

ideation

RESEARCH & SCHOLARSHIP AT WILLIAM & MARY

ideation

RESEARCH & SCHOLARSHIP AT WILLIAM & MARY

this just in...

by Joseph McClain

THEY COME IN THREE FLAVORS AND GO PRETTY MUCH ANYWHERE

The neutrino is an abundant, interesting and mysterious subatomic particle. It has no charge and until recently, was thought to have no mass. These “ghost particles” can go pretty much anywhere and through anything. “If you shot neutrinos through a brick of lead a light year thick,” Patricia Vahle said, “most of them would come out of the other side.”

Vahle is an assistant professor of physics at William & Mary. She is an important part of NOvA, an experiment that will bring about a greater understanding of the neutrino—and of the universe itself.

Ground was broken on May 1 for NOvA’s detector, a lab of the University of Minnesota. The detector will catch and identify neutrinos that have traveled 500 miles underground from the U.S. Department of Energy’s Fermi National Accelerator Laboratory outside Chicago.

The properties of neutrinos hold the key to a number of questions, such as a fuller understanding of nuclear fusion and fission mechanics and the mystery of why antimatter is so rare in the universe.

“If you want to understand how the universe began and how it evolved and how it is working today, you need to understand as much as you can about the neutrino,” she said.

Neutrinos are difficult to study, but it’s not because they are scarce: In the time you took to

read this sentence, an enormous number of neutrinos have passed through your body.

“They’re difficult to study because they don’t interact very much,” Vahle explained.

“To study a neutrino, you have to make it interact with matter so you can see what comes out.”

The NOvA experiment is designed to make those neutrino-matter interactions happen. On their way to Minnesota, the neutrinos will be counted at a Fermilab detector. Neutrinos come in three “flavors,” Vahle explained: electron, muon and tau. A predecessor experiment to NOvA, known as MINOS, used a similar scenario to verify that the neutrinos were oscillating—or changing flavors. A better understanding of neutrino oscillation will yield a better understanding of neutrino mass, she said.

“We make a beam of muon-type neutrinos and what we found in MINOS is that some of those neutrinos just go away,” Vahle said. “We can’t tell what they’re going into. They can either go into tau-type neutrinos or they can change into electron-type neutrinos.”

NOvA is designed to identify just how the



The calibrator: Patricia Vahle

neutrinos are oscillating. “We think that these muon neutrinos turn into tau neutrinos,” she said. “But they could turn into electron-type neutrinos.”

Vahle’s part in the project is to lead a team responsible for the calibration of the detectors.

“It doesn’t sound very sexy, but it’s a fundamental step

that you have to do in order to understand what you’re seeing when a neutrino interacts in your detector,” she said. “What happens is this: The neutrino comes in, it gets close to a nucleus in the detector and it will interact with that nucleus. It’s going to spit out a shower of daughter particles that form in that interaction.”

She explained that NOvA scientists will measure the energy of each daughter particle and add them up to determine the energy that the neutrino had to begin with.

“In order to figure out how much energy each one of those daughter particles has, you need some reference to compare it to, some sort of ‘standard candle,’” she said. “So, I’m leading the group that figures out what that ‘standard candle’ is and what sort of process we need to go through to figure out what the energy of the neutrino was in the first place.” **i**

Our gift to the gifted

Joyce VanTassel-Baska focuses on high achievers

ideation

RESEARCH & SCHOLARSHIP AT WILLIAM & MARY



FROM THE PRESIDENT

Along with the lush green of a William & Mary spring and the annual rites of commencement comes another recurring feature of campus life—news of important work done by our faculty and students. This issue of *Ideation* celebrates the career of Joyce VanTassel-Baska, one of the university's most productive and influential professors. The issue also describes how the geology department, a longtime leader in faculty-student research, provides its majors with hands-on field experience. There is news as well about how our new student-funded "Green Fee" and the work of our newly created Sustainability Committee are making a real difference for the better in the campus environment; dozens of ideas are afoot—SCORS is one (Solar Cells On the Roof of Small). And there is an engaging account of an important discovery by a cohort of our freshmen. A group of them, working in the Sharpe Community Scholars Program, actually unearthed a cache of lost documents about an early African American entrepreneur, the great Maggie Walker.

As always, this issue of *Ideation* is well worth our time!

Cordially,

Taylor Reveley

- page 1 **High achiever in high-ability**
Joyce VanTassel-Baska's enormous contributions to gifted education
- 6 **Integrated Science Center Phase 2**
Psychologists, biologists, neuroscientists move in and begin working
- 8 **We're not only what we wear**
We're also—among other things—how long we wear it
- 12 **First-year discoveries**
Our belief in early involvement in research pays off big time
- 16 **The hanging anthologist**
Henry Hart's enormous post-WWII anthology is held up at the starting gate
- 18 **All about the inspiration**
A new scientific paradigm for the neural genesis of respiration
- 20 **Basement to ceiling**
Senior geology majors show their stuff in the Blue Ridge and the Piedmont
- 22 **WMCAR at 20**
A new lab for our Center for Archaeological Research
- 24 **Lab, Field & Library**
A roundup of research, accomplishment and advancement
- 29 **Beginnings**
SCORS: an initiative to put solar cells on the roof of Small Hall

research in the big leagues

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.

- | | |
|---|---------------------------------|
| CHANCELLOR
Sandra Day O'Connor | RECTOR
Michael K. Powell '85 |
| PRESIDENT
Taylor Reveley | PROVOST
P. Geoffrey Feiss |
| DEAN OF ARTS & SCIENCES
Carl Strikwerda | |
| VICE PRESIDENT FOR STRATEGIC INITIATIVES
James R. Golden | |
| VICE PROVOST FOR RESEARCH & GRADUATE/PROFESSIONAL STUDIES
Dennis Manos | |
| DIRECTOR OF STRATEGIC COMMUNICATIONS
Michael J. Connolly | |

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

Ideation is published semiannually by the College of William & Mary, Office of University Relations, P.O. Box 8795, Williamsburg, VA 23187-8795.

