. The joint project aims to improve the environment and produce sustainable energy using algae. Throughout this academic year I will be leading a wide-ranging discussion on what it means for us to be a liberal arts university in the 21st Century. I invite you to participate, and to help us articulate the fundamental nature of our College.



Best wishes,

Michael R. Halleran

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On the cover: Government professors Dennis Smith and Amy Oakes put their heads together to create PIPS—the Project on International Peace and Security—an undergraduate think tank that takes on geopolitical policy issues.

Photo by Joseph McClain/earthly enhancement by Rachel Follis '11

a liberal arts university

The College of William & Mary in Virginia

Chartered February 8, 1693, by King William III and Queen Mary II of Great Britain. Phi Beta Kappa, the nation's premier academic honor society, and the honor code system of conduct both were founded at William & Mary.

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Ideation is the crystallization and conceptualization of ideas. It is part of the process through which thought ultimately becomes deed.

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changing the
in

WORLD

6-page increments

by Joseph McClain

What impact can an ‘undergraduate think tank’ make on national security policy? You’ll be surprised.



Cindy Baker

Amy Oakes and Dennis Smith of William & Mary’s government department formed PIPS to get students working with real security issues.

Largely unknown outside of the think tanks and government agencies within the D.C. Beltway, the policy brief is a demanding and important form of writing.

“Policy briefs are normally anywhere between four and six pages long and are very, very dense,” Dennis Smith explained. “Actually, they’re quite hard to write. What you have to do is to lay out a problem very succinctly and then add a solution—very simply. And the solution can be quite complex.”

These situation-and-remedy distillations function as the narrative ball bearings deep inside the machine that turns the wheels of democracy. The four- to six-page policy briefs are like acorns: some of them will grow into mighty executive orders, departmental directives or other documents that can leaf out into many hundreds of pages of minutiae and have world-altering effects. Others, again like acorns, never will see the light of day. But the truth is simple: If you want to be a player in the decision-making processes of public policy, you’ll need to be as familiar with the policy brief as an Elizabethan poet was with the sonnet.

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The current class of PIPS members are (from left) Levent Kiran '11, Megan Liaboe '10, Raymond Ciabattoni '10, Hannah Thornton '10, Alex Bellah '11 and Kristopher McClellan '10.

PIPS was established as an “undergraduate think tank,” a practical, research-based initiative in which an elite group of students grapple with real, live issues with security implications and then produce relevant policy briefs.

Undergraduate think tank

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“Ultimately most of my students are going to get jobs in D.C., in think tanks or the government,” Smith said. “They’re not going to be writing research papers; they’re going to be writing policy briefs.”

Smith, along with Amy Oakes, are co-directors of PIPS—the Project on International Peace and Security at William & Mary. Both Smith and Oakes are assistant professors in William & Mary’s government department. PIPS itself operates within William & Mary’s Institute for the Theory and Practice of International Relations.

Working for (or with) the feds

PIPS, now in its second year, was established as an “undergraduate think tank,” Smith said, a practical, research-based initiative in which an elite group of students grapple with pressing issues with security implications and then produce fresh policy recommendations. Products of the excellent government and international relations programs at William and Mary, many of our graduates work either for the federal government or with it. Once they begin work, they soon find themselves faced with the necessity of mastering the policy-brief format.

“Policy brief” is actually an umbrella term, explains seasoned diplomat Mitchell Reiss, covering a variety of memos, reports and intelligence assessments. “It’s an avalanche of information; I have seen hundreds of these documents,” he said. “PIPS is working on documents that we

would call Memos to the Secretary. These would be things that the policy planning office would send up to the Secretary of State suggesting a change or a way to enhance an existing policy.”

If Smith and Oakes are the parents of PIPS, then Reiss is the program’s godfather. Ambassador Reiss is diplomat in residence at William & Mary. He has a foreign-service dossier that’s already thick and continues to grow, as his experience in security-sensitive areas such as North Korea and Northern Ireland means that his name is automatically on the short list whenever events dictate that the U.S. needs a special envoy to visit one of these trouble spots. At William & Mary, he teaches a course, Challenges in American Foreign Policy, in which he urges students to take a more prescriptive approach to American foreign policy issues: “In other words, to not only understand the complexities, but to go one step further and actually try to make policy recommendations for trying to solve things,” he said.

An insider’s take on things

It only made sense for Smith and Oakes to seek out Reiss during the formative period of PIPS. He brought an insider’s connections (see sidebar, opposite page), and an experienced diplomat’s understanding of the challenges of the profession.

“First of all, it’s very, very difficult to influence American foreign policy from outside the government. The reality is that it’s sometimes

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TAKING NOTICE OF PIPS

On a rainy day in late September, Mitchell Reiss brought a guest into Morton Hall to meet with PIPS fellows. It was Edward J. Lacey, the deputy director of policy planning staff in the State Department.

As the group sat down to a pizza lunch, Reiss laid the ground rules. “What is said here today is not for attribution,” he said, looking around the table. “And completely off the record.” After all, the discussion was to center around matters of national security.

Lacey and Reiss were on hand to lend the insight of State Department insiders as the PIPS fellows begin to formulate their topical questions for the year. PIPS Co-Director Dennis Smith said that he was thrilled to have the meeting with Lacey, “the number-two policy planning guy in State.”

“I probably don’t have answers to your questions,” Lacey said early in the session, “but I can point you in the right direction.”

Both foreign-service veterans did their best to point the PIPS fellows in the right direction, giving seasoned advice as the students outlined their topics in bold strokes. The students brought up potential topics ranging from foreign aid in recessionary times, cultural considerations inherent in the build-up of native Iraqi and Afghan armed forces and the removal of economic incentives that might encourage nuclear proliferation.

Lacey spoke candidly about the State Department’s position on many of the topics, punctuating his remarks with comments such as this one: “You seem to be asking me is this issue worth your time and I will say definitely yes, because it so happens that Secretary (of State Hillary) Clinton is very interested in this subject.”

For a program that’s only a single year old, PIPS has already attracted a lot of attention inside the Beltway. Mitchell Reiss arranged the meeting with Lacey.



Edward Lacey chats before lunch with PIPS fellows (from left) Hannah Thornton, Alex Bellah, Megan Liaboe and Raymond Ciabattoni.

Later this fall, Smith and Co-Director Amy Oakes are meeting with higher-ups within policy planning in the State Department.

The PIPS policy of reaching out to the foreign policy community for suggestions on security-related topics has paid dividends. The 2008 PIPS class was invited to present their briefs in April at the McLean headquarters of Booz Allen Hamilton, a consulting firm whose main client is the U.S. government. The presentation drew invited attendees from the upper echelons of the profession. One attendee, David M. Finkelstein, vice president of the Center for Naval Analyses, was motivated to write a letter to Geoffrey Feiss, who was William & Mary’s provost at the time.

“Speaking as a person who lives and works in the ‘think tank’ world of greater Washington, D.C., I am absolutely impressed by what PIPS has achieved in its first year,” Finkelstein wrote. “I thought you would want to know that your students did so well in representing The College of William and Mary and that persons like myself think that the Project on International Peace and Security is an important initiative and a great investment in the future of Our Nation.”

A few weeks after the PIPS briefing, a Booz Allen team (including two William & Mary alumni) visited campus on a recruiting trip. Exposure to PIPS was good for Booz Allen, as well.

“Typically it’s the business students who are looking at us, but we want a much broader diversity of students,” explained Terence Mandable ’92, a principal at Booz Allen. “We want liberal arts majors. We want people who have good analytical skills, good problem-solving skills and great writing skills, strong oral communications skills. We can train and teach some of the other things, but that academic foundation is really important. So, we’ve been looking at programs like the one Dennis and Amy have been leading. That was part of the appeal, to reach a very different student base than the one that comes to talk to us.”

Booz Allen hired 21 members of William and Mary’s class of 2009. The consulting giant has already arranged to host a spring, 2010 briefing by this year’s PIPS class. Edward Lacey also wants to hear more about PIPS: “Everything I’ve heard so far, I’d like to hear how it ends up,” he said. “So when you guys are done, come up to Washington.”

All six policy papers from the first year of PIPS are available on line at www.pips.wm.edu.

Researching relevant security issues

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hard to influence it from within the government,” Reiss said. “The way to have a fighting chance of doing so is not just to have a good idea, but also to be able to articulate it in a manner that is persuasive.”

‘Medium-range issues’

The issues PIPS tackles are all security-related, or as Oakes says, “Broadly, scenarios in which you might threaten or use military force—situations that endanger U.S. national interests.” Further, she explained, PIPS concentrates on “medium-range” issues, issues that might reasonably be expected to come to a head in five to fifteen years. Short-range policy questions, such as what the U.S. should do about Pakistan today, are unsuitable for PIPS because such a question requires an immediate response.

Likewise, Oakes said, “It’s harder to anticipate what the issues are going to be in 50 years.” Policy challenges that are predicated on developments in the distant future (What should Washington do if China surpasses the U.S. in military capability?), while important, have too long a development horizon to be suitable for the program.

For PIPS, medium-range issues are just right. “We have a pretty good idea what those issues are going to be and we can come up with reasonable plans for how they can be addressed,” Oakes said.

“That’s why I think we’ve had so much luck in the relationship with the Department of Policy Planning at the State Department, because their mission is exactly the same,” she added. “Everybody in Washington is thinking about the short term, but they, like us, are constructing strategy for dealing with medium term issues.”

Even limiting the scope of PIPS to medium-range security issues still leaves a wide range of potential topics. Where to begin? Smith thought to ask for suggestions from security and foreign-policy professionals themselves.

Asking for topics

“We sent out a ton of letters and e-mails, asking them what types of questions they thought were important right now,” Smith said. “We got a decent response for the first year. We generated a list of about 80 questions, hoping for an even bigger list this year.”

Not all the responses from the foreign-policy community were reassuring. “Some policymakers told us, when we first broached this idea with them, that they were skeptical,” Smith said. “They didn’t think undergraduates could produce anything that they would consider valuable.”

PIPS started its first year with something to prove to the skeptics, but the undergraduate think tank concept had quite a bit going for it. To begin with, PIPS is a highly selective program; fellows are selected from a group of invitees that represent the highest-performing students in William & Mary’s government and international relations programs. Six fellows were selected and sat down with Smith, Oakes and that list of 80 security issues.

“Out of the 80, we quickly narrowed it down by topics that we thought were especially interesting. So we went down from 80 to maybe 12. Then out of that 12, we refined it down to 6 research questions, because there were only 6 fellows,” Smith said. “Then they started working on them.”

The security implications of some PIPS topics are not always immediately apparent to the layman. For instance: What does the aging population of Japan have to do with U.S. security? Plenty, it seems. PIPS fellow Alanna Whytock ’09 explained in her policy brief that the U.S. alliance with Japan is “the lynchpin of the nation’s security architecture in Asia.” A grayer Japanese demographic, she points out, means an economically and militarily weaker ally for the U.S.

A standout among standouts

Reiss cited Whytock’s paper as a standout effort, although he speaks highly of all the offerings from the 2008 PIPS fellows.

“There was some very interesting thinking done about how Japan can play its role as our major ally in Asia at a time in which they are resource-constrained this way,” Reiss said. “It implicates the future of the Japan-U.S. alliance. It implicates defense spending issues for Tokyo.”

Whytock’s policy brief suggests that the U.S. could help to counter the effects of declining enlistments in the Japanese armed forces by selling advanced weapons systems, such as the F-22 fighter, to Tokyo.

“This paper addresses some pretty big-ticket, big-idea type of issues. Not a lot of people are thinking about them,” Reiss said. “There is an intersection of the demographic change with the defense challenge where I thought someone was doing some very smart thinking on an interdisciplinary basis.”

Whytock’s paper garnered notice elsewhere, as well. A writer for the Tokyo bureau of Bloomberg News contacted PIPS seeking information about the report. An official from the think tank CNA (Center for Naval Analyses) heard Whytock’s presentation in April at the Northern Virginia headquarters of the giant government consulting firm Booz Allen Hamilton (see sidebar).

“Alanna’s solution was one that the people at CNA were just tickled pink about,” Smith said. “This is directly relevant to defense planning, right now. At CNA, they said this issue was one that is actually relevant to policymakers, especially as DOD (Department of Defense) is doing the quadrennial defense review right now. They asked if they could use it. In fact, they’ve interviewed Alanna.”

Other papers from the first year of PIPS bring similar interdisciplinary insights into their narratives of looming problems and potential solution. Jeremy Meisinger ’10, for instance offers a new economic development model and concept of “energy independence”, based on promoting the creation of multiple algae-based energy suppliers in the developing world. Rachel Walsh ’10 points out in her brief how the differences in public education systems in the Arabian Peninsula can affect a state’s level of Islamic radicalism.

“Her basic message was that Yemen and Saudi Arabia both have major problems with radicalism, but Kuwait doesn’t. Why is that the case?,” Smith asked. “She said it came down to the way in which their education systems were organized.”

He further explained that the structure of the education systems in Yemen and Saudi

Arabia result in large numbers of students primarily receiving a religious education.

“When they graduate, they have extensive religious training, but few practical job skills,” Smith said. “As a result, not only are they highly sensitized, ideologically, they also tend to be unemployed and tend to fall prey to these radical groups. What is fascinating in the case of Kuwait is that they have a very well balanced and organized education system. There is religious education but it’s not radical in nature; it’s not Wahabist; it’s standard, conservative Orthodox Muslim. At the same time, graduates of Kuwaiti schools come away with a level of technical education that makes them employable. Rachel contends that this explains why we see so few Kuwaitis participate in terrorism, while we see so many young people from Yemen and Saudi Arabia.

New year, new fellows

PIPS enters its second year with a new crop of six fellows. Some of the 2008 PIPS fellows—including Meisinger—were juniors and will return this year to act as mentors to the new members of William & Mary’s undergraduate think tank.

Think tanks often promote or are sympathetic to one or another geopolitical school of thought, often identified with a particular foreign-policy architect.

“There are realists—Henry Kissinger and Brent Scowcroft being examples,” who advocate a tough-minded approach to foreign policy in which government focuses on promoting the national interest through the pragmatic use of power, Oakes explained. “And you have neo-conservatives, who borrow ideas from both realists and the liberals, such as political commentator Charles Krauthammer—and key members of the Bush administration during the run-up to the Iraq—Paul Wolfowitz, for example,” she said. “Finally, you have liberals, who are committed to the multilateral promotion of democracy, free trade and progressive norms—think Woodrow Wilson, Bill Clinton.”

As PIPS enters its second year, Smith and Oakes are taking pains that making sure that the project remains ideologically and politically neutral—even though individual students may exhibit ideological leanings. They stress to the



Joseph McClain

Amy Oakes, co-director of PIPS, is currently serving a fellowship at the Kennedy School of Government at Harvard.

PIPS fellows that their policy briefs could be seen by the whole spectrum of the policymaking community, a group professionally sensitive to bias and able to detect and interpret nuance.

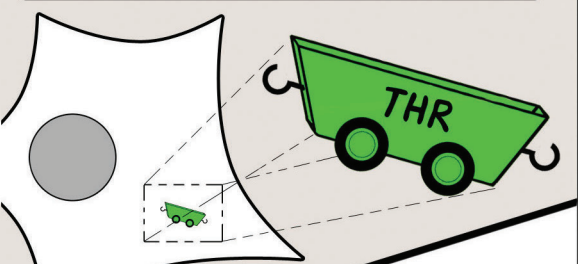
“We don’t want to be seen as a conservative think tank or a liberal one. We just want to be known as an *undergraduate* one, with students who are doing exciting, thoughtful and important work; work that’s very well done,” Oakes said. “Dennis and I have no particular political agenda. Regardless of what our personal beliefs are, we’ll critique every paper with the same degree of rigor. The fellows have to present these papers to policymakers and at think tanks. Even if we may privately disagree with what a student says, we’re not going to let them present an obviously flawed paper. That’s not in our interest.” **I**

Dennis Smith, co-director of PIPS, discusses policy issues with members of the inaugural class of PIPS fellows. From left: Andrew Noll ’10, Smith, Jeremy Meisinger ’10 and Michelle Burgess ’10.

HOW IT WORKS:

ADVENTURES IN NUCLEAR TRANSPORT

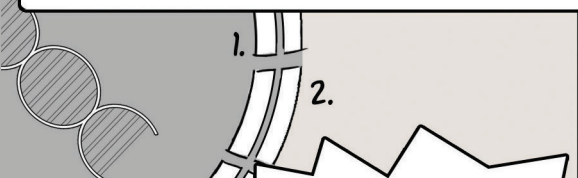
THINK OF THE **THYROID HORMONE RECEPTOR** AS A MOLECULAR WORKMAN'S **TRAILER**, MANUFACTURED OUT IN THE **CYTOPLASM** OF THE **LIVING CELL**.



TO DO ITS JOB, THE **THR** HAS TO GET INTO THE **NUCLEUS**... **BUT HOW???**



A MOLECULAR **PICKUP TRUCK**, KNOWN AS **IMPORTIN**, BIOCHEMICALLY HITCHES ITSELF TO THE **THR** TO TOW IT **ACROSS THE CYTOPLASM** AND INTO THE **NUCLEUS**.



THE **NUCLEUS** IS SEPARATED BY NOT ONE, **BUT TWO**, MEMBRANES-- THE **NUCLEAR ENVELOPE!**



SOMEHOW, THE **THR** AND ITS **IMPORTIN** MUST NEGOTIATE THE **PORE COMPLEXES** OF THE **NUCLEAR ENVELOPE**. BUT, **THERE IS MORE THAN ONE ROUTE INTO THE NUCLEUS**. PROFESSOR ALLISON IS TRYING TO DETERMINE **WHICH ROUTE** THE **THR** USES.

TRAFFIC CONTROL

NUCLEAR TRANSPORT ISN'T WHAT YOU MIGHT THINK IT IS

by Joseph McClain

Lizabeth Allison sometimes confuses even scientific people when she talks about her work.

"I was at a party once and I told someone that I worked on nuclear transport," Allison said. "He worked at Brookhaven National Lab and he said 'Hey, we're in the same business.' I said, 'Well, no. We're not.'"

Allison's lab, on the third floor of William & Mary's new Integrated Science Center, investigates the intracellular travels of a "messenger" protein known as the thyroid hormone receptor. "Nuclear" in "nuclear transport" refers to the cell's nucleus, not to nuclear energy.

"There are two major areas within cells. There's the nucleus, where all the genetic information is, and there's the cytoplasm, where all sorts of metabolic activities take place," Allison explained. "We're interested in what the mechanisms are for movement between the cytoplasm and the nucleus."

Allison, the Margaret L. Hamilton Professor of Biology at William & Mary and chair of the biology department, refers to her work as "traffic control."

A journey into the nucleus

The thyroid hormone receptor is the vehicle that Allison's lab watches. Like other proteins, it's synthesized in the cytoplasm. Then, to do its job, it needs to journey into the cell's nucleus, steering its way through the pore complexes of the double membrane surrounding the nucleus. Once safe inside the nucleus, the thyroid hormone receptor can go about the important work of turning genes off and on.

"We're studying how this protein gets to where it needs to be in order to function," Allison said, "and—in certain disease situations—how it is mislocalized."

When thyroid hormone receptors go astray, they usually exhibit a mutation or some other discernable defect. These mislocated receptors tend to get gridlocked in the cytoplasm in protein pile-ups known as aggresomes. Michelle Munyikwa, a member of the class of 2011 working in Allison's lab, explained that some mutations

of the thyroid hormone receptor are out of shape—literally. She noted that misfolding is a common characterization of mislocalized thyroid hormone receptors.

Disrupt the structure/disrupt the function

"Proteins require a certain structure to function properly, so if the structure is disrupted, then their function is disrupted, and they kind of clump together and tend not to work," Munyikwa said. "They have a sequence of amino acids and those amino acids interact with one another to form a 3-D structure. So if for some reason something is a little strange and they don't fold quite the way they're supposed to—then they don't work."

Allison pointed out that a mislocalized, misdirected thyroid hormone receptor—stuck outside the DNA vault of the cell's nucleus—can't function. Nonfunctioning thyroid hormone receptors can lead to dire consequences for gene expression, the multi-step biochemical process through which the DNA contained in the genes is put to work.

"There are all sorts of things that can happen. In some cases there are particular genes that should be being expressed—but aren't," Allison explained. "This can lead to a lack of control of a cell dividing."

A cell that should stop dividing, but instead continues to divide and proliferate, eventually might lead to some form of cancer, she said. Some mutations of the thyroid hormone receptor can be trouble in and of themselves, she added.

"We've studied one form of the receptor that's considered cancer-causing—an oncogenic form. It has a more cytoplasmic localization. It gets recruited to these aggresomes," Allison said.

"This oncogenic protein can also pull the normal receptor into the aggresomes with it; it interacts with the normal receptor and takes it to the wrong location," she



photos by Joseph McClain

Lizabeth Allison hears about how her student, Michelle Munyikwa '11, found some aggresomes.

continued. "That's why we talk about it as traffic control."

Up until about eight years ago, scientists studying the thyroid hormone receptor believed that its intracellular traffic control essentially was a one-way street: The thyroid hormone receptor starts off in the cytoplasm and, if all goes well, it enters the nucleus and gets down to work. Then Allison's lab showed that the protein moves two ways—both in and out of the nucleus.

"We found that the thyroid hormone receptor doesn't just go in and stay there and bind to DNA and regulate genes like everyone had thought for decades: It shuttles between the nucleus and the cytoplasm," Allison said. "We still don't really understand the physiological significance of that, but it means that we started looking for mechanisms about how it gets into the nucleus—and then we discovered we also had to study how it gets out."

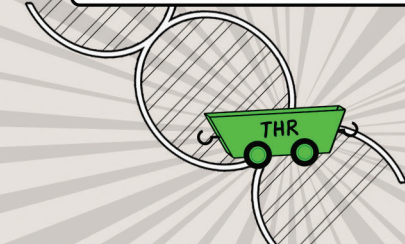
The mysterious export process

Allison said that export—the mechanism or mechanisms by which the thyroid hormone receptor proteins shuttle out of the nucleus—is an almost completely unstudied process, but one that may be important to the understanding of how certain cancers and thyroid hormone disorders work.

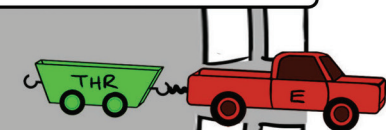
"No one had thought about export," she said. "They've looked at a mutation in the thyroid hormone receptor and said, oh, it affects hormone binding or maybe its affecting the way the receptor interacts with the gene. But some mutations are in regions of the cell that we're pretty sure have to do with nuclear export. So maybe part of the defect in these cancer cells or other diseases has to do with misregulation of traffic control."



ONCE INSIDE THE **NUCLEUS**, THE **THYROID HORMONE RECEPTOR** GOES TO WORK ON THE **DNA**, FACILITATING **GENE EXPRESSION**.



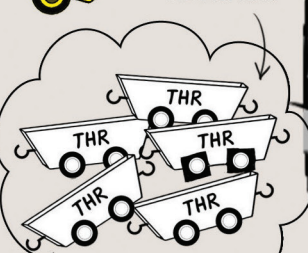
PROFESSOR ALLISON HAS FOUND THAT A **DIFFERENT MOLECULAR PICKUP TRUCK**-- KNOWN AS **EXPORTIN**-- TOWS THE **THR** BACK **OUT OF THE NUCLEUS** AND INTO THE **CYTOPLASM**.



MUTATIONS IN THR CAUSE GRIDLOCK, AS **HEALTHY THR MOLECULES** GATHER AROUND THE **DEFECTIVE ONE**. SO, **THR CAN'T GET INTO THE NUCLEUS** TO DO ITS JOB, INSTEAD COLLECTING OUT IN THE **CYTOPLASM**, NEAR THE **NUCLEUS**, IN **BUNCHES** KNOWN AS...

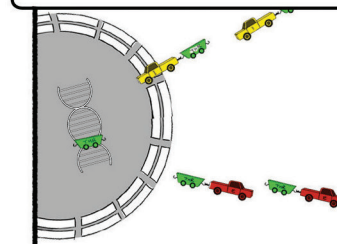


MUTATION!



AGGRESOMES!

HEALTHY TRAFFIC MEANS A HEALTHY CELL, WHICH, OF COURSE, MEANS A **HEALTHY BODY**.



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Allison collaborates with Assistant Professor Shantá Hinton (front) of Hampton University and her students. Hinton and her group are studying stress granules, complexes similar to aggresomes.

TWO FUNDING SOURCES

Lizabeth Allison's lab has received steady support since 2001 from not one, but two federal funding sources.

Her most recent grant was for \$204,105 in June from the National Institutes of Health. She also has received ongoing funding from the National Science Foundation. Allison's investigation of nuclear transport is basic science research that has strong clinical potential for cell-based maladies such as cancer and thyroid hormone disorders, making her work important to both funding agencies.

"In order to run the lab I need substantial funding and the NIH grants are not quite enough and the NSF on its own wouldn't be enough either. But the two together make a very nice package," Allison explained. The NSF grant is in its second renewal, while the NIH grant is in its third renewal. When she prepares grant applications, she divides the major research objectives so that the NIH funding is applied to the export pathway and clinical implications, while the NSF is focused on the import pathway and more general biological implications. The arrangement has been win-win for the government funding agencies and for the College alike.

"The program director of NIH and the program director with NSF understand entirely the synergy between them," Allison said. "They understand that if I'm buying a bottle of sodium chloride off the NIH grant that some of that might get used for the objectives of the NSF grant. Everybody's gaining a lot in terms of their educational training, as well as the research that we're publishing. I think they see it as worth both agencies' funding to keep it going."

Allison has opened her new lab in the Integrated Science Center to research groups from Hampton University led by Assistant Professor Cornelius Bondzi, who is a collaborator on the aggresome project, and Assistant Professor Shantá Hinton. Hinton and her students are collaborating with Allison's lab, focusing on stress granules, another cytoplasmic complex similar to aggresomes.

"One of the nice things about having funding from NIH and NSF is that it means you can develop a facility that can be used by other institutions that may not have as many resources," Allison said. "We have this really great location for people to come and do science and interact with each other."

Nuclear transport

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receptor just seems to do everything in its own complicated way."

Allison's lab is beginning to take a closer look at the receptor's traffic patterns, mapping out in detail each biochemical turn, twist and lane change. Manohara Mavinakere, a post-doctoral researcher in the lab, has begun what Allison calls a "very systematic dissection" of the different export sequences. He'll be examining the various amino acids involved, working to define the minimal sequence—the shortest possible biochemical signal for the thyroid hormone receptor to follow its route.