Address all correspondence to the editor, Joseph M. McClain, at the address above or e-mail below.
Phone 757-221-1615

- EDITOR
Joseph M. McClain
- GRAPHIC DESIGNERS
Lucinda Baker
Rachel Follis
- PRINCIPAL PHOTOGRAPHER
Stephen Salpukas
- All photography in *Ideation* is by Stephen Salpukas, unless noted
- GRAPHIC ASSISTANT/PROOFREADER
Teresa Edmundson
- TRANSCRIPTIONIST EMERITA
Ann McGrath

WHAT DO YOU THINK?
research@wm.edu

READ IDEATION ONLINE:
www.wm.edu/news/ideation

A gift to gifted education

Joyce VanTassel-Baska has spent a career making sure that tomorrow's Mozarts and Einsteins get what they need today

by Erin Zagursky



Joyce VanTassel-Baska is not a person who is afraid of trying new things. As a high school teacher with no basketball experience, she decided to coach the girls' basketball team because she thought it wasn't fair that the girls not have a team due to the lack of a coach. In two years, her team became city champions.

Joyce VanTassel-Baska also is not a person who has a long, slow learning curve. When she stepped onto the court, she had no basketball experience; two years later, her team became city champions. That same chutzpah and drive to address unfair situations led the English and Latin teacher to become interested in the 1970s grassroots movement to do more for gifted students.

Now, nearly four decades later, VanTassel-Baska, the Jody and Layton Smith Professor of Education, is preparing to retire from her position as executive director of William & Mary's Center for Gifted Education. She is recognized as a pioneer in the field of gifted education, and her research has directly affected students and educators around the world.

"I recognize that it's a small pond, but it's been my niche for a long time, and I think that once you find your niche, you are able to do things at ever-increasing levels and produce more because you know the field deeply and well," she said.

Before coming to William & Mary's School of Education in 1987, VanTassel-Baska served as the state director of gifted programs for Il-

Taking a moment on the porch of the Scotland Street headquarters of the Center for Gifted Education, Joyce VanTassel-Baska reflects on her career as a researcher and teacher.

Four areas of research concentration

continued from page 1

Illinois, as a regional director of a gifted service center in the Chicago area, as coordinator of gifted programs for the Toledo public schools and as a teacher of gifted high school students in English and Latin. She also initiated and directed the Center for Talent Development at Northwestern University. At William & Mary, VanTassel-Baska developed a master's program and a doctoral program with emphasis in gifted education. Most importantly, she founded the Center for Gifted Education in 1988.

Creation and implementation

With VanTassel-Baska at the helm, the Center for Gifted Education has supported the needs of gifted and talented people by not only creating services and special programs, but by also providing those same innovative programs for educators, graduate students, policy makers, researchers, parents and K-12 students. The center is known internationally for its research-based curricula, which were developed for high-ability learners. Curricular materials developed by the center are currently used in all 50 states and 28 countries.

Most of VanTassel-Baska's work at William & Mary has been through the Center for Gifted Education. Throughout her career, her research has concentrated on four major areas:

- curriculum effectiveness
- gifted students from low-income and minority backgrounds

- teacher effectiveness
- talent development in eminent individuals.

She began researching gifted students from low-income and minority backgrounds around 1982 while she was still at Northwestern University. She said the emphasis in this research has been concentrated on finding appropriate measurements to assess the abilities of these learners and on discovering the best mechanisms for nurturing these students during different stages of development.

The most important research that she and her fellow researchers at the Center for Gifted Education have done in this area was conducted in South Carolina over the last eight years.

"Our center researchers built a series of performance-based assessments that were used for identification by the state of South Carolina and eventually adopted as their mechanism for identifying students," VanTassel-Baska said. "As a result of using those assessments, anywhere from 14 to 20 percent more low-income and minority students are identified now in South Carolina for gifted programs."

Center researchers tracked that pattern for six years, and the results held true each year. The researchers also did follow-up studies to find out what worked—and what didn't—when these students were placed in traditional gifted programs with students from more advantaged backgrounds.

"What we know from that study is that participants benefited tremendously in two areas from being in gifted programs," VanTassel-Baska said. "First, it's an amazing confidence-builder for them. They begin to see themselves with new eyes, and they are able to mobilize their own abilities."

Building communication skills

The second area in which the students benefited from was the development of communication skills.

"If you stand up and talk in front of people, that's a confidence builder. If you can write well and get positive feedback on your writing, that's a confidence builder," she explained. "So they were developing some very important skills as a result of having the access to gifted programs."

Center researchers also tracked the students' performance on the high-stakes test in South Carolina in those academic areas in which individual students were identified as gifted.

"It took these students two years to come up to the level of their more advantaged counterparts—but in two years they did. It took a little longer, but they were able to meet the same standard that the others met," said VanTassel-Baska. "Those findings were quite gratifying: To know that you're identifying these students for gifted programs, placing them—and then being able to talk to their parents, their teachers and themselves about what it's meant to be in the program, and to track results of participation on outcome measures."

Curriculum effectiveness

VanTassel-Baska is most well known for her research into curriculum effectiveness, work she began around 1990. In gifted education, not many researchers were focused on curriculum or its effectiveness. Because it is applied research, it is not something that many researchers were interested in doing.

"It's very difficult research to do, because it's research that's done in schools—where you're collecting data in classrooms on students and teachers," said VanTassel-Baska.

The major finding from the work is that gifted students can grow significantly within subject-matter areas that are based on critical thinking—language arts, for instance—if they're given a high-powered curriculum and are taught to move to higher levels. What was surprising about this finding, VanTassel-Baska said, was that the researchers saw amazing growth gains from the combination of accelerated and enriched learning models. They found growth from students using the accelerated model, which moves students through an advanced curriculum more quickly, as well as from an enriched model, which exposes students to greater depth of learning and complex activities. These results supported the use of the

Integrated Curriculum Model (ICM) that she had been working on for 20 years. Results also suggested that different forms of grouping the gifted produced strong results whether it was cluster, pullout or self-contained. VanTassel-Baska and her collaborating researchers also found that "gifted curriculum" isn't necessarily just for the gifted: A curriculum designed for gifted learners can be used for a broader band of students "who can benefit from it in powerful ways," she said.

"The results are intuitively what you would expect," she explained. "Gifted kids start higher, and they show significant and important gains. More typical learners start lower, but they still show significant and important gains by being exposed to the same kind of curricular emphasis—and that emphasis is very much focused on higher-level thinking and particularly, critical thinking."

Teacher effectiveness

An outgrowth of the research on curriculum effectiveness has been research into teacher effectiveness, which began around 2000. The researchers concentrated on differentiation—a concept in which teachers use a variety of strategies and materials found effective with the gifted with other students as well. VanTassel-Baska and her collaborating researchers have investigated how to ensure that teachers have the differentiation strategies that they need in order to work effectively at high levels—with the gifted students or with anyone else.

"The research suggests that all students should have access to high-level thinking, and that teachers can use those strategies effectively," said VanTassel-Baska.

In order to determine how teachers are doing, center researchers came up with a measurement tool to assess teachers' capacity to differentiate. Using that measurement tool across different populations of teachers, the researchers were able to understand patterns of differentiation, the frequency of differentiation use and its effectiveness.

Differentiation is a powerful educational tool, but mastery of the techniques is not always easily attained. VanTassel-Baska's studies have suggested that it takes two years with five days or so of professional development in each year—with follow-up in the classroom—to impact teachers' use of differentiation at a significant and important level.

Cross-cultural work

Center researchers also conducted a cross-cultural study with Singapore, focusing on teachers' use of differentiation in specialized schools for the gifted at the high school level.

"What we saw was that the teachers in those schools were all using good differentiated

JOYCE VANTASSEL-BASKA—AN OVERVIEW

Since 1974, Joyce VanTassel-Baska has served as principal investigator of 60 separately funded projects, totaling almost \$15 million in grants from federal and state agencies. Some of those grants brought about Project Clarion and Project Athena, which were each funded for \$3 million over five years. Project Clarion was an initiative that promoted scientific conceptual understanding in gifted children between ages 4 and 8 through interactive activities and projects. Project Athena examined the effect of William & Mary English/language arts curriculum units designed to increase the reading and critical thinking skills of Title I elementary school students.

Five states—Ohio, Virginia, Colorado, South Carolina and Illinois—have presented VanTassel-Baska awards for her contributions to the field of gifted education. She has also received numerous other awards for her work, including the National Association for Gifted Children's Early Leader Award in 1986, the State Council of Higher Education for Virginia Outstanding Faculty Award in 1993, the Phi Beta Kappa faculty award in 1995 and the National Association of Gifted Children Distinguished Scholar Award in 1997.

She has published 26 books and more than 450 refereed journal articles, book chapters and scholarly reports. Her most recent book is *Comprehensive Curriculum for Gifted Education* (3rd Edition, 2006).

VanTassel-Baska has served as a consultant on gifted education internationally, in all 50 states and for several national groups, including the U.S. Department of Education. She was a visiting scholar at Cambridge University in 1993 and a Fulbright lecturer in New Zealand in 2000.

Although she has been very successful and productive in her research efforts, VanTassel-Baska said that at heart, she is a teacher.

"I think why William & Mary has been such a good fit for me is that teaching is fundamentally where my values lie," she said. "Yes, I've done research, and I'm not ashamed of my research, but if you were to ask me about the William & Mary dual credo for faculty—teaching and scholarship—I would always put teaching first and scholarship second. Even though I have worked in the latter part of my career here very hard on scholarship, it's been because of the importance of leaving some kind of legacy behind of the work done here. The legacy of that work also lives on in my graduate students as they make their own unique contributions to the scholarship of the field."



Mark Mitchell

Joyce VanTassel-Baska works with children during one of the summer enrichment programs sponsored by the Center for Gifted Education.



Among the plaudits at a March festschrift celebrating her career: "Joyce VanTassel-Baska has been such an important force in gifted education. I mean, she's our empress," said Frank Worrell, faculty director of the academic talent development program at the University of California, Berkeley.

continued on page 4



Mark Mitchell

With a slate of research-based accomplishments that many academics would envy, Joyce VanTassel-Baska says that, down deep, she remains a teacher.



LEGO competitions are used to challenge students with high spatial ability, an emerging sector of gifted education.



Always at the forefront of her field—and at the center of the center she founded—VanTassel-Baska discusses a paper on spatially gifted students written by Steve Coxon (right), a current graduate student and Kimberley Chandler, director of curriculum at the Center for Gifted Education.

Learning, training and practice

continued from page 3

strategies, but Singapore teachers outperformed American teachers in terms of the effective use of those strategies over time,” said VanTassel-Baska. “Again, my explanation for that would be that we don’t insist that our secondary teachers be trained in gifted education in this country, and in Singapore they do. Moreover, Ministry of Education specialists in content and gifted education follow-up in the classroom to help further the use of the strategies. It’s an interesting contrast to the United States where we lack resources to provide that kind of follow-up support.”

Talent development

VanTassel-Baska’s favorite area of research is in talent development. It grew out of her personal interest in reading biography. In 1993, she received research leave from the College and went to England to study the lives of Charlotte Bronte and Virginia Woolf, focusing on their talent development processes.

She has many fond memories of the trip, such as her visit to the Bronte parsonage. She read Charlotte’s letters while her daughter, then 11 years old, sat next to her and read *Jane Eyre* for the first time. She also fondly recalls attending a seminar on Virginia Woolf at Cambridge in the same room where Woolf gave the lecture that became the essay “A Room of One’s Own.”

“There is something about handling artifacts from the lives of eminent people in the past, people whose works you have read, whose works you admire and whose minds you have been fascinated with,” she said. “To pick up letters they have written or photographs of their families or original editions of their work...that’s very thrilling for me.”

VanTassel-Baska found that early experiences—both educational and relational—greatly impacted the talent development of many people who went on to be notably high achievers. Additionally, the influence of family can play an important part of the process.

“I think that internal characteristics are also very powerful in the lives of these individuals,” said VanTassel-Baska. “They had tremendous motivation. They had tremendous capacity for hard work. They had the zeal that Darwin was talking about, the enthusiasm to keep going in the face of failure. Those characteristics matter a lot. Passion matters a lot. It isn’t just that they’re interested in things; they’re *passionate* about things.”

She also found that the lifestyles of the accomplished and famous often include a capacity to work on something for long periods of time, getting so engrossed in it that they lose track of time.

“That’s probably where the ‘absent-minded professor’ label came from,” she said. “A lot of professors engage in their work that way. It’s indicative of the mental state necessary to do important work.”

VanTassel-Baska said that there is a general rule that says that it takes an individual 10 years of very hard work in a field in order to make a breakthrough.

“So this notion of learning, training and practice in a talent development area is critical in order to produce something of worth in any area,” she said.

Although VanTassel-Baska enjoys the archival research, she hasn’t pursued it as much as the other strands of her research because she thought the other areas would be more useful to

people, and she received federal grants to support the school-based research efforts.