"It's a painstaking process and, as you can imagine, if you start altering sequences within a protein, you could potentially alter the three-dimensional structure or alter some other function," Allison said. "You have to do very careful tests to be sure that what you're doing is strictly related to export and not interfering with other things. It's like solving a puzzle." **i**

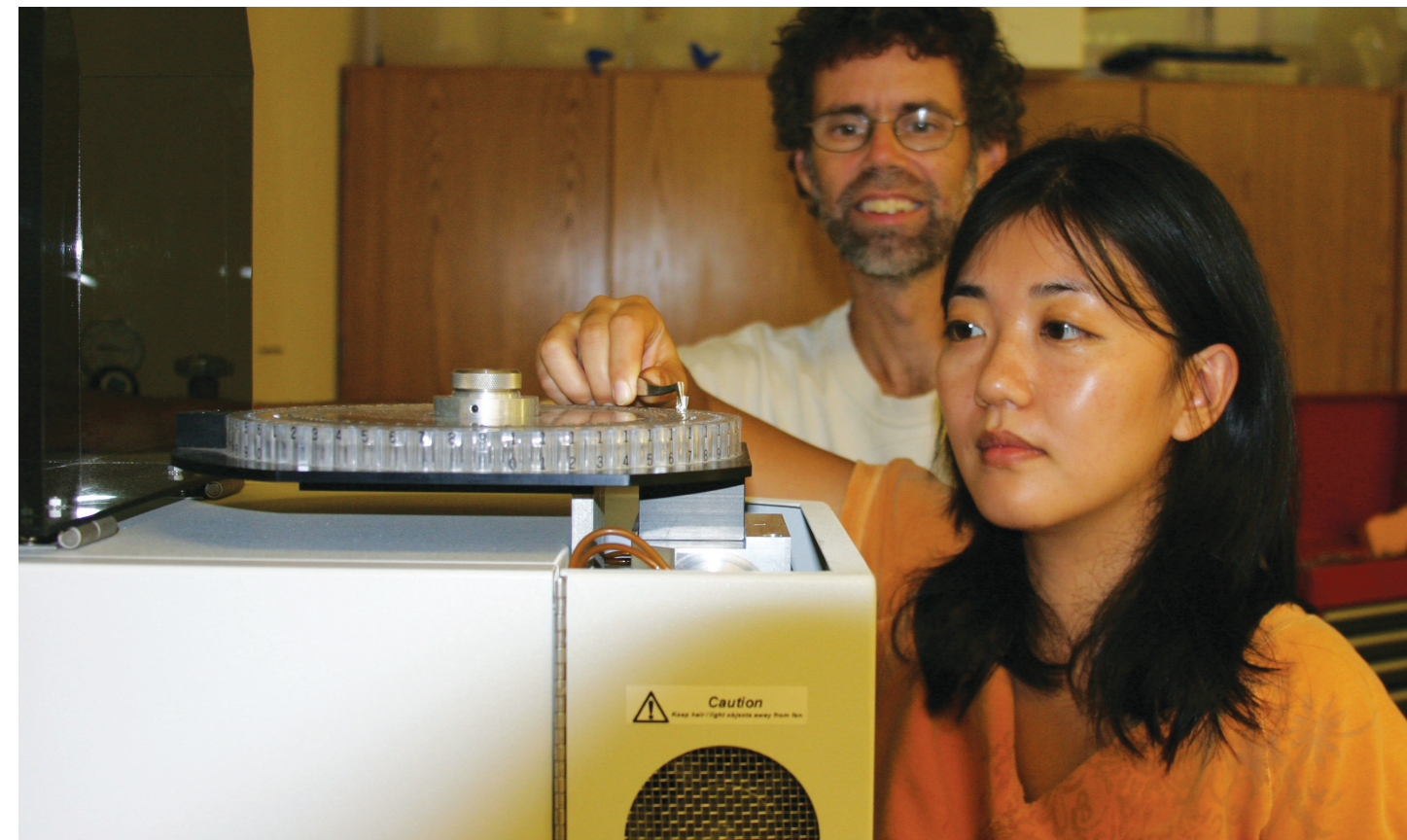


Post-doc Manohara Mavinakere (top) works on the project with Allison, as do a number of students, including John Giddens '10 and Jeff Stanton '11.

Post-doctoral program brings seasoned young researchers

William & Mary's interdisciplinary environmental program is expanding its research and education capability, thanks to a new post-doctoral fellowship program.

by Erin Zagursky



Joseph McClain

Post-doctoral researcher Yuehan Lu loads an elemental analyzer at the Keck Lab as director Randy Chambers looks on. Lu divides her time between the Keck Lab and VIMS.

Post-doctoral researchers are not new to William and Mary, but the Mellon Foundation fellowship has introduced a "teacher-scholar" aspect to the school's Environmental Science and Policy Program.

Made possible by an \$800,000 matching grant from Mellon, the program brings one environmental researcher to the school every year. Each researcher will spend two years at William & Mary polishing classroom teaching techniques under a faculty mentor, while also conducting research projects with undergraduate students.

The College's first Mellon-supported post-doctoral fellow, Yuehan Lu, began her work at William & Mary in September 2008. The second, Chris Marcoux, began his fellowship in August 2009.

Yuehan Lu

Lu, who earned her Ph.D. from the University of Michigan, has been working on a collaborative project involving Randy Chambers from William & Mary's Keck Environmental Field Laboratory and Elizabeth Canuel and Jim Bauer of the Virginia Institute of Marine Science (VIMS).

"She is collecting water from each of the sites seasonally and we're looking at the composition of the sources of organic matter in the water as well as examining differences in the reactivity of the organic matter by doing incubation studies," said Canuel, a professor at VIMS.

Lu used geographic information systems—or GIS—to map out watersheds of first-order streams (streams that do not have any other streams feeding into them) in the freshwater region of the York River. She and her co-collaborators identified streams in three categories: those that were dominated by agriculture, forested or urban lands.

"What she has done subsequently is to collect water from each of the sites kind of seasonally, and we're basically looking at the composition of the sources of organic matter in the water as well as differences in how reactive that organic

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WHAT THEY BRING TO THE TABLE

Post-doctoral researchers have been common in the College’s research labs for years, and the Mellon program extends a special “teacher-scholar” post-doc combination into our interdisciplinary environmental science and policy program.

“Everybody’s talking about undergraduate research right now, but I think that William & Mary is distinctive in that the faculty are doing very serious research with undergraduates, and this post-doc program just seems to fit,” said Mike Tierney.

VIMS researcher Elizabeth Canuel said that she has worked with post-doctoral students before, but the new program is unique because she is mentoring Yuehan Lu on both her research and teaching.

Randy Chambers said that the Mellon-supported program gives a post-doctoral fellow “virtually everything that a faculty member has to do, in terms of mentoring students, designing classes and conducting research.”

Canuel added that post-doctoral programs like William & Mary’s add a lot to an academic institution.

“Post-docs can allow a department or a program to explore new areas. Departments may not be able to make a hire in a particular area or they may be thinking about several potential areas to

make hires in, so a post-doc can allow departments to try out how that area of research fits into the department or program,” she said. “Post-docs are generally energetic and fresh and bring perspectives from their previous institutions. This type of melding creates a stimulating and vibrant academic community.”

Additionally, she said, post-doctoral programs also create new collaborations. In Lu’s case, she sparked a first-time collaboration between Canuel and Chambers.

“Jim Bauer and I here at VIMS have collaborated in the past, but neither of us had collaborated with Randy Chambers, and he sort of brings a more terrestrial, wetland and ecological component to the project,” Canuel said. “So that’s been fun, just to develop new collaborations, and using the post-doc as the vehicle for doing that.”

Collaborations beyond the confines of William & Mary have also been made as a result of Lu’s involvement at the College. Chambers introduced her to a colleague who researches organic matter that comes from the freshwater that dumps into the coastal Everglades system.

“So he’s doing a very similar project, and now he and Yuehan are collaborating on a project, and he and I are already collaborating on a project,” said Chambers. “So there’s this nice academic mix going on between the Chesapeake Bay and the Everglades now.”

“We never know when these kinds of connections are going to be made,” said Chambers.

The value of post-doctoral researchers

Continued from page 9

matter is by doing some incubation studies,” said Canuel.

Chambers explained that people have studied the total amount of dissolved organic carbon that flows into the Chesapeake Bay estuary from streams, but little more is known about what this matter consists of and how it affects the bay’s food web.

“What Yuehan is doing that is different is twofold,” said Chambers. “One, she is characterizing the types of organic carbon, and then she’s looking at it as a function of surrounding land use. So does the organic matter coming off of an agricultural field differ from what’s coming off of a forest? You would say, ‘Well, yeah, it has to be different.’ But what is it? No one knows.

“That’s important to us as estuarine scientists—to figure out what the connections are between these adjacent watersheds or upland environments and the health and quality of the bay,” he said.

As the post-doctoral program is both a research and teaching program, Lu has engaged undergraduates in her project, and she also has done classroom teaching. In the spring 2009 semester, she taught an upper-level undergraduate course in environmental chemistry, and in the spring 2010 semester, she will teach another class.

Chambers said that having new course offerings in environmental studies is very important because the faculty members who teach in that program are based primarily out of other departments and programs.

“Yuehan gets to be one of the first environmental faculty members to teach a course dedicated to the program,” Chambers said.

Additionally, during her first year at William & Mary, Lu helped a first-year graduate student conduct research on the west coast, and she mentored a high school student who participat-

ed in a five-week Governor’s School internship program during the summer.

Chris Marcoux

Chris Marcoux, who earned his Ph.D. from the University of Massachusetts, Amherst, is working in the College’s Institute for the Theory and Practice of International Relations with its director, Mike Tierney and with Rob Hicks, associate professor of economics.

“My plans are to fully integrate him into the PLAID research project,” said Tierney, who is the Weingartner Associate Professor in William & Mary’s government department.

PLAID, which stands for Project-Level Aid, is a project that provides information on the flow of international aid through a comprehensive database which contains information on all of the projects committed by bilateral and multilateral aid donors since 1973. Marcoux is focusing

his research on the distribution of international environmental aid.

“There’s a basic difference in preference between a lot of developing countries and the developed world,” he said. Developing countries are more interested in environmental projects with immediate and local impact, Marcoux explained, while developed countries tend to focus on projects that have broader and longer-term implications. Along with other PLAID collaborators, he is interested in which projects are supported by “brown aid”—those that are expected to yield local environmental benefits—versus “green aid,” or projects that will benefit the global environment.

“We’re trying to figure out why some countries are able to secure greater amounts of brown aid and why some only get green aid,” Marcoux said. “That’s a source of tension in sort of north/south environmental politics that the OECD (Organisation for Economic Co-operation and Development) say that they’re giving X billion dollars a year, but it’s not necessarily going to the projects that are the highest priority for the developing world.”

Marcoux points out that his research not only has academic value, but it also has immediate policy implications.

“The ultimate goal of the research is to allow donor countries to give international aid more effectively—which should have some sort of beneficial, real-world consequence,” he said.

Marcoux’s fellowship comes at an exciting time for the institute and its PLAID researchers. The institute has partnered with the nonprofit organization Development Gateway, which maintains an online database of foreign aid projects.

“Originally we were thinking of their database—called AiDA—as a competitor to PLAID, but now that we’re partnering with them and creating a single database that combines the best elements of both, we don’t think of them as a competitor but as a partner,” he said. We think now that it will just improve the quality of the PLAID database.”

Researchers at the institute attended a data-vetting workshop in Washington, D.C., during which they unveiled a beta version of the PLAID database. After making improvements from what they learn during that release, the institute will roll out a second beta version of the PLAID database in Oxford, England, in March of 2010. Marcoux will be an active participant in both events, said Tierney.

But, like Lu, Marcoux’ fellowship is about both research and teaching. He actually began working during the summer of 2009, a few months prior to the start of his fellowship. During that time, he worked with 12 undergraduate student assistants and a master’s student in computer science on the database. He also worked on several papers to be presented during the September data-vetting workshop.

In the fall 2009 semester, Marcoux, who previously taught as at Virginia Tech for two years, is teaching a new class on the science and politics of the global environment.

“It’s a topic that a lot of people are interested in, but it’s not typically a course that’s offered,” Marcoux said. “In fact, if you do a search on the internet for syllabi, you’ll find that it’s typically a one- or two-week unit in a global environmental politics course or something like that, but nobody ever really spends a lot of time looking at it in depth so I thought that would be interesting.”

Additionally, Marcoux is coordinating a speaker series for next spring, and plans to teach a research seminar where students will both learn research methods and apply them to the PLAID project. Finally, during his last semester, Marcoux will teach a global environmental politics course.

“All the students I’ve worked with over the summer...they’re just really dedicated, really motivated and hard-working,” he said. “I haven’t had the opportunity to work with students in that capacity before, in terms of bringing them on board with research, and so I really didn’t know what to expect. ... But from just what I’ve noticed this summer, it’s going to be really fun. I have absolutely no doubt that we’re going to be publishing research with students in regular academic journals.” **i**



Chris Marcoux (left) discusses research with Mike Tierney, director of the College’s Institute for the Theory and Practice of International Relations.

Joseph McClain

Memories of

‘The past isn’t dead. It isn’t even past.’—Faulkner

by David Williard

Images of the racial lynching in U.S. history are directly connected with those circulated from Abu Ghraib prison in Susan Donaldson’s courses on Southern literature and culture at the College of William & Mary. The latter represent “disturbing echoes” of the former that her students find “unnerving,” Donaldson said.

Donaldson, the NEH Professor of English and American Studies at the College of William and Mary, served as co-editor with Amy Wood (Illinois State University) of a special issue of the *Mississippi Quarterly* devoted to lynching’s place in American culture. The issue joins the emerging scholarship on this once-hidden American phenomenon by probing it in terms of memory-making. In that sense, the lynching photographs and the interrogation photographs find their parallel.

Donaldson credits publication of James Allen’s *Without Sanctuary* (2000), a work featuring photographs and postcards of victims of lynching, with catapulting scholarship forward. “Lynching photographs were taken by the perpetrators of the spectacle and, quite often, mailed around the country,” Donaldson said. “In many respects, those photographs pictured not just lynching victims but the mobs, who looked directly at the camera as if to underscore not only their complicity with the event but their sense of bonding with the audiences of those photographs.”

The Abu Ghraib photographs were treated the same way, said Donaldson. Synthesizing an argument made by Katherine Henninger (Louisiana State University) in the journal, Donaldson explained, “they were circulated on the Internet and connected to this whole notion of establishing a boundary line between Americans, on the one hand, and Iraqis, on the other.”

Coming to meaning

Between 1888 and 1945, nearly 4,000 men, women and children were victims, according to estimates contained in the journal. Although there were exceptions, lynching was an act predominantly committed in Southern states

by white men against black victims. It was a vehicle for reinforcing “white supremacy” and “bonds of whiteness,” Donaldson explained. In the special issue of the *Mississippi Quarterly*, Donaldson and the journal’s contributing authors explore the thorny issues involved with attempts to excavate and interrogate the old narratives of lynching after decades of neglect.

The first two essays consider ways in which the violence of lynching held symbolic power for whites and blacks, alike. Donald G. Mathews (UNC-CH) in “The Southern Rite of Human Sacrifice” posits lynching as a “blood sacrifice” in the context of the widespread evangelical theology that assumed the supremacy of the white race. In that sense, lynching represented a cleansing ritual through which “sin” and “impurity” could be expiated from the dominant society, Matthews argues. The second essay, “Out on a Limb: The Spatial Politics of Lynching Photography,” examines the dispossession represented by the photographs of lynching published in *Without Sanctuary* in 2000.

Subsequent essays deal with attempts by artists and activists to challenge some of the conventional understanding of lynching as a phenomenon of the Reconstruction-era South, directed against men. Julie Armstrong (USF) considers Mary Turner, a pregnant lynching victim in Georgia in 1918. “Because it disrupted the conventional lynching narrative, artists and writers found it particularly difficult to shape and make meaning from her story ... that lay beyond language, beyond sense,” the editors wrote. Christopher Metress (Samford University) looks at Rod Serling’s attempts to represent the 1955 lynching of Emmett Till on his television show *The Twilight Zone*. Till was murdered after being accused of whistling at a white

STRANGE FRUIT



Southern trees bear strange fruit.
Blood on the leaves and blood at the root.

—Billie Holiday

photo by Joseph McClain

woman in Mississippi. According to the editors, Serling’s treatment was censored, stymied “at every turn” by executives and sponsors who feared that Southern audiences would be alienated. In another essay, Dora Apel (Wayne State University) addresses the experience of citizens in Duluth, Minnesota, who commissioned the nation’s first lynching memorial, a Memorial Wall in remembrance of three African American men who were hanged in the center of the city in 1920. In order to meet objectives of being a public voice for African American citizens and creating a narrative that white citizens could embrace, the memorial had to present victims in “heroic proportions” while “eclipsing lynching’s horrifying context of white supremacy and black subjugation,” the editors contend.

Of particular interest to Donaldson is an essay submitted by Edwin Arnold (Appalachian State University). It addresses the 1899 lynching of Sam Hose in Newnan, Georgia. The event generated contradictory accounts by

local white newspapers, by a white New York newspaper and by an investigator hired by black activists. Arnold’s essay deals with attempts within the community to resolve the conflicting narrative today.

“The Sam Hose lynching haunts Newnan until this day, as well as my own hometown, Griffin, which is about 25 miles away,” Donaldson said. “It was in Griffin that Sam Hose was taken off a train by a mob and taken over to Newnan, where he was lynched in a spectacularly public and gruesome manner.” Donaldson’s great-grandfather was a sheriff in Griffin during the early years of the 20th Century. “He might well have been a spectator,” she added.

Resisting the redemptive narrative

As a scholar whose interest is in the politics of storytelling, Donaldson has several concerns involving what she refers to as the “politics of interpreting atrocities of the past.” One of them involves what she called the time-lag problem.

“Because of the way we construct memory as a society, we sometimes tend to ignore the fact that those memories can be constructed by certain pools of forgetting,” Donaldson said, alluding to the case of Mary Turner. “It has to leave out certain stories that might contradict just what the memory represents.”

Donaldson also recognizes the potential social consequences that are involved in storytelling, including those based on research currently being advanced by trauma theorists. “Scholars have argued that certain events and violence are so disruptive, so painful, so wounding that they cannot be assimilated into either personal or cultural narratives, and that they emerge in other forms. They may emerge in flashbacks, in violence, in forms of hysteria,” she said.

Perhaps chief among Donaldson’s concerns is the ethical danger of generating what she calls “redemptive narratives.” Often, attempts to reconcile violence fail to recognize its extent and impact, she suggested.

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Susan Donaldson is the NEH Professor of English and American Studies

Strange fruit

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“It is all too easy to try to slip these events of violence into narratives that suggest reconcili-ation or closure or redemption through the suffering of others,” she said. “There is that danger of being complicit in the violence wreaked upon lynching victims by objectifying them, by distancing ourselves, of refusing to acknowledge our complicity simply through the act of looking.”

As a participant in the storytelling, Donald-son balances the conflicting objectives both in her scholarship and in her classrooms, where students arrive with little knowledge of the roles lynching played in the American past.

“What happens if you pay too much attention to the perpetrators, to the white mobs?” she asks. “Does that become a way of silencing the victims? Does that become a way of represent-ing the victims as merely passive? Does it ignore their resistance? Does it ignore their subjectivity? Does it become a way of reinforc-ing the dehumanization that these rituals were designed to impose?”

She said some of the questions can be applied to events of our own time, such as Clarence Thomas’ reference to his confirmation hearings before the U.S. Senate as a “high-tech lynch-ing,” or to *TIME* magazine’s deliberate darken-ing of O.J. Simpson’s mug shot on its cover. Her concern extends through the Abu Ghraib photographs and into discussion involving America’s supposed entry into a “post-racial” society.

Race remains an issue that is uncomfortable to many Americans, Donaldson said. Although advocates of America’s post-racial status point to the election of President Barack Obama as evidence, she remains skeptical.

“Here again, that tends to be a form of resolu-tion,” Donaldson said. “It becomes a form of redemption that may be more illusion than a confrontation with the uglier reality of how these issues, how these definitions of race con-tinue to define how we act collectively.” **1**

‘Because of the way we construct memory as a society, we sometimes tend to ignore the fact that those memories can be constructed by certain pools of forgetting.’

Preston chosen for National Humanities Center Fellowship

by Lillian Stevens

Katherine Preston, the David N. & Margaret C. Bottoms Professor of Music at William & Mary, is one of 33 scholars from all over the world to be selected as a National Humanities Center Fellow for 2009-10. While on research leave from W&M, she will live in Chapel Hill and work at the center (located in Research Triangle Park in North Carolina) as the William J. Bouwsma Fellow in Musicology.

Preston is the fourth William & Mary faculty member to win a National Humanities Center fel-lowship since the center opened 32 years ago. She will spend the year alongside other scholars, each of whom will be working on a substantial research project.

“These fellowships generally go to scholars who have completed—or nearly completed—research on a major project,” Preston explains. “I’m currently working on a book on the performance of English-language opera in the United States during the second half of the 19th Century, and the role that women played in the dissemination of that music.”

Preston has published three books, and recently has completed two other large projects that will be published in late 2009 or early 2010. She is delighted to focus on this particular book, having conducted the research for it over the course of many years. Finding uninterrupted time to write, however, was difficult, in particular during the years she served as chair of the Department of Mu-sic. The time at the Humanities Center will allow her to focus exclusively on this project, which is titled *Against the Grain: Women Managers and English Opera in Late Nineteenth-Century America*.

“English opera is one style of musical theatre about which we know very little. It was, however, very popular. I am also interested in the women who were the stars or prima donnas of the compa-nies, as many of them were musical directors of their own troupes,” she said. “This is contrary to the social expectation of women during the time and certainly flies in the face of our perceptions about what was socially permissible for women during this period.”

Preston noted that the NHC fellowship experience is structured to foster scholarly interaction and collaboration.

“We are expected to use the time to think, network with other scholars and write. The 33 fellows are, in fact, in residence with offices in the center and are expected to be there,” she explained. “There is a real opportunity to get to know the other fellows, develop a sense of community, share ideas in seminars, lectures and conferences.”

Preston’s NHC fellowship comes on the heels of another major honor. Just last semester, she taught American music courses at the University of Leiden in the Netherlands, as the Walt Whit-man Distinguished Chair of American Culture, a Fulbright Fellowship award.

She joins the ranks of leading scholars who will come to Research Triangle Park in 2009-10 from the faculties of 23 colleges and universities in 14 states and also from four institutions in other nations including Germany, the Netherlands, Poland and the United Kingdom. Chosen from 475 applicants, the scholars represent the fields of history, literature, philosophy, art history, anthropol-ogy, environmental studies, musicology and religion.

The NHC, a privately incorporated independent institute, is the only independent entity of its kind in the world dedicated solely to advanced studies in the humanities. Since 1978 the center has awarded fellowships to leading scholars in the humanities, whose work there has resulted in the publication of more than 1,200 books in all fields of humanistic study. **1**



Katherine Preston: “There is a real opportunity to get to know the other fellows, develop a sense of community, share ideas in seminars, lectures and conferences.”

FOR WHOM THE BELL DIDN'T TOLL

The Spanish Civil War continued to claim victims even after the actual combat had ended

by Erin Zagursky

Marcos Burgos never knew his father. His mother would only say that his father had been killed during the Spanish Civil War. She dared not say more.

“Because if she did, she ran the risk of putting her whole family in danger,” said Nathan Hoback ’10. But now, nearly two years after the Spanish government passed a law to break the decades of silence that followed the war, Burgos and many others like him are recovering the stories of the war’s victims. A group of William & Mary students has joined that effort and are now seeking to broadcast those once-silenced voices with a newly created web site, Mapping Memory in Madrid.

With funding from the Mellon Foundation, five students from William & Mary’s Hispanic studies program, under the guidance of Modern Languages and Literatures Professor Francie Cate-Arries, travelled to Madrid in March to look into the progress being made under the country’s new law of historical memory.

“We wanted to go and see how this law is playing out in Spanish culture today and how they are actually going about this recupera-tion of memory,” said Shannon More ’10. “We literally went on a route through Spain to these different sites of memory, to these organizations, to these people and we asked them how are you commemorating the war and how are you finding the memory and how are you sharing these stories.”

History

Francisco Franco and his nationalist party took power in Spain following the Spanish Civil War’s end in 1939 and Franco himself remained in power until his death in 1975.

“Under his rule, you couldn’t speak about the Civil War,” said More. Supporters of the democratic Republic against Franco’s mili-tary insurgency who were caught speaking about their side of the war would be jailed, shot or put into a concentration camp, she said.

This *pacto de olvido*, or “pact of forgetting,” lasted even after Franco’s death in 1975.

“Spain transitioned out of the dictatorship, and their culture changed and their govern-ment changed, but this pact still lived on,” said More.

Finally, in 2000, a group of individuals who lost family members in the war sought to exhume some of the common graves of Franco’s civil-ian victims from that time, and so began a new interest in examining the past. In December 2007, the Spanish government passed the *Ley de Memoria Histórica*, or “Law of Historical Memory.” The law provided reparations for victims of human rights violations and their families, offered Spanish

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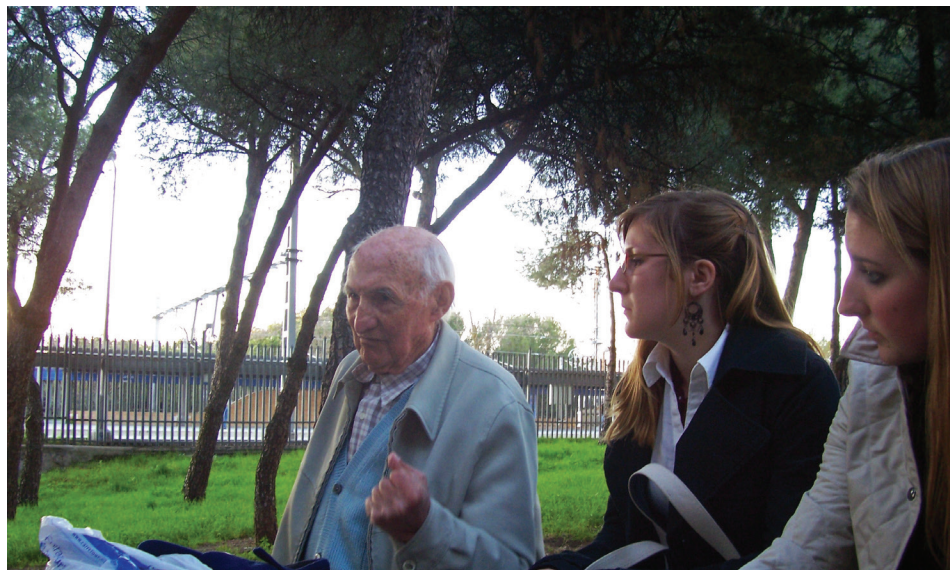


photo courtesy of Memory Mapping Project

Marcos Burgos tends a shrine at the wall where his father was executed in the months following the Spanish Civil War.



Bibiano Morcillo, a 94-year-old veteran of the Spanish Civil War, shows his papers from when he was a soldier in the Spanish Republican army.



Morcillo tells Mary Schrack and Shannon More about the 1936 revolt of military insurgents. A loyalist, he fought against Franco's forces.



Once the war was over, Morcillo's decision earned him four years in Franco's jails, such as Carabanchel prison, now covered with graffiti.

Mapping memory

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citizenship for Civil War exiles and established a state-supported archive, the *Centro Documental de la Memoria Histórica*—the Center for Historical Memory, More explained.

Mellon Trip

During their trip, the students visited various exhibitions, organizations, archives and historical sites from the war. They also met and interviewed various people who had been touched by the war, including 94-year-old veteran Bibiano Morcillo, who was a 21-year-old Spanish soldier in Madrid when the war began.

“We found that all of the personal testimonies of these people we met, that was the heart of our trip,” said Hoback. “You have these people pouring their lives out to you and not only that, but they’re inviting you to participate in it, and that’s just something incredible, something different than just reading it in a history book.”

During the trip, each student focused on a different area of research. More focused on personal documents from the war and post-war era—letters, appointment books, school notebooks. Hoback concentrated on the role of film in the recuperation of memory.

Casey Lesser ‘11 looked at museum exhibition as a way to commemorate the war. At one exhibit about women political prisoners during the Franco years of repression, Lesser said she realized what a unique experience they were getting.

“We learned about these stories that we probably would have never learned about,” she said. “How these women were incarcerated just because they refused to answer to allegations that they might be hiding someone or something in their homes.”

Mary Schrack concentrated her research on the *Valle de los Caídos*, or Valley of the Fallen—a memorial site that Franco created to commemorate those who died during the war. Franco is now buried there, as well. Though both nationalist and republican soldiers are buried there, the site “favors the nationalist side,” said Schrack. Much of the controversy stems from the knowledge that the imposing monument was constructed through the forced labor of Republican political prisoners.