“There is this pragmatic streak in me that research ought to mean something, and in particular, research in education ought to mean something, to be able to help people in schools do a better job. That’s my research ethic. If you work in a field like education—which is applied—then your research should in fact benefit that profession,” she said.

However, now that she is retiring, she plans to more thoroughly pursue her interest in archival research and talent development. Right now, she is interested particularly in the life of Sir Francis Galton, who is considered by many to be the father of gifted education. He was also an accomplished explorer, a pioneer in the field of statistics and the cousin of Charles Darwin. VanTassel-Baska travelled to the University of London last year to conduct research in the Galton archive.

The importance of gifted education

Although gifted education has come a long way from where it was when VanTassel-Baska started her career, it still has significant strides to take, she said.

“Unlike when I came into the field in the 1970s, we have a much more systematized field than we had before,” she said. “But even within that systematized area, we still have what I call a ‘patchwork quilt’ of opportunities.”

For example, the services available to a child depends on the state—and in many cases the school district—the gifted child calls home. VanTassel-Baska advocates a more uniform availability of services.

“I think there is a real need to provide a much more systematic guarantee that no matter where you live, no matter how much money your family makes, if you’re bright, you will have opportunities to grow and develop in ways that are appropriate for your needs,” said VanTassel-Baska.

She suggests a model which is based around a university’s gifted-ed program. K-12 districts could work with the university program in cooperative arrangements, developing programs and services, creating a sustainable, systematic training mechanism for teachers and establishing a source of ongoing professional development.

“My wish there would be that in every state, there would be at least two universities offering coursework in the education of the gifted and running centers like this one to be sure that there were good opportunities for students at all age levels,” said VanTassel-Baska. “Gifted students have many unmet needs.”

However, in the country’s current financial situation, many critics of gifted education question the need for it and accuse it of merely taking the smart kids out of the classroom. But VanTassel-Baska said that putting gifted children together in these programs is vital.

“I think schools have to think about what are the best kinds of opportunities that they can offer students who are so promising intellectually or academically or in the arts or leadership,” she said. “What are the opportunities that we can provide in any given context that can optimize those abilities? Once you can answer that question, the second question becomes how can you best deliver that? The reality is that if you want to optimize the abilities of students in specific domains, then you have to put students together with others who share their level of learning, their interest and their passion.”

Benefits of peer grouping

“There’s never a question about putting the best basketball players together to make a team or never any question about the development of musical talent and putting the best players together and giving them first chairs in orchestras or first soprano in a chorus because we understand and accept that it is necessary to have the strongest performances,” she said. “And yet when it comes to academics, we become much more skittish about putting the best students together to work to their optimal capacity. Yet, peer grouping is absolutely essential to the development of high-level talent. In the absence of that, these students will not prosper.”

VanTassel-Baska said that not having strong gifted education programs is to our detriment.

“We have other societies around the world who now see this as a national priority. Korea sees it as a national priority, Singapore, China—many societies are willing to put their resources into the best and the brightest, and the United States so far has not been willing to do that, providing less than a penny per student in funding at the federal level,” she said.

VanTassel-Baska said that it is often hard for people to understand what not having gifted programs would do.

“But 30 years down the road, we will know that we have made a mistake by not developing our best minds,” she said. “We will know it because we will no longer be preeminent in the world. We will know it as we don’t enjoy the quality of life that we have enjoyed over the past 30 years. We will know it in the fact that certain breakthroughs in medicines have not been made, certain social problems have not been solved; we will know it as life becomes ever-more complex and we don’t have sufficient numbers of people who are able to meet the challenge of those

complexities and solve problems in important ways. The lack of attention to gifted and talented students as a group will cause us to suffer in the long run as a society for not nurturing the new Toni Morrisons, the new Newtons, the new Hawkings who could be making huge contributions to future generations. But can we at the moment see it? No, because we’re not looking for the right outcomes from schools which should be differentially calibrated to the capacities of students. We should be raising the mean for all learners and increasing the variance for our top learners, not closing the achievement gap by holding them in place. Our instructional approaches must be based on the talent development processes of higher level thinking and problem solving, not the lower level skills currently drilled on for performance on state tests.”

Legacy, personal and professional

VanTassel-Baska said that what she is most proud of from her career are her doctoral students: “They are out around the world starting gifted education centers of their own at different higher education institutions or doing good work in other educational contexts for gifted students.”

She is also very proud of her daughter, a William & Mary alumna who, following in her mother’s footsteps, is a Latin teacher pursuing a master’s degree in gifted education at George Mason.

“In the final analysis, it’s the people I’ve influenced that matter the most to me,” VanTassel-Baska said. “They give me the greatest satisfaction that they have gone on, or are going on, to do good work in gifted education. I know in the case of many of them, these career opportunities would not have happened had William & Mary not been here, had the program not been here, had I not been here.” **i**

A brisk morning's walk through ISC 2

Psychologists and biologists move in—and get a move on

by Joseph McClain

You have to keep reminding yourself that you're inside what used to be Rogers Hall. The venerable chemistry building has been gutted and transformed into a state-of-the-art working space now known as Phase 2 of the Integrated Science Center. The chemists aren't around, either; they moved to new quarters in the first phase of the Integrated Science Center last summer.

The lion's share of the psychology department is on the first floor of ISC 2. The second floor is occupied by biologists, whose new department headquarters is in the adjoining ISC 1. ISC 1 is new construction that opened last summer.

In late April, there was still some unpacking and setting up going on, but actual science was going on in most of the labs. The biologists had moved over from Millington Hall, as had most of the psychologists. The departments aren't 100 percent consolidated, though; there are a few psych people left in the Bell Building and some biologists remain in Millington. In the ISC 2, much of the talk in both departments had to do with how much better things were.

"This is a nice, big open space," psychologist Peter Vishton said, looking around his new facility. Vishton, who moved his lab over from cramped quarters in the basement of the Bell Building, works on studies involving visually controlled actions, especially in infants. "The parents will be more comfortable; that will make the babies more comfortable—and that will give us better data."

Joseph Galano, meeting with a graduate student ("For the first time, we have a window!"), said he usually works with seven or eight undergraduate students, researching prevention of child abuse and neglect, often in partnership with the group Prevent Child Abuse Virginia.

"I'm very fortunate here at William and Mary to have wonderful undergraduate students," Galano said. "We used to work in a closet; now we have a wonderful research space."

Constance Pilkington, psychology chair, paused outside the department conference room where a group was assembling to hear a senior's honors project presentation.

"Our new seminar rooms provide us with a lot more space to host invited speakers and to have research meetings," Pilkington said.

The ISC 2 benefits go beyond better, more pleasant and more convenient work spaces. Like the adjoining first phase of the Integrated Science Center, the ISC 2 was built with the needs of the scientists in mind. The psychologists, for example, now have a dedicated computer-driven research lab, no longer having to make do with a patched-together collection of machines.

"Computers are our microscopes and our test tubes," Pilkington said. "I know everyone uses computers, but we use computers to collect so much of our data. Using a computer, we can get reaction time and that tells us all sorts of things about what goes on in the brain. We collect physiological data and that tells us about your emotional state."

The psych department's new computer infrastructure even extends to a pair of Faraday chambers, electrically shielded booths that allow researchers in the EEG lab to get better data when they monitor brain activity in human subjects.

"Right now these fluorescents are flickering at 60 hertz—that's 60 times a second," Assistant Professor Paul Kieffaber explained. "All the outlets in the walls, they are pulsating with alternating current. All of this creates electrical noise. The sensors that we use to record brain activity are so sensitive that they pick up on all this kind of environmental noise; in fact that noise is much louder than the kind of activity that we're able to record at the surface of the scalp."

Kieffaber said until the Faraday chambers were installed, researchers used software to filter out the electrical noise. "It's easy. And," he said, "it distorts your data." Pilkington said that the shielded booths are almost never seen in a school the size of William & Mary, but will be valuable for a large part of the psychology faculty.

"The cool thing about this is we've got cognitive psychologists, clinical psychologists, social psychologists, pretty much the whole spectrum of psychology can come in here and do brain recording," she said.

Like the EEG lab, Pilkington said the department's new dyadic interaction lab will see wide use. A suite of four interaction rooms are connected to an observation room by video as well as two-way mirrors.

"Because we have these four rooms in the suite, we can have people interacting together, then break them out into separate rooms," Pilkington said. "We can watch everything that's going on from the central control room."

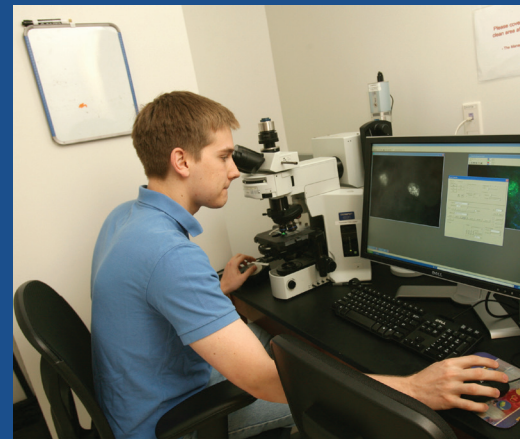
On the second floor, a similar metamorphosis was underway in biology labs.

"It's bright, it's open. It's a great place to be. This is really a great change," said Matt Wawersik, a biologist who works with stem cells in fruit flies. "We have our own microscope room. Before, we just had this makeshift shell that was really a box we went into. We have the rooms across the way that are colloquium space that we can meet for teaching and for lunches or lab meetings."

Opening of the Integrated Science Center Phase 2 is the latest milestone in the development of a science precinct at William & Mary. The first phase of the ISC opened for business in summer of 2008. Taken together, ISC 1 and 2 provide a total of 70 teaching and research laboratories (plus faculty offices and support facilities) for the departments of chemistry, biology and psychology. Plans are being developed for the third phase of the Integrated Science Center. [i](#)



Peter Vishton works with a group of students in one of the new computer facilities in the ISC 2. One of the 16 psychology laboratories in the Integrated Science Center complex is a dedicated computer lab. Department Chair Constance Pilkington says, "I know everybody uses computers, but for psychologists, they really are our test tubes. We really wouldn't be able to collect the data that we're collecting without them."



Dan Zabransky '09 uses the confocal microscope in Matthew Wawersik's lab. "Having this home for our own little confocal is just a phenomenal thing. The advantage is that it allows you to take thin sections of tissues—less than a micrometer—optically," Wawersik said. The instrument was purchased with a combination of funds from Arts & Sciences and the National Science Foundation.



"This thing was my answer to lack of a window in my lab," Matt Wawersik says, gesturing to the large monitor on the wall. "This is a great teaching tool." Wawersik studies the genetics of stem cells in fruit flies, inducing mutation to identify the cause of change in individual stem cells. His work has implications for human health issues ranging from fertility to cancer: "There's a cancer stem cell hypothesis that basically says that the hardest to treat cancers actually have cancer stem cells at the root of them—stem cells that have transformed into a cancer cell."



Constance Pilkington, chair of the psychology department, takes notes from the observation room in the dyadic interaction suite. Dyads—pairs of people—can be studied either through the two-way mirror or by video. The observation room controls four encounter rooms. Pilkington said the dyad suite will be used by social psychologists, personality psychologists, clinical psychologists and development psychologists.



Paul Kieffaber, assistant professor of psychology, shows off one of the Faraday chambers in the department's EEG lab. "We have two different booths where we can run," Kieffaber said. "We just pop them in a chair, put a cap on their heads and start recording their brain waves." The Faraday chambers provide isolation from "noise" coming from lights and electrical sources.



Joseph Galano, associate professor, meets with Carla Correia, first-year Psy.D. student. Galano conducts research on the prevention of child abuse and neglect, often involving students in his work. Correia is the graduate student representative on the Prevention and Promotion Advisory Council to the State Department of Mental Health.

Lisa Bateman '09 stands behind the podium with advisor Janice Zeman, associate professor of psychology, as she begins to present her senior honors defense. The department has between 250 and 300 majors each year, more than 100 of whom are involved in research with faculty mentors at any given moment. This year, 18 seniors will present honors theses in psychology. Bateman's work is on children's emotional expression.



Karl Mendoza, a master's student in biology, works on neural anatomy in the lab of John Griffin, Class of 2012 Associate Professor of Biology and director of the neuroscience program. The two are working to perfect a gold nanoprobe staining system designed by Mendoza. Adapting a probe used in cancer treatment, their aim is to develop a tool to label specific individual neurons. "The goal is that we'll be able to go back and record from those cells, so we'll be able to trace where they connect to and we'll know their physiology," Griffin said.