“The valley will forever remain this black hole of Republican memory,” she said. “The law can’t remove Franco’s body and it can’t un-carve these symbols etched into the walls. The valley will always remain and is a hotly contested site of memory.”

Alex Wright focused his research during the trip on the role of international groups in recovering Spain’s Civil War memory. Many men from other countries fought for the Republicans in International Brigades, said Wright.

Because after the war those survivors returned to their home countries, that geographical separation creates another obstacle in recovering memory. And, like so many other things commemorating the “losers” in the war, what once existed has been nearly erased. For instance, at the Fuencarral Cemetery, there once existed a large plaque to commemorate the International Brigades. However, Franco took it down and plowed over the graves.

“That gives you an idea of the mentality and the physical application that was used to create this atmosphere we’re still fighting against today—this idea of erasure, literally getting rid of what was there,” said Wright. In May of 2009, at a commemorative ceremony held in the Fuencarral Cemetery by the Association of the Descendants of Spanish Exile—with whom the students met and interviewed during their final night in Madrid—a new plaque honoring the International Brigades was unveiled.

Fate of a father

Marcos Burgos was born in Madrid one month after the war ended in March 1939, lived without any knowledge of the circumstances of his father’s death until 2006 when his sister died. As he went through her papers, Burgos discovered a letter detailing his father’s death: Marcos Burgos Salcedo, a captain in the Republican Army, had been executed against a wall in the Almudena Cemetery on July 12, 1939, when Burgos was just two months old.

His mother had simplified matters. Her husband had not been killed in the war, but rather was just one of many victims of postwar reprisals against those who had sided with the Republican side.

Since finding that letter, Burgos has been searching to find whatever he can about his father. He was able to discover various Army and government documents, which are now scanned and available on the William & Mary students’ site. The students were also able to help him ensure his father’s story is recorded for generations to come by putting Burgos in touch with Spanish researchers Antonio Castillo and Verónica Sierra of the University of Alcalá de Henares, who had hosted the students on their on-site visit to the *Archivo de Escrituras Cotidianas*.

Burgos now marks his father’s memory at the wall where he lost his life with a small photo and a simple flower arrangement. But thanks to the efforts and Madrid-based contacts of the William & Mary team, his story—once so close to being lost forever—can be known and remembered for years to come by people around the world. His father’s personal correspondence from prison, as well as documentation of his execution by Franco’s firing squad, now forms part of the Spanish-based university archive’s permanent collection, now part of the University of Alcalá de Henares’s permanent archival collection. **i**

MAPPING MEMORY: MADRID.BLOGS.WM.EDU/

When the William & Mary students returned to the United States, they immediately began work on their web site so that they could capture all that they had discovered and share it with the world.

“This web site is meant to be a William & Mary-based framework for studying the memory of the Spanish Civil War,” said Shannon More. “It’s sort of our version of recuperating the memory of the Civil War.”

The web page is organized according to different “sites of memory,” including: associations, commemorative sites, exhibitions, profiles and testimonies, and research centers. Each tab provides links to the related sites, the students’ field notes, related research, bibliographies and a wealth of other information including a video interview with Bibiano Morcillo about his experiences in the war.

The web site also includes a Google map with “pushpins” to mark exactly where and whom the group visited during the Spring Break trip. This “mapping memory” idea echoes Article 14 of the Law of Historical Memory, which says that the government will create and make public maps of the mass graves of the “disappeared” during the war and during the postwar years of political violence, said Alex Wright.

The students said that they hope their web site will help other researchers.

“We put it all on this web site in the hope that people who want to further study the memory of the war can come here as a starting point and build from there,” said More. “This project is really neat because people can go to Spain and go from this, go to the places we went to and then go further and then bring it back and update the site and it can keep growing endlessly.”

The students unveiled the new web site during final exams in April 2009, the 70th anniversary of the end of the Spanish Civil War and the beginning of Franco’s dictatorship.



The Valley of the Fallen honors those who fought for Franco—built by the forced prison labor of those who opposed him.



Students meet with Ludivina García Arias, president of the Association of the Descendants of Spanish Exile at a plaque honoring fallen soldiers of the International Brigades. From left: Casey Lesser, Shannon More, Nathan Hoback, García Arias, Mary Schrack, Alex Wright.



NEVER

trust a whimbrel

by Joseph McClain

Shifty,
stilt-legged
shorebirds
continue
to surprise
even seasoned
scientists

Whimbrels routinely fly from the bottom of the world to the top. Somewhere along the line, they've developed a knack for doing the unexpected.

Scientists thought they had a pretty good handle on these wading birds and their hemispheric migrations. For starters, it is well known that whimbrels winter in southern climes, preferring coastal areas down both sides of South America, where it's summer during our winter. In spring (our northern hemisphere spring, that is), they fly northward, seeking marshy, crab-rich areas such as Virginia's Eastern Shore. They only stay a while among the creeks and marshes, resting and feeding for the last stage of their spring migration, when they take off for one of their breeding grounds in the far north.

A whimbrel might very well winter in Patagonia and, that same year, lay eggs within sight

of the Arctic Ocean. Bryan Watts, director of the Center for Conservation Biology, explains that scientists had understood that there are two populations of the birds. The western whimbrels related to the Pacific Ocean and used breeding grounds near the Alaska-Canada border. Watts and his colleagues have been studying the eastern population, which nest in Ontario and Manitoba along the western side of Hudson Bay and James Bay.

But then two years ago, scientists at the Center for Conservation Biology began to realize that once a whimbrel takes off, only the bird knows the flight plan.

In 2008, a female whimbrel named Winnie

made national news when she set a distance record for whimbrels in a 146-hour, 3,200-mile flight from the Eastern Shore to breeding grounds in the Mackenzie River basin near the Alaska-Canada border. At an average speed of 22 miles per hour, Winnie's apparently non-stop flight overturned conventional scientific thinking about whimbrels, their habits and their migration patterns.

This year, a rambling, 5,600-mile odyssey by a bird named Hope continues the rewriting of the natural history of *Numenius phaeopus*. Hope surprised scientists by visiting both of the well-known northern whimbrel breeding grounds—and apparently not breeding. Watts said part of the explanation for Hope's behavior lies in the late arrival of the arctic summer in the James Bay region.

Late arctic summer

"They've had an incredibly late summer," Watts said.

"They've had a lot of snow cover and ice up to the north. It looks like a lot of these birds have gotten up there and

then probably not been able to breed. The breeding season is so short that if the thaw-out is late, then they're just not going to breed for the year."

Researchers from the Center for Conservation Biology, a joint program of William & Mary and Virginia Commonwealth University, have been working with staff from The Nature Conservancy to track the movements of Winnie, Hope and other whimbrels by satellite. For the past two years, the scientists have been trapping these curved-billed wading birds at their migratory staging areas on the Eastern Shore. The birds are released unharmed, but wearing a tiny state-of-the-art satellite-tracking device that lets researchers follow the bird's northward migration.

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Fletcher Smith of the CCB scans for whimbrels as Libby Mojica tends to both the helm and the other side.



Fletcher Smith, David Curtiss and Adam Duerr work quickly and carefully to free a trapped whimbrel.

PLEASANT SPRING FOR US = BAD NEWS FOR BREEDING BIRDS

The same weather system that kept the eastern U.S. comfortable during the early summer months may be disastrous for dozens of species of birds that breed in Canada.

Bryan Watts said the Canadian jet stream stayed south longer this year, moderating temperatures in Virginia, but keeping snow and ice on the ground in the eastern breeding grounds of whimbrels west of James Bay and Hudson Bay.

He said the area around the Alaska-Canada North Slope, the western breeding grounds for whimbrels, had

a normal ice-out this year. But the eastern birds could be in trouble, and not just whimbrels.

"A good example is snow geese. It appears like they may have had a bust of a season, but there are dozens and dozens of species that breed up there," Watts said. "It could be impacting red knots, black-bellied plovers, all of the small birds, semipalmated sandpipers. It's not restricted to birds, of course, mammals are also presumably impacted."

Never trust a whimbrel

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“This year we put out five solar powered transmitter units. These are the same units we used last year on two birds,” explained Libby Mojica, a research biologist at the center. “This year, we decided to increase the number of birds. We’re doing five in the spring and then we’ll be putting out an additional four in the fall.”

‘A completely ridiculous verb’

Scientists have been identifying birds for decades by trapping them, then putting identification-bearing bands on their legs. The verb describing the process, of course, is banding. The more high-tech version of banding, involving the attachment of satellite transmitters, has become known as “transmitting.”

“‘Transmitted’ sounds like a completely ridiculous verb,” Mojica admits, “but I have seen it many times.”

Mojica said the five transmitted whimbrels were released between May 18 and 22. Whimbrels use the Eastern Shore as a refueling point on their way north from the birds’ summer grounds that extend down both coasts of South America. They feed on the crabs abundant in the creeks and inlets of the Delmarva Peninsula, storing up energy to continue north to one of the two breeding grounds used by the species.

In the tradition of Winnie, the 2009 crop of transmitted whimbrels were given names. Mojica said all the names related to Eastern Shore landmarks near where they were trapped. Boxer for example, was named for Box Tree Creek, while Fowler’s name came from Fowling Point. Hope’s name came from Hope Creek.

Watts explained that Hope and other birds staging on the Eastern Shore were assumed to be part of the eastern population, whimbrels thought to remain separate from westerners.

Boxer flies north, then south

Some of the birds followed the expected migration scenario, confirming more than one aspect of scientific theory. Boxer, for instance, flew up to the James Bay breeding grounds, just like a good eastern whimbrel should. Then, an apparent victim of the late summer, Boxer blew off breeding and flew back down to the Eastern Shore, right to Box Tree Creek where he had been trapped in May.

“This is something we’ve been interested in.

We’ve thought that these birds are really spatially structured; they go to specific sites. So Boxer is using the same staging area for the fall that he used in the spring,” Watts said. “It’s pretty wild to have that bird staging on that same little creek in the spring and again in the fall.

Last year, Winnie, expected to take the straight shot to James Bay like other eastern whimbrels, flew to Alaska instead. “Nobody expected that,” Mojica said. “Some shorebird biologists were questioning whether Winnie was just a fluke.”



Whimbrels are one of the world’s most wide-ranging shorebirds. Their migrations, often nonstop, take them from tidal flats to arctic tundra. Young whimbrels might leave the nest an hour after they hatch.

The odyssey of Hope

This spring, Hope did not exactly follow Winnie’s wingbeats. Instead, she took a rather roundabout journey to James Bay, going through Pennsylvania and New York, even veering off northeast before heading for the mouth of James Bay. As expected, she spent several days in and around the whimbrel’s eastern breeding grounds. Then Hope tossed the script and took off for the western breeding grounds.

“That’s totally new information to us,” Watts said. “The eastern and western population of whimbrels were thought to be distinct and not overlapping. Then last year we had Winnie, who was clearly staging here with the eastern population, then went west. But Hope actually went up to the eastern breeding grounds—and then went over to the western area. Completely unexpected.”

Watts and his colleagues had a couple of clues that the western and eastern populations may not be completely separated. For one thing, he said, there is a marked dimorphism in size, with the western population running quite a bit larger

than the easterners. In 2008, Winnie was the largest whimbrel ever captured on the Delmarva Peninsula. Hope was even larger than Winnie.

East, west—no difference?

Watts said it’s tempting to consider that the two breeding areas might be interchangeable, “but the morphology doesn’t support that. The western birds are significantly larger in body size than the eastern ones. That doesn’t argue for there being complete mixing between the two.”

Watts offered a couple possible scenarios for Hope’s behavior. One is that Hope is a westerner that for some reason staged at the eastern grounds on the Delmarva Peninsula. The second is that she is an eastern bird who found her proper breeding grounds inhospitable, likely because of the late spring, and set off for the western grounds.

“The former is more likely, because it would seem odd that the eastern population would know where the western population is breeding,” Watts said. “But it’s hard to say.”

It’s a dangerous life

The satellite tracking project has confirmed one aspect of the whimbrel’s life: It’s a perilous one. This year’s breeding season was a wash for Boxer and Hope—and probably the entire eastern whimbrel population. After her record-setting migration flight of last year, Winnie got into trouble. She weathered several storms on her way south, finally dropping out of sight on the edge of Lake Superior. Watts figured that Winnie was worn out after fighting the storms and got stuck in an area with plenty of water, but no crabs to eat.

Hope hangs in there, so far

In August, Hope made landfall on St. Croix, in the U.S. Virgin Islands. She was not only tracked there by satellite, but a birder actually spotted Hope foraging for crabs.

Hope made landfall on St. Croix on the evening of Aug. 14 after completing an extraordinary 100-hour, 3,500-mile flight out over the open ocean. She left South Hampton Island in upper Hudson Bay on Aug. 10.

Watts said that he expected hope to stage in the Virgin Islands for two to three weeks before heading down to South America to winter.

But, once again, a whimbrel won’t be outguessed. As of mid-October, the satellite tracking device showed Hope still in the Virgin Islands. **i**

IT’S BETTER TO BE THERE

FROM ITS BASE IN D.C., GEG ENGAGES TOUGH PROBLEMS OF INTERNATIONAL ENVIRONMENTAL GOVERNANCE

Environmental problems have grown more acute and more global in the last 30 years, outstripping the capabilities and powers of the international institutions that were set up to contain them.

Globally speaking, Maria Ivanova says, we’re trying to address 21st-Century environmental issues—depletion of natural resources, the plague of persistent organic pollutants, climate change and many others—with a structure of governance that’s just not up to the task. But there’s no reason for environmentalists to despair.

“A new generation of environmental leaders is emerging with a highly collaborative international agenda,” she said. “And they are reaching out to the founding architects of the international environmental institutions for inspiration and lessons in statesmanship.”

The focus of Ivanova’s research is not the environmental problems per se, but rather the organizations, policies and laws established to manage, remediate and (hopefully) eliminate troubles with the environment. An assistant professor in William & Mary’s government department and a current fellow at the Woodrow Wilson International Center for Scholars in Washington, she regularly involves William & Mary students in her work with U.S. and international environmental policy issues through the Global Environmental Governance (GEG) Project.

Directed by Ivanova, the GEG Project is a partnership of the Institute for the Theory and Practice of International Relations at William & Mary and the Yale Center for Environmental Law & Policy. Its mission is to provide research and advocacy to strengthen environmental policymaking on a global level.

A base in the power base

Their base in the College’s Washington, D.C., Office gives Ivanova and her students ready access to the materials—and the policymakers—available in the nation’s capital. Adam Anthony ’87 is the director of the William & Mary Washington Office, strategically located in the Dupont Circle neighborhood. He and his staff have provided infrastructure for initiatives such as the GEG Project.

“Maria’s ‘base of operation’ here in the Washington Office makes it logistically easier for her to coordinate a large student research team and places her within a few blocks of most of the nation’s leading environmental policy experts,” said Anthony. “Her students are getting exposure to the type of policy experts and research resources not available anywhere else.”

Accordingly, the students working out of the D.C. office in 2008 were able to interview nearly a dozen heavy-hitters on the international environmental scene, including Mohamed El-Ashry, founder and former CEO of the Global Environment Facility; Dan Reifsnyder, deputy assistant secretary for environment at the U.S. Department of State; and Melinda Kimble, a senior vice president at the U.N. Foundation. Caroline Cress ’10 has been working in D.C. with Ivanova since her freshman year.

“Conducting this level of research is a rare opportunity for undergraduate students. It is also a field of research that is inherently related to important ongoing political processes, which makes the work both applicable and satisfying,” Cress said.

Putting together the ‘green hall of fame’

In the summer of 2009 Ivanova, in collaboration with Daniel Esty at Yale, convened the historic Global Environmental Governance Forum: Reflecting on the Past, Moving into the Future, which gathered several generations of environmental leaders in Glion, Switzerland, to “rediscover the past, analyze the present and imagine the future.” Cress and several other students joined Ivanova at the forum, a gathering of international environmental luminaries that some participants dubbed “the green hall of fame.”

Much of the GEG forum focused on the evolution of the United Nations Environmental Programme (UNEP), an agency created amid high environmentalist hopes in the 1970s, but which has yet to fulfill its early promise, Ivanova said.

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“‘Transmitted’ sounds like a completely ridiculous verb. But I have seen it many times.”

Global environmental forum

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“I view UNEP as the anchor institution for the global environment,” Ivanova explained. “They are supposed to provide leadership, to catalyze action and to coordinate the activities of the U.N. system on the environment. They’re supposed to be the global conscience for the environment.”

Ivanova is familiar with UNEP. In fact, she has taken groups of William & Mary students to visit the organization’s headquarters in Nairobi, Kenya, in 2006 and in 2008. A highlight of the Glion conference was the attendance of not only current UNEP Executive Director Achim Steiner, but every other UNEP executive director to serve since the agency’s founding in 1972—Maurice Strong, Mostafa Tolba, Elizabeth Dowdeswell and Klaus Töpfer. Also attending was Ambassador John W. McDonald, who drafted the United Nations resolutions that created UNEP while serving at the U.S. State Department in the 1970s.

“We convened the very people that imagined UNEP, drew up its blueprint, created it—and then ran it,” Ivanova said. Their participation provided the forum with a continuity that allowed the participants to examine the successes of international environmental institutions, as well as to examine their shortfalls, with an eye to moving ahead.

International consortium

As befits an international environmental gathering, the GEG Forum was made possible by an international consortium, which included four governments, Germany, Norway, Sweden and Switzerland; the United Nations Foundation; UNEP; the U.N. Institute for Training and Research (UNITAR); the University of Geneva; and the Horn of Africa Regional Environment Center at Addis Ababa University in Ethiopia.

To fulfill its role as an “anchor institution” within the greater international community, Ivanova said that UNEP was designed as “an agile and able intergovernmental body that would bring coherence, competence and connectivity to an already fragmented institutional landscape.” The organization’s architects said at the time of its creation that they wanted to establish “a brain, not a bureaucracy,” that could incorporate environmental issues into other areas of concern such as development, health and economics and help to mediate international disputes of an environmental nature.

Created to be an effective force

“UNEP was created with good intentions,” Ivanova explained. “It was created to be effective.” The forum participants discussed the history of UNEP and traced the paths of its successes and failures. The GEG Project issued a report, “Global Environmental Governance in the 21st Century: Way Ahead Wide Open” and a pair of video documentaries based on the deliberations. In the GEG reports, Ivanova stresses that while UNEP has problems, it hasn’t been completely ineffective.

“UNEP has been weakened over the years, and its remote geographical location has also contributed to some of its marginalization within the UN system. It has not fulfilled the original vision of being the anchor, but it has succeeded in many other ways,” she said. “It has catalyzed a number of agreements on a number of environmental problems. It has put the environment on the agenda more strongly.”

One of the most vexing aspects of the history of global environmental issues is the persistence of the problems of international governance, as sovereign nations create a kind of Tragedy of the Commons as they pursue national interests at the expense of the global public good.

Current UNEP Executive Director Achim Steiner expressed surprise that the environmental governance issues being discussed today are nearly identical to where the discussions started four decades ago.

“What is striking is that whether it is 1970, 1980, 1990 or 2000, the questions have not changed,” Steiner remarked during the conference.

Ivanova said that for many attendees at the forum this lack of progress came as a surprise, but not to her.

For more information on the GEG Project and the forum, visit www.environmentalgovernance.org.

Maria Ivanova discusses a point with a delegate at the Global Environmental Governance Forum held this June in Glion, Switzerland. Several William & Mary students and alumni attended the international conference, as well.



courtesy of GEG



Adam Anthony

A planning discussion in William & Mary's D.C. office with Mohamed El-Ashry, founder and former CEO of the Global Environment Facility, and a member of the advisory board for the GEG Forum. From left: Bert Cortina '11, Caroline Cress '10, Philip Zapfel '09, Clare Stankwitz '11, El-Ashry, Maria Ivanova.

Passing the torch

“The very purpose of the forum was to convene several generations of environmental leaders and illustrate that the questions we are grappling with today are not new and that we need to learn from the individuals who have confronted them before,” she added.

In that spirit, the GEG Forum contained a strong passing-the-torch component, with the elder statesmen of international environmental policy bringing into the fold those that Ivanova refers to as the “new generation of environmental leaders,” young professionals competitively recruited to attend the forum and five Catto Environmental Fellows from the Aspen Institute. The youngest attendees at the forum who ensured that the event ran smoothly included current William and Mary students Cress and Clare Stankwitz '11, alumni Susanah Stoessel '07, Jenn Hatch '09 and Phil Hernandez '09, and graduate students from Yale’s Environment School and the Graduate Institute in Geneva.

“To have heard these discussions and to be able to meet all of the forum participants in person will have a significant impact on how I deal with and perceive these issues in my future education and work,” said Stankwitz, another veteran of the D.C. office. “I now understand better just how difficult it can be—even in a well-researched and often-discussed field—for leaders to come to an agreement on a particular course of action, particularly on an international basis.”

For Caroline Cress, organizing and attending the GEG Forum was a capstone experience of sorts in the lead-up to her senior year.

“This summer especially acted as a complement to my academic education at William & Mary because I was actively involved in a political process which I have been researching from the sidelines for two years,” Cress said. “Just as a field lab is essential for truly learning a subject in the natural sciences, experiences such as organizing and attending the GEG Forum are essential for a full learning experience in political science.”

Cress, Stankwitz and the other students and emerging environmental leaders at Glion announced in a press release a pledge to personally commit to creating a new wave of environmental action in the 21st Century. As GEG Forum participants, they can do so with a sense of history and the original principles of the international environmental movement.

“We need to rethink these institutional mechanisms, because the problems are more acute, because they’re more global, because we understand them better,” Ivanova said. “We have to figure out a new way to pursue collective action that will deliver results. This is where the young people come in. The purpose of our project at William & Mary and Yale is to equip that new generation of environmental leaders with the right tools to be able to solve those problems.” **i**



This summer, the mercury rose on Lake Matoaka

Caitlin Dronfield '10 helps geologist Jim Kaste and Randy Chambers, director of the Keck Lab, core into the bottom of Lake Matoaka.

by Joseph McClain

Before Lake Matoaka, there was Ludwell’s Millpond. Before that, it was a cypress wetland that the colonists dubbed Archer’s Hope Swamp.

One hot July day, Randy Chambers, Jim Kaste and Caitlin Dronfield went out on the lake to delve down through the waters and into the bottom, coring down through the Lake Matoaka bottom, past the Ludwell’s Millpond layers and into the regions representing the pre-1720 era, when the lake was a cypress swamp.

They did it twice, once about 100 meters off the Keck Lab dock and another time near Squirrel Point. They came back to the lab with a pair of cores two meters long, representing the bottom of Lake Matoaka from 2009 through prehistory. Kaste is an assistant professor of geology at William & Mary; Chambers is the director of the W.M. Keck Field Laboratory and the Talbot Professor of Biology. Dronfield is a geology major in the class of 2010. They’re collaborating on an environmental study of Lake Matoaka and its watershed, currently concentrating on mercury deposits through the decades. The cores were halved lengthwise and laid out on a table in the Keck Lab for examination.

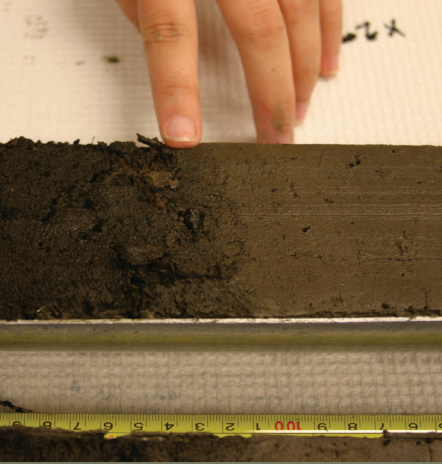
“I think I’ve got a piece of Pocahontas’s charcoal,” said Dronfield, smiling as she uses a plastic spoon to tease out a small black chunk from the old end of the core. She will spend much of her senior year doing analysis on the historical trend of mercury deposits in the sediment.

Working with Kaste, a specialist in heavy-metal deposits in soils, Dronfield will use cold vapor atomic absorption spectrometry to determine how much mercury is in each layer of the core. Kaste explained that the researchers can date each layer by using natural and anthropogenic radioactive tracers.

“This also will allow us to determine quantitatively when heavy metal deposition from the atmosphere began in the region. By that I mean mercury, lead and so forth delivered via rain,” Kaste said. “We’re using (biologist) Dan Cristol’s lab for the mercury measurements.”

Chambers said the cypress swamp was flooded to make the millpond in the 1720s, an event clearly visible in the abrupt transition in color and texture in the sediment. The pre-dam section of the core is readily apparent, with its darker, grainier texture, spotted with large chunks. For the researchers, the most interesting aspects will come out of analysis.

“Previous studies have shown that there was a spike in mercury in the 1970s and an increasing trend from then on,” Dronfield said. She said the project will go on to examine how much mercury comes in from each of the various tributary streams of Lake Matoaka. **i**



Caitlin Dronfield points to the core’s abrupt transition. The darker area on the left is from before the swamp was dammed in the 1720s.

Joseph McClain

Field Lab & Library



Charles F. Gressard and Jill Russett

Christopher Gareis is honored for education research

Christopher Gareis, associate dean for teacher education & professional services at William & Mary's School of Education, received the Virginia Educational Research Association's Charles Clear Research Award recently.

The award is presented annually to an "individual, group or organization that has made a sustained contribution to educational research or evaluation in the Commonwealth of Virginia or the nation," according to VERA. The award is named for a prominent Virginia educator who contributed to the association's early development.

"Quite honestly, I remain simultaneously surprised, thrilled and honored to be receiving this award," said Gareis. "It is especially meaningful to me because, although I am not a native Virginian, I have spent my entire career in the Commonwealth and I have long considered it my home. Therefore, it is incredibly affirming to have my work in and contributions to Virginia recognized by my peers."

Gareis received the award at the annual meeting of VERA, at which he made a presentation on his current research, which focuses on "developing teachers' abilities to use classroom-based assessment to improve student learning," he said. His work in this area, which was conducted with his colleague Leslie Grant '06, resulted in their 2008 book *Teacher-made Assessments: How to Connect Curriculum, Instruction, and Student Learning*.

Gareis began working at William & Mary in 2001 as the School of Education's associate dean for professional services, and he is also an associate professor of educational leadership. His research interests include instructional

leadership, teacher mentoring, teacher evaluation, teacher compensation and classroom-based assessment.

Gareis said that he is particularly thrilled about the Charles Clear Research Award because it is being presented to him by an education research association.

"In an applied field such as education, research is sometimes seen as being disconnected from the workaday life of teachers and leaders in K-12 schools," he said. "As both a professor and as a former secondary school teacher, I have always been keenly aware of this tension. Indeed, I would characterize a considerable amount of my career-long work as an attempt to translate research into practice for teachers and educational leaders in the field. To be recognized by a group of people that I consider to be extraordinary researchers for my role in bringing research to bear on practice is extraordinarily gratifying."

—Erin Zagursky



Christopher Gareis

Education grant funds study of high-risk drinking

William & Mary's School of Education has received a federal grant to study high-risk drinking and behavior among college students.

The two-year grant, totaling \$276,804, is provided by the U.S. Department of Education's Office of Safe and Drug Free Schools. The College's School of Education is one of 20 recipients across the country to receive the grant.

High-risk drinking on college campuses has been identified as a national priority by U.S. Secretary of Education Arne Duncan, said Jill Russett, who has been appointed project coordinator to

oversee the grant at William & Mary. The project will focus on solutions to prevent and reduce high-risk drinking among college students, she said.