ECO FASHION

by Lillian Stevens

Regina Root looks into exactly why green will be the new black next year...and the year after



Regina Root (right) and Tonya Boone share a nature-inspired wrap that combines traditional *fuxico* emblems in a variety of textures.

Cindy Baker

“Some view ‘sustainable fashion’ as the ultimate paradox. Sustainability aspires to preserve the environment for future generations. Fashion, on the other hand, is constantly in flux and has long represented luxury and waste,” says Regina Root.

Root is associate professor of Hispanic studies at the College of William and Mary and also teaches courses on environmental and material culture. She is making a name for herself in the world of ecofashion academics, first as the editor of a special ecofashion-themed issue of *Fashion Theory*.

“*Fashion Theory* is one of the world’s leading sources for the field of fashion studies,” says Root, “so it was also a little intimidating to know that this volume was going to help define the role of sustainability as a category for analysis in fashion studies.”

The ideas that constitute ecofashion include attention to sustainable textiles or other materials, the emphasis on living wages for workers, the integration of local forms of knowledge into the design process and the terms of consumption—all in the service of personal expression.

Following the UK publication of *Fashion Theory*—a U.S. edition appeared three months later—colleagues at the London College of Fashion, along with an academic publisher, invited Root to co-edit a forthcoming international professional handbook. This work will outline the field of fashion studies, particularly as they relate to sustainability issues in a globalized world.

The ecofashion concept begins with the realization that we are, indeed, what we wear. But we’re also how it was made and how long we wear it.

“Dress is a powerful cultural tool that conveys meaning,” Root explained. “We have opportunities to behave sustainably on any given day. We define ourselves through the clothes we wear and when we opt for disposable clothing, we all pay the price.”

Increasingly eco-savvy consumers

Consumers are increasingly eco-savvy about the choices they make and how they spend their clothing dollars. Designers and the fashion industry at large are paying attention.

“Designers are pushed by consumers,” says Root. “The multi-billion-dollar fashion industry employs some 26.5 million people worldwide. Some think of fashion as haute couture—and it can be—but it can also be about change and innovation and renovation.”

In recent years, the visibility of ecofashion has been raised through various initiatives, including the United Nations’ Environmental Program, which promotes “cool green lifestyles that do not strain the planet or exploit people.”

“The idea is to educate the world about the impact of our lifestyles and consumption practices in particular,” says Root.

The choices are not always easy and rarely clear-cut. For instance, consider cotton. This natural fiber, the basis of denim and T-shirts, remains a popular fabric choice. Root pointed out that Europe and the United States consume almost half of the world’s cotton and also subsidize cotton production to keep clothing prices low.

“Interest in organic cotton is growing exponentially, in part due to an awareness of the effects of the pesticides used to grow conventional cotton, which deplete soil and can devastate the health of agricultural workers,” Root said.

But, for the ecofashionista, wearing organic cotton is neither a no-brainer nor a slam-dunk. First, there’s a little matter of supply and demand: “There is simply not enough organic cotton to satisfy the demand for the fiber,” she says.

Organic isn’t necessarily better

“Moreover, when you factor in the manufacturing and dyeing process, some scholars argue that the entire life cycle of organic cotton may not be any more sustainable than its conventional counterpart,” Root explained. “So it’s important to remember that there are plenty of alternatives to cotton. We need to educate ourselves.”

Social and political forces shape culture; fashion is no exception. Root believes that the flows of international tourism and globalization have made it all the more necessary for design to be relevant to the communities it represents and serves. In short, sustainable communities produce sustainable clothes—and a community is sustained when its workers earn living wages. “In Latin American design today, we are see-

Professor Root’s Ecofashion Do’s and Don’t’s

DO...

...educate yourself.

The label might say it’s organic and eco-friendly, but was it made in a sweatshop?

...follow a garment’s life cycle—from inception to finish.

When engaging the process, find out all you can about the materials used to create your garment, the people involved in its manufacture and how you might recycle it when you are finished wearing it.

...recreate an old garment.

Why give up an article of clothing when you can reuse the collar or sleeves and create something new? Repairs can be decorative or functional, so go ahead and “upcycle” those old clothes.

...buy second-hand. Or try ‘swishing.’

Consumerism is so out. Invite your friends to a “swish” party and swap usable clothes and accessories.

...avoid garments that need dry cleaning.

Enough said.

...redefine clean. Embrace wrinkles!

The consumer-use phase of everyday clothes often impacts the environment much more than the pre-consumer phase. Be sensible about what gets tossed into the hamper. Wash clothes with cold water, air dry or tumble warm. Forget your iron ever existed.

DON’T...

...get distracted by trends.

Shop as if buying heirlooms for future generations.

...think that all fibers are the same.

Organic alternatives are usually best, but do your homework. *Ecofashion* reveals that bamboo fabrics sold as “natural” sustainable alternatives sometimes were processed in the same ways as the most polluting fibers, like viscose rayon. Technological advances are quite fashion-forward these days: There are human-made, biodegradable fabrics that feel as soft to the skin as natural fibers.

...buy clothing colored with synthetic dyes.

Synthetic dyes can produce environmental disasters, both in their production and application. Be aware, too, that some natural dyes get sourced from unsustainable resources or are used along with toxic chemicals for setting the color.

...throw away old clothes.

The average American consumes 70 pounds of textiles annually. Most of this ends up in landfills. Consider recycling or donating the clothes, accessories and shoes that you no longer wish to keep.

...obsess about mistakes.

We all learn from them. Artistic and scientific innovations respond to them. Rise to the ethical fashion challenge—use your creative agency to experiment with passion and purpose.

ing a pronounced focus on the people involved in the manufacturing process,” Root explained. “This, in turn, has changed the whole sense of a designer’s authority and vision—and sometimes even the outcome of the final product.”

A prime example involves Brazilian designer Carlos Miele, who has collaborated with a

women’s cooperative from Latin America’s largest shantytown, Rocinha, on the outskirts of Rio de Janeiro. The Rocinha Cooperative of Women’s Artisans and Seamstresses, or COOPA-ROCA, was initially founded in the 1980s by Brazilian sociologist Maria Teresa Leal. Women in the

continued on page 10

ECOFASHION

continued from page 9

shantytowns, many of whom are skilled seamstresses, have always gathered to sew together, often making *fluxico* garments from textile scraps, a tradition with a deep cultural history in Brazil.