"The specific goal of this grant is to develop or enhance, implement, and evaluate campus- and community-based prevention and early intervention strategies to prevent high-risk drinking among college students," said Russett.

The funds awarded from this grant will support a variety of substance abuse programs and research activities on the campus of William & Mary. Funded projects include prevention and education programming in collaboration with the fraternities and sororities, continued research in this topic area and collaboration of key stakeholders with an interest in substance abuse outreach efforts on campus. The project staff partnered with the Office of Student Affairs to develop the grant proposal and they will continue to work with Health Educators Courtney Dowell and Sarah Menefee, and Associate Director of Student Activities Anne Arseneau, in integrating the new program into existing campus prevention efforts.

Charles F. Gressard, an associate professor in the counseling program at the School of Education, will serve as project director. He has 35 years of experience in addictions counseling and addictions counselor education. Gressard oversees the concentration in addictions counseling for the community counseling master's program at William & Mary and is the director of the William & Mary New Leaf addictions clinic.

—Brian Whitson

Linda Malone is awarded Distinguished Fulbright Chair

Linda Malone, the Marshall-Wythe Foundation Professor of Law at William & Mary Law School, has been awarded the Distinguished Fulbright Chair in International Environmental Law for 2009-2010. Awards in the Fulbright Distinguished Chairs Program are viewed as the most prestigious appointments in the Fulbright Scholar Program. Eight hundred faculty and professionals are named as Fulbright Grant Scholars each year, but Distinguished Chairs are only awarded to approximately forty individuals worldwide. As the Distinguished Fulbright Chair, Malone will research and lec-

ture at the Polytechnic Institute of Turin in Italy from March to June 2010.

"Professor Malone's contributions as a scholar and teacher have enriched our law school community and the international academic community for many years," said Dean Davison M. Douglas. "I join with my colleagues here at William & Mary in congratulating her on her recognition as a Fulbright Distinguished Chair."

Malone said that she was "deeply honored by this unique opportunity and exceptional award. My research and involvement in the initiatives to enforce international environmental law have never been more exciting and critical to sustainability, particularly in relation to climate change. To be teaching at such a renowned institution, at such a crucial time in controlling climate change, will be of enormous benefit to my international and American students when sharing our views and experiences. I have spoken to several past chairs in a variety of programs and locations, and each one of them has said it was one of the best experiences of their careers."

While in Turin, her research will focus on sustainable development, particularly on developing public policies that will assist societies in reaching environmental sustainability. She will also study protected-areas management and international cooperation for nature and landscape conservation. As the Turin Chair, she will have the opportunity to teach courses on International Environmental Policies and Legislation.

Malone is recognized internationally as an expert on environmental policy. Her specialty is international environmental law, although she has worked extensively in numerous areas of international law over the course of her career.

—Office of Law School Communications

Sustainability interns find big savings quickly

As interns for the Committee on Sustainability (COS), Tyler Koontz '09 and Judi Sclafani '11 spent their summer months researching William & Mary's recycling and waste services. Thanks to that work—and a recommendation by the students—the College will now save \$40,000 annually.

COS Summer Internships are an ongoing, competitive grant program supported by funds from the Green Fee that was initiated in the spring of 2008. The grants are intended to afford summer research opportunities for graduate and undergraduate students that directly serve the sustainability needs of the College. Koontz and Sclafani were awarded two of the four grants made available in May of 2009 for their proposals to evaluate and improve the College's recycling program.

"As an undergraduate student, to be given the opportunity to conduct meaningful research as part of the College's commitment to sustainability has been exciting, unique, and both person-

Murray Scholars examine culture of Virginia's Eastern Shore

Each year, Murray Scholars make a trip to the farm of program benefactors James and Bruce Murray and other points on Virginia's Eastern Shore. They made a side trip to the Barrier Island Center and the Historic Almshouse Farm near Michipongo to investigate Eastern Shore culture where they encountered a "fairy ring." Murray Scholars Program Director Dan Cristol, a biologist, says that this was the first example of this phenomenon seen by many of the students.

"Different fungi have this way of expanding into larger and larger circles by sending out their mycelium—or 'fungal roots'—from a central point," Cristol explained. "The largest fairy ring known is 700 years old and over a half-mile in diameter. This one is relatively small but was the first one many of the scholars had seen and thus caused some excitement."

The Murray Scholars Program, now in its seventh year, seeks out the best high school

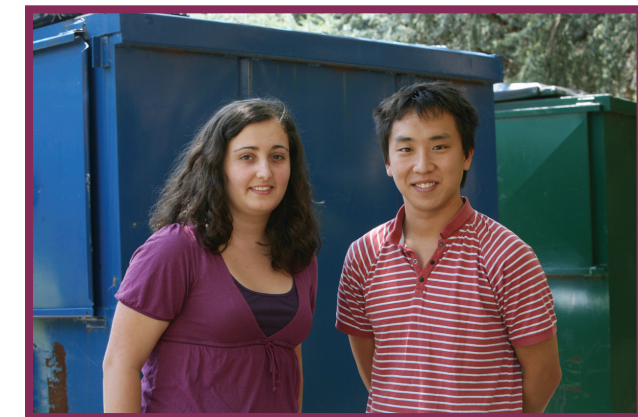
courtesy Dan Cristol



Murray Scholars (from left) Becca Starr, Olivia Walch, Fiona Balestrieri, Katie Mitchell, Nick Schmedding, Colton O'Connor and Jenn MacLure stand inside a fungal "fairy ring."

students in the Commonwealth, admitting four each year with a full scholarship. The program provides a number of opportunities for research and scholarship for the participants, including a capstone research project and the opportunity to design a cross-disciplinary academic major.

—Joseph McClain



Judi Sclafani '11 and Tyler Koontz '09

ally and professionally rewarding," said Koontz, adding he hopes to see the recycling program continue to grow. "I am confident that the recycling program has the potential to become a model for other universities nationwide."

COS asked the students to focus their research on improving the efficiency and cost-effectiveness of recycling on campus. Within the first four weeks of the internships, they had found a way to cut recycling expenditures by half. By shifting the recycling pick-up schedules from "on-call," where bins were emptied only when the College notified their recycling vendor, to a regularly scheduled service, Koontz and Sclafani estimated that the College would save around \$40,000 each year. They also discovered that the solid waste dumpsters were emptied too often, creating the potential for tens of thousands of dollars in additional savings. Both recommendations were included in a final report issued in August.

Koontz and Sclafani set multiple tasks for

cheaper per ton to service than solid waste, creating a needed economic incentive to increase the amount of waste diverted into recycling.

The students were advised and assisted by Sandra Prior, director of environmental health & safety, and Rowan Lockwood, professor of geology and the chair of the COS Programs and Education Subcommittee. Helping the students navigate the intricacies of the recycling and waste programs were Dave Shepard, associate vice president of facilities management, and Bill Sanders, the College's support services supervisor. Shepard was particularly active in Koontz and Sclafani's research, suggesting avenues of inquiry and accepting many recommendations. "Their research points to significant cost savings for the processing of the College's recyclable materials and provides a strong foundation for the growth of the program to achieve more sustainable operations," Shepard said.

—Phil Zapfel, sustainability fellow

L. F. & L.
Schroeder Center has
new name, new director

The Schroeder Center for Health Policy at the College of William & Mary has started the 2009-2010 academic year with a new name and a new director.

Jennifer Mellor was named director of the center effective July 1, succeeding founding director Louis F. Rossiter. Mellor, the Class of 1955 Distinguished Associate Professor of Economics, came to William & Mary in 1998. She teaches health economics and graduate health-care policy in the Thomas Jefferson Program for Public Policy. Mellor said she plans to make the center a more visible member of the campus as well as the Williamsburg community.

“I hope the Schroeder Center will become the hub of health and healthcare policy discussions for the campus and the greater Williamsburg community,” she added.

First up for the community, the Schroeder Center scheduled an Oct. 28 panel discussion on healthcare reform in the auditorium of the College’s admission office. The non-partisan panel will discuss what pending reforms could mean for the Medicare and Medicaid programs and populations.

On campus, Mellor has already spearheaded the creation of three undergraduate research assistantships awarded across the social sciences. Through this program, undergraduates will work with professors in the School of Business as well as the departments of economics and government conducting research on topics ranging from a comparison of healthcare information technology in Japan and the U.S. to a look at health insurance coverage for children and an examination of a prospective payment system for Medicare outpatients.

Another part of the center’s new identity is a name change. Since its founding in 2003, the center has been called the Schroeder Center for Healthcare Policy. As of Sept. 1, 2009, the center became known as the Schroeder Center for Health Policy.

“It’s a subtle change,” Mellor admits. “But, it’s an important one.

Mellor noted that changing the name helps the center better promote the broad focus of the research being conducted by its faculty on policies pertaining to healthcare and public health. Health policy research examines not just healthcare issues but also the wide array of factors that lead to better health, she said. These factors include a variety of health behaviors, the environment and genetics.

“Recent evidence tells us that behaviors like smoking, nutrition, physical activity and others,



Jennifer Mellor

matter significantly more than medical care in preventing premature deaths,” she said. “The name change reflects a growing recognition of the importance of both medical and non-medical determinants of health.”

The Schroeder Center for Health Policy is housed within the Thomas Jefferson Program in Public Policy. It was founded through an endowment from Cliff and Lois Schroeder.

—Suzanne Seurattan

Interactive map shows
aquatic grass coverage
in the Chesapeake

Researchers at William & Mary’s Virginia Institute of Marine Science (VIMS) have created an interactive map that allows web users to see the coverage of underwater grasses in the Chesapeake Bay and its tributaries.

The tool, created using Google Maps® by researchers in the Submerged Aquatic Vegetation (SAV) program at VIMS, is designed to help resource managers, scientists and citizens better track and visualize bay-grass restoration efforts. It is freely available on-line at <http://web.vims.edu/bio/sav/maps.html>.

Underwater grasses serve many essential functions in the Chesapeake Bay and other coastal ecosystems. Grasses give critical shelter to young striped bass, blue crabs and other key species; improve water clarity; add oxygen to the water; reduce shoreline erosion; and provide food for over-wintering waterfowl.

Each year, scientists with the SAV program at VIMS conduct an aerial survey and collaborate with colleagues in Virginia and Maryland in field studies of underwater grass coverage in the Bay. This information is used to gauge progress towards the Chesapeake Bay Program’s goal of restoring underwater grasses to 185,000 acres in the Bay and its tidal tributaries by 2010.

Professor Robert “JJ” Orth, head of the SAV program at VIMS, says “We’ve always been interested in providing users with timely access to maps and data for current and past annual surveys. We moved our monitoring reports,

maps, and data to our web site early on, but were never fully satisfied with the access speed.”

Orth says access to the new map is much faster. In addition, the map displays charts showing the coverage of underwater grasses in particular areas from 1970 until present.

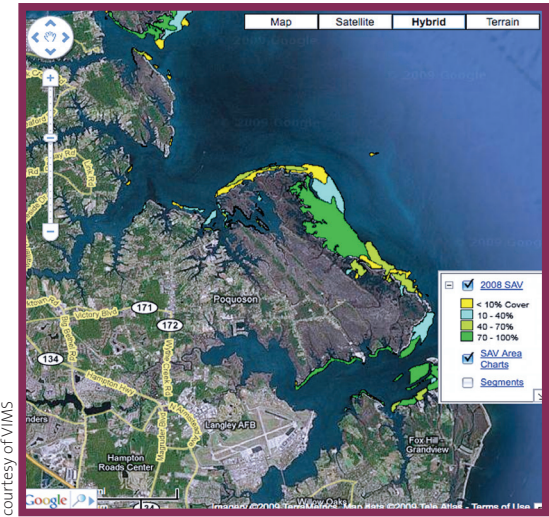
“As you zoom in, the map switches from an overall Bay chart, to zone charts, and finally to individual segment charts,” says Orth. “Zoom in even further, and the green areas denoting SAV coverage resolve into different colors that denote the density of underwater grasses in each bed.” These density data, painstakingly interpreted from aerial photography by program scientists, tell the user whether the grass coverage in a particular bed is sparse, moderately thick or very thick.

Users can also select what to display on the map, showing or hiding the colored bed areas, choosing between Google Maps’ “satellite view” with aerial imagery or “map view” with roads and location names. Users can also choose to show or hide the historical charts and the boundaries of the geographic segments used to report bay-grass coverage.

The map was created using Google Maps and ESRI ArcGIS® Server by David Wilcox, a geographic information systems analyst in the SAV program at VIMS. In the future, Orth and Wilcox expect to add additional data layers including SAV aerial imagery, historical bed areas and field observations, along with other enhancements.

Launched in 2005, Google Maps is a free web-mapping service application that powers many map-based services on the web. Google estimates that users spend one million hours a day using it and its sister product, Google Earth.

—Dave Malmquist at VIMS



Underwater grasses in the Chesapeake Bay area.

Andy Allen is first recipient of Sullivan Scholarship

Andy Allen ’11 is preparing to relish everything the old world has to offer. As the first recipient of the Timothy J. Sullivan Scholarship, he will spend the fall semester of his junior year at the University of Nottingham in England.

The scholarship enabling him to go is made possible through the generosity of Christopher Fildes, a financial journalist in London and long-time benefactor of the College, and former William & Mary President Timothy J. Sullivan, for whom it is named.

Fildes established the scholarship in collaboration with the Drapers’ Company, a more than 600-year-old English guild that today administers charitable trusts on behalf of schools and non-profit institutions, in honor of Sullivan, who served as the College’s 25th president from 1992-2005.

Sullivan, who was installed as a member

—Jon Shaw at the Reves Center

Cross wins award
from Mensa

Tracy L. Cross started the fall 2009 semester with a new job and the surprise of a lifetime.

Cross, William & Mary’s new Jody & Layton Smith Professor and executive director of the Center for Gifted Education, was awarded the Mensa Education & Research Foundation’s Lifetime Achievement Award during a surprise presentation at a recent School of Education meeting.

According to the foundation, the award is presented to individuals who have “contributed a lifetime to scholarly pursuits in intelligence, giftedness or creativity.” Since its inception in 1999, only seven individuals, including Cross, have received the award.