Fluxico is a lovely way to work with and recycle pieces of fabric that might get thrown away otherwise. These cloth rosettes might be called “yo-yos” by U.S. quilters or clothiers. Like quilt squares, *fluxico* rounds are sewed individually, then pieced together. The name comes from the verb *fluxicar*—to gossip—which is what often happens when you sit around a table in this Brazilian version of a quilting bee. During his early work with the Rocinha Cooperative, Carlos Miele received a UN Development Grant.

“He worked closely with members of the cooperative to produce haute couture to the high-precision industry standard, ensuring living wages and thereby elevating them from poverty,” says Root. “In essence, the project has helped create the antithesis of the multinational sweatshop. Today, the cooperative works with other prominent designers and labels throughout the world and truly serves as a model for what can happen when you have a greater sense of interconnectedness.”

No longer just about the designer

Of particular interest to Root is how the process tells a story about the relationship between the *fluxico* seamstresses and the design itself. On ecofashion catwalks, it’s no longer all about the designer. Materials, method of construction and other sustainability concerns also carry value. So a Carlos Miele garment produced by the cooperative carries an additional provenance that is interwoven with the “designer” label.

“This is what the industry often calls added value,” she said. “From my perspective, eco-fashion’s greatest potential lies in its ability to inspire creative agency. Fashion can re-articulate the past, empower certain sectors of the population, enact change and produce cultural meaning. Ecofashion also provides a powerful response to the environmental crisis.”

In 2004 when Root proposed the concept of “ecofashion” to Berg Publishers, she stressed that the goal was to bridge disciplines and represent various world culture regions for the emerging field of sustainable-fashion studies.

The resulting work outlined some of the problems in the worldwide fashion industry. Root noted that “big fashion” employs tens of millions of people—many of whom do not receive living wages. The industry also has a snowshoe-sized carbon footprint: Fashion still relies on dangerous chemicals to produce textiles for clothing and further exhausts limited fossil fuels to sustain its supply chains.

“The impact on climate change is undoubtedly significant,” Root says. In addition, fashion also promotes excessive consumption, she noted.

Business and supply chain models

Last year, Root began to collaborate with associate professor Tonya Boone from the Mason School of Business, an expert in sustainable operations and supply chain management. Their work links business and supply chain models to the processes for creating sustainable fashion. This includes an examination of the role of international agencies such as the United Nations and non-governmental organizations like Raíz Diseño, a transnational network of Latin American designers who view design as a useful tool in the struggle to acquire voice, power and market share in the international marketplace.

“I think that we will see the interest in sustainable fashion grow as more consumers in general become engaged around these issues,” says Boone. “Research suggests that while many consumers want sustainable goods, they are often not willing to pay premium prices for them. Still, I’ve seen estimates that indicate around 20 percent of the U.S. public are actively engaged in sustainable issues. This represents a considerable market segment.”

Boone predicted that as sustainable fashion supports consumers’ self-vision and self-expression, they will seek out sustainable fashions. “We plan to develop models of the sustainable design process, and then examine their effect on the fashion supply chain,” she said.

“There’s also a lot that the average consumer can do to behave more sustainably,” says Root. “The research shows that the most unsustainable stage of a garment’s life is actually while the consumer uses it. Washing, drying and ironing clothes takes a lot of energy. In response, some designers are engaging new technologies to manufacture clothing that is stain- and odor-resistant, so that we wash them less. There are also designers introducing clothing that can be reconfigured if it tears or has a stain. Choosing washable fabrics over those which must be dry-cleaned is also a fairly inexpensive step in the right direction.”

Boone said it’s not clear what effect the economy will have on the sustainable clothing segment of the apparel industry.

“On the consumer side, there are low-cost fashion and apparel products that have adopted environmental management systems. Right now it just looks like consumers have dramatically reduced spending,” says Boone. “On the business side, companies with sound strategies are more likely to weather the downturn and more likely to continue to support sustainability initiatives. Sustainability is compelling more companies to be more creative and resourceful. A lot of businesses are discovering that sustainability not only provides them with marketplace advantages, but more importantly, with operational opportunities.”

Several companies are discovering what Boone described as “powerful synergies” among environmental concerns and product quality and lean management systems. “For example, as a part of their sustainability strategy, Central Textiles—a supplier to the fashion industry, used quality management tools to simultaneously improve quality and reduce waste, which has reduced their costs and environmental impact.”

A multinational problem

Probably the biggest challenge to any fashion trend is the multinational nature of the fashion supply chain. Many of the fashion production processes take place around the globe. Uniting suppliers and subcontractors from dozens of different countries around sustainability initiatives is a challenge, Boone said.

“Nonetheless, some of the largest fashion, textile and apparel firms are committed to sustainability’s core values and we should continue to see changes in production processes and supply networks that improve environmental performance,” she added.

Ecofashion concepts are already moving from the designer-label world into the environmentally more important ready-to-wear arena. On the horizon, Root predicts better and more international labeling—not unlike nutritional labeling on grocery store items—on garments.

“Some companies already provide this information, such as Patagonia’s ‘Footprint Chronicles.’ Patagonia has truly led by example, having switched from virgin to recycled polyester and from conventional to organic cotton well over a decade ago,” Root said. “They map out every aspect of their lines, starting from the

fleece made from a PET plastic bottle or the cotton seed. Consumers can even return their products when they are done using them. This all then gets recycled into the next line of clothing. It’s quite remarkable.”

Not all designers or companies provide this kind of information, however. There is, quite likely, change on the horizon for the eco-conscious clothes shopper.

“When it comes to fashion, we now have several countries working towards international standards to certify what constitutes organic, fair trade, ethical and sustainable,” says Root. “Sustainable fashion continues to articulate new relationships to material culture. In fashion this means that the entire creative process is changing, with more designers recognizing the significance of their role as facilitators to a larger production process that will require sustainable materials and sustained livelihoods for the people involved.”

Ecofashion in the classroom

This fall, Root will import her ecofashion research into the classroom, as she will lead a freshman seminar on ethical fashion through the Sharpe Community Scholars Program, a William & Mary service-learning-based program. The course will focus on Latin American fiction, essays, photography and documentary films including *Ropa Americana* (American Clothes), which follows what happens to an old purple T-shirt after it doesn’t sell at Goodwill.