The foundation chose Cross for the award because of his “dedication to research in the field of gifted students over the span of 15 years,” according to a press release.

During his career, Cross has become “the most active researcher in the world on the suicidal behavior of gifted students,” the release said. He has written five books on the topic, and he has served as the editor of every research journal in the field of gifted education.

“The innovative research of Dr. Cross sheds light on an important issue, suicidal behavior, in the realm of gifted students,” said Greg Timmers, president of the Mensa Education & Research Foundation. “He has worked tirelessly for the past 15 years in the area of intelligence and gifted stu-

dents, which is the forefront focus of the Mensa Foundation. Dr. Cross deserves this award and we look forward to his future research.”

Cross comes to William & Mary from Ball State University, where he served since 1997, beginning as a professor of psychology at the school’s Teachers College. In 2000, he became the George and Frances Ball Distinguished Professor of Psychology and Gifted Studies and held that title throughout the rest of his tenure at the college.

While at Ball State, Cross also created and served as director of the doctoral program in educational psychology, executive director of the Institute for Research on the Psychology of Gifted Students and associate dean for graduate studies, research and assessment.

Prior to his work at Ball State, Cross worked as the executive director of the Indiana Academy for Science, Mathematics and Humanities—a state-supported, residential school for academically gifted adolescents.

—Erin Zagursky



Erin Zagursky

Tracy L. Cross, flanked by William & Mary Provost Michael Halleran (left) and Dave Remine, a Mensa Foundation trustee.



Davison Douglas and Neal J. Robinson

Robinson named to Tucker
Adjunct Professorship

William & Mary Law School Dean Davison Douglas presented the 2009-2010 St. George Tucker Adjunct Professorship to Neal J. Robinson during a luncheon at the Alumni House on August 28, 2009. The professorship, created in 1995, is given each year to a member of the Law School’s adjunct faculty for outstanding teaching. The professorship is named for St. George Tucker, a law professor at William & Mary in the late 18th and early 19th Centuries who was one of the most influential legal scholars of his time.

Robinson is a partner with Tarley Robinson P.L.L.C. in Williamsburg, where he specializes in mergers and acquisitions, corporate, and securities law. He is a 1992 graduate of the Law School and has been a member of the adjunct faculty since 2003. He teaches Complex Transactional Practice and Accounting for Lawyers. In the past two years, he has also co-taught an innovative course that involves both law and business students, *Entrepreneurship: Business @ Legal Problems*.

Before attending law school, Robinson enjoyed a successful career in business. Early in his career, Robinson became vice president for finance of Braniff Airlines—the youngest person in that company’s history to hold that position. Thereafter, Robinson served as president and chief executive officer of U.S. Telephone, a company that later became the long-distance unit of Sprint Communications. Immediately before beginning his studies at William & Mary Law School in 1989, Robinson was the chief executive officer of Voice Control Systems—a company that became a world leader in the development of voice recognition technologies.

“Neal Robinson is a marvelous person to serve as our St. George Tucker Adjunct Professor for 2009-10,” said Douglas. “He is an extraordinarily dedicated teacher who brings a rich background in both law and business to the classroom. Our students are fortunate to have him as their professor.”

—Ami Dodson

STRING THEORY / STRING PRACTICE

Sebastian Brock ’11 puts the Bassalope through its paces. Co-designed by Brock, the Bassalope is the product of 18 months of craftsmanship and research. Named for a mythical antler-bearing bass, the yo-yo retails for \$115.





Scott Hardaway, head of the shoreline studies program at VIMS, discusses shoreline management with members of the Virginia House of Delegates' Chesapeake Subcommittee.

Legislators learn about Chesapeake Bay issues at VIMS

Members of the Virginia House of Delegates' Agriculture, Chesapeake and Natural Resource Committee visited the Virginia Institute of Marine Science in August to talk with researchers about issues facing the Chesapeake Bay and its watershed.

The visiting delegates, members of the Chesapeake subcommittee, represent districts from the Eastern Shore to the Blue Ridge and share an interest in restoring and maintaining the Bay's ecological and economic health. They were invited to VIMS for the two-day retreat by Delegate Harvey Morgan, whose district includes the VIMS campus in Gloucester Point. Morgan chairs the full House committee.

In addition to discussions with VIMS scientists, the delegates heard from representatives from the Chesapeake Bay Commission, the Chesapeake Bay Foundation, Omega Protein, U.S. EPA, U.S. Dept. of Agriculture, Virginia Dept. of Conservation and Recreation, Virginia Dept. of Environmental Quality, Virginia Farm Bureau, and the Virginia Marine Resources Commission.

VIMS Dean and Director John Wells, who led off the retreat with an overview of Bay issues, says the event "provided a wonderful opportunity to learn from each other how VIMS can best fulfill its legislative mandate to provide advisory service to the Commonwealth on marine-resource issues."

Delegate Morgan says the information gained during the retreat was "invaluable in helping us to understand and manage the challenges we face in restoring the Bay."

During their visit to VIMS, subcommittee members explored issues related to blue crabs, harmful algal blooms, menhaden, ownership of subaqueous lands, oyster restoration and aquaculture, seagrasses, shoreline management, storm-surge modeling and water quality.

Their visit included a cruise aboard the RV Pelican, a surplus Navy landing craft that VIMS has retrofitted for Bay and coastal research.

The delegates learned about VIMS' role in protecting the Yorktown shoreline, sampled and viewed the algae responsible for the current "red tide" in the York River, and discussed the collaborative project between VIMS scientists and watermen to remove derelict crab pots from the Bay.

During a second-day cruise aboard the CBF vessel, Bea Hayman Clark, the delegates discussed environmental education, York River water quality, and issues related to oyster aquaculture and watermen, including spat-on-shell oyster restoration efforts.

House members attending the retreat included Harvey B. Morgan, Beverly J. Sherwood, R. Lee Ware, Jr., Edward T. Scott, Matthew J. Lohr, Brenda L. Pogge, Lynwood W. Lewis, Jr., David L. Bulova and Margaret G. Vanderhye.

—David Malmquist at VIMS

Government professor observes Afghan election

William & Mary assistant professor of government Rani Mullen served as an international observer for Afghanistan's most recent election—a presidential contest held in late August. Mullen was among approximately 80 observers in the country with Democracy International (DI). Though she witnessed few fraudulent conditions, she fears her observations in Kabul, the nation's capital, were not indicative of electoral conditions across the country.

Democracy International wasn't the only American group in Afghanistan to observe the election, just the second presidential contest held by the fledgling democracy. Mullen said in addition to DI, National Democratic Institute (NDI) and International Republican Institute (IRI) also had observers on the ground. Mullen estimates she was among some 130 U.S. observers in the country most of whom, like her,

Sophia Serghi rocks the Kennedy Center

Sophia Serghi's fingers hurtle from one piano key to the next, dashing to form sounds both strident and soothing. Her back is straight and her eyes are closed as she fires off one note after another.

She gives an emphatic, almost violent, nod for violinist Susan Via to join her. She jumps in, her own hands engaged in a sprint down the page of Serghi's *Toward the Flame*.

It's all blissfully athletic business for the two William & Mary Department of Music faculty as they rehearse six of Serghi's original compositions for an October performance on the Kennedy Center's Millennium Stage in Washington, D.C.

The concert, From Byzantium to Punk Rock, was sponsored by the College and the government of Cyprus.

"Most of the music springs from my experience from the Byzantine church," Serghi said. "But embedded in there are all these wonderful rhythms that come out of my rock experience. It's a very strange combination. But it works."

Serghi's music has been performed around the world. But the opportunity to appear at the Kennedy Center is special.

"I'm really happy about the Kennedy Center for two reasons," she explained. "One, it's so close to my home and a nationally renowned venue. Two, there's a good chance for the Greek community to have access to music that for many reasons was inspired by my Greek heritage."

For the most part, Serghi composes at break-neck speed. She finished two of the Kennedy Center selections, about 20 minutes of music, in two weeks.

"I don't wait for inspiration to come; if it's there, it'll come out," she said.

—Jim Ducibella

were volunteers. And concedes the election she witnessed was not the election everyone saw.

"Essentially I think what happened was that there were two elections," Mullen recently told WHRV public radio host Cathy Lewis on her weekday program, HearSay.

She said one type of election took place in the polling places in some urban areas, like the ones she observed in the nation's capital Kabul, where security was good, domestic and international observers were present and voting procedures were largely followed.

The other sort of election took place in locations away from the capital or larger cities, that were not secure and that appear to have been rife with fraudulent procedures including double (and sometimes worse) voting. She chronicled her observations and experiences in an online blog.

—Suzanne Seurrattan

beginnings:

ChAP: BIOFUEL FROM THE CHESAPEAKE BAY'S ALGAE

by Joseph McClain

What we want to do," Emmett Duffy said, gesturing toward the first slide of his projected PowerPoint, "is to take pollution and turn it into fuel, on a large, economically competitive scale."

Duffy was addressing a gathering of a couple dozen scientists, engineers and industrialists gathered in the Alumni House in January to discuss how to make biofuel from algae—and how to make it profitable. Algae-based biofuel is a hot research topic. There are a number of ongoing investigative projects across the country, virtually all of them based on the cultivation of a monoculture—one or another single species of algae, sometimes genetically engineered strains. But Duffy was talking about something completely different: making fuel using the wild algae naturally growing in waterways.

In late September, the project became known as ChAP—the Chesapeake Algae Project—after William & Mary and its Virginia Institute of Marine Science signed a formal agreement with a number of partners, notably StatoilHydro, a Norwegian energy firm that has agreed to seed ChAP to the tune of \$3 million. Other key partners are the Williamsburg energy advisory firm Blackrock Energy, the University of Maryland, the Smithsonian Institution and the University of Arkansas.

Duffy, the Loretta and Lewis Glucksman Professor of Marine Science at VIMS, is only one of the researchers involved in ChAP. Duffy and Professor of Marine Science Elizabeth Canuel have been cultivating algae in a flowway at the VIMS Gloucester Point campus for months.

Duffy pointed out that ChAP's use of wild algae has a number of advantages over other bio-fuel approaches. For one thing, they sequester, rather than release, nutrients and carbon. "Rather than creating an environmental problem—as we've seen in corn ethanol production—they solve an environmental problem," he explained.

As Dennis Manos sees it, algal biofuel could be part of the answer to the question posed by the world's appetite for petroleum.

"We would like to help companies put a significant dent in the world's thousand-barrel-per-second appetite for oil," said Manos, William & Mary's V.P. for research.

ChAP differs from other algal biofuel initiatives in two ways.

"In the first place, we're going to work with many species of algae, as opposed to concentrating on farming a monoculture, or attempting to contain genetically modified algae in open-water environments," Manos said. He explained that using a polyculture approach makes the algae less susceptible to disease and generally more robust.

"Nature has spent three billion years perfecting the right algal strains for a particular set of conditions," Duffy added. "We want to use that natural engineering, and that's what sets this project apart from others."

The other difference is that the process is designed to work without competing with either fresh-water supplies or agricultural resources. "The process will work in brackish water, salt water, even waste water," Manos said. "That's one of the best parts of the whole idea, and ultimately, while producing affordable transportation fuel, using wild algae can even help to remediate conditions that otherwise would lead to harmful algal blooms."

ChAP will integrate the work of researchers at VIMS with those on the Williamsburg campus of William & Mary. In Williamsburg, Gene Tracy, Chancellor Professor of Physics and Applied Science; Bill Cooke, professor of physics; and Robert Hinkle, associate professor of chemistry, are lead members of the team, which includes other faculty members.

Considered as a replacement for petroleum, an individual alga is basically a bag of oil supported by a skeleton or shell. Different species of algae considerably in lipid content, which essentially means how much of the algae is oil. Elizabeth Canuel points out that lipid content among algal species can vary from 5 to 50 percent. In that way, algae are not unlike different varieties of food crops like corn or potatoes, Manos said.

"Something that does just fine on the Aran Islands west of Ireland would barely be recognized as a potato by a farmer in Idaho," he explained. "And likewise, McDonald's isn't going to make french fries out of the little potatoes from Peru." Farmers have had thousands of years of experience with food crops to sort out what variety is suitable for different applications, but for ChAP, the learning curve necessarily is going to be a bit steeper.

Early samplings from the flowway at VIMS show many algal species. But the samples are dominated by a single species of diatomaceous algae, a group known for the symmetrical beauty of their skeletons under a microscope, but as Manos says, "not particularly brilliant as a feedstock for fuel, largely because they have so much skeletal material."

Even if the wild, abundant—yet bony—dia-



Elizabeth Canuel and Emmett Duffy inspect the flowway at VIMS.

toms aren't ideal little bags of oil, they do offer some benefits: "They pay you back by growing very rapidly. So a low shell-to-lipid ratio is often made up for by the rate of growth," Manos said. "If I can grow three grams of something that's half as efficient in the time it takes you to grow one gram of something that's perfectly efficient, I still win."

Much of the early work of ChAP is focused on growth, harvest and identification of available algal species. At the same time, other members of the team are examining a number of possible biofuel production scenarios. It's a complex problem, beginning with any number of algal species that can serve as feedstock and ending with any of a number of target fuels—butanol, biodiesel, gasoline additives or even an algae-based substitute for jet fuel.

"What we make is going to depend critically on pairing the demand for the product with the suitability of the feedstock we're working with," Manos explained. "And also, is there a process to reach that particular target fuel from that particular feedstock?"

Corporate partners StatoilHydro and Blackrock Energy will provide "an immediate link to the market" of any product developed through the initiative, Manos said.

The project was initiated by exploring, among others, technology originally developed by Walter Adey of the Smithsonian Institution as a large-scale aquarium filter. Adey has been meeting with a group of researchers at William & Mary and VIMS for the past year, working out details of how to adapt the concept to industrial-scale algae cultivation. A test site has been operating at VIMS, using brackish York River water, and a second test station is planned for Lake Matoaka on the William & Mary campus. **i**