The film will highlight the transnational scope of the textile trade. Root said her seminar also will explore gender and labor practices in the maquila industry, the assembly plants in free trade



Carlos Miele’s signature use of transparent and flowing silk chiffon is evident in this mustard blouse worn by Katherine McCarney ’10.

zones that provide much of the cheap clothing to the United States market. “Clothing produced at a sweatshop comes at a hefty human and environmental price,” she said. “I know that the Sharpe Scholars will bring fresh perspectives to the field when we address these questions.” **1**

WHAT’S SO ‘ECO’ ABOUT THESE FASHIONS?

It’s not always a simple question. Regina Root points out that when it comes to sustainable fashion, there are a variety of labels, certifications and standards. But, by any reasonable standard, the three pieces shown on pages 10 and 11, on loan from Brazilian designer Carlos Miele, make the grade. Here are Root’s remarks:

- **The studio.** “Miele’s work has been showcased on the Ethical Fashion Forum and is regularly recognized as an example of best practices in ecological and social responsibility.”
- **Material.** “Miele is known for purchasing organic materials from companies that engage ethical and fair trade practices. The dyes he uses are described as eco-friendly in some reports, although I do not have the specifics on these particular garments.”
- **Construction.** “Ecofashion inspires local connections that contribute to social change and environmental stability. These particular garments exemplify a

design process that has brought into dialogue an emblem of cultural identity, specifically the *fluxico* from northern Brazil, and ethical labor practices. The *fluxico* for Miele’s collections are fashioned from old fabric swatches. The Rocinha Cooperative of Women’s Artisans and Seamstresses—which currently numbers about 150—helped create these garments by hand.”

“These garments are examples of what scholars call ‘slow fashion.’ Their creation involves a meaningful process focused on preserving the environment and the dignity of workers. For these reasons, I think they make the cut,” Root said.



Cindy Baker



Hispanic studies/international relations major Kendall Simmons '09 wears a strapless pewter dress of silk *fluxico* that grow as they reach the earth.



This strapless raspberry dress of champagne silk, modeled by psychology graduate student Kristin Reardon, ends with a glamorous train.

by Erin Zagursky

Sharpe scholars walk into an old building, walk out with a cache of lost documents

Without so much as a map or an “X” to mark the spot, a group of Sharpe Scholars uncovered a historical treasure.

Their find will shed new light on the lives of early 20th-Century African Americans.

The group discovered a cache of original documents related to the life and work of Maggie L. Walker, the first female to found a bank in the United States and a “womanist” who worked tirelessly to improve the lives of other

“When you have these all together, it gives you a fabulous film over time of how people were living and dying in this area,” said Heather Huyck, an adjunct associate professor at William & Mary. “It’s a really fascinating treasure for historians and for the general public. It will help us better understand all American history.”

Third year of a freshman seminar

The discovery comes three years after Huyck, a former National Park Service employee, began teaching a freshman seminar on the St. Luke Building and its historical context. The seminar is part of the College’s Sharpe Community Scholars Program. The program takes freshmen, teaches them about community issues and then asks the students to address those issues through student-generated projects.

Huyck began teaching the seminar in hope of

bers in 24 states and provided professional jobs for African American women and safe meeting places for African Americans “in the middle of Jim Crow, which sought to thwart their aspirations in every way it could,” said Huyck.

Walker’s home, at 10½ E. Leigh Street in Richmond, is a National Historic Site administered by the National Park Service, but the four-story St. Luke Building, boarded up and vacant, has been largely ignored. Huyck and her students have been trying to change the building’s status by working toward getting the site designated as a National Historic Landmark.

With permission from the Stallings family, which owns the building, Huyck’s students have been inside St. Luke’s before. However, because it is vacant and deteriorated, they had not done much exploring. Huyck knew there

stairway and look at the attic. At first, they saw some old props and an aisle seat from the building’s original center auditorium. They also saw boxes full of documents from when the building housed a daycare in the 1970s. As they continued to explore the space by the light of their flashlights, a cell phone and a light for their video camera, one student picked up a piece of paper that would change everything.

It was a 1930s “death card”—an insurance card that recorded someone’s death and the related payout information.

“We got really excited, and we started moving boxes out of the way and picking up stuff,” said Amy Clinger ’11, a Sharpe Fellow who was leading the group of students that day.

When the students began moving aside the boxes of 1970s documents, they revealed stacks

various other documents from the businesses that once existed in the building.

“It was like a big treasure hunt,” said Clinger. “We were excited—very, very excited. We were on a high all day long.”

A renegotiated dinner

Huyck had told the students to let her know when they were done in the building that day. She was shopping with her husband when her cell phone rang.

“It was a delirious Amy and I could hear all this giggling in the back,” said Huyck. “I had lightly said to them if anybody finds another copy of the *St. Luke Herald*, I would take them to dinner at the Williamsburg Inn. This was a mistake. I had to renegotiate that dinner—it’ll be at our house instead.”

With the permission of Stallings, the students removed six boxes of documents from the building that first day. Stallings stored those documents in another one of his buildings, and the students took a few samples back to Williamsburg to show Huyck. She immediately realized how much the documents could tell about African American women’s lives.

Later that week, the students returned with Huyck and several National Park Service employees to remove the rest of the documents from the attic. Altogether, the students carried out 31 boxes.

Once they were all removed, the group had to decide what to do with them. That process showed the students about doing history work in “real time,” said Huyck.

“They’ve been in an attic for 80 years, with zero climate control and zero security, but somebody had carefully placed the St. Luke documents under the newer papers

to protect them and had carried all those boxes up the stairs,” said Huyck. “They go from non-existent to being sacrosanct, and we’re trying to figure out how to make that transition. We want to do what’s best for the documents and for the students’ education. The students found these documents!”

Finally, it was decided that the documents would be given to the National Park Service, but the students would get them for about a year to copy and catalog them. Because the papers have been in the attic for decades, they are covered with soot and dust. With training from the park service, the students began using a lab at William & Mary to do their work in April. Because of the number of documents, which are being

stored in the Swem Library’s Special Collections Research Center, the students believe the work will continue through next semester.

Serendipitously, most of the six students who made the discovery are part of the seminar’s document team. The other two teams include one that is enhancing the Maggie Walker National Historic web site and another that is producing a folder on the St. Luke Building. Originally, the document team was hoping to, at best, find old newspaper clippings and documents from members of the community.

“This is the kind of stuff we thought we’d never find, or we thought we’d find like one letter,” said Clinger. “But instead we found something much more important.”

Documents of a rare type

Huyck said the documents hold a wealth of information for both the students and other historians to explore.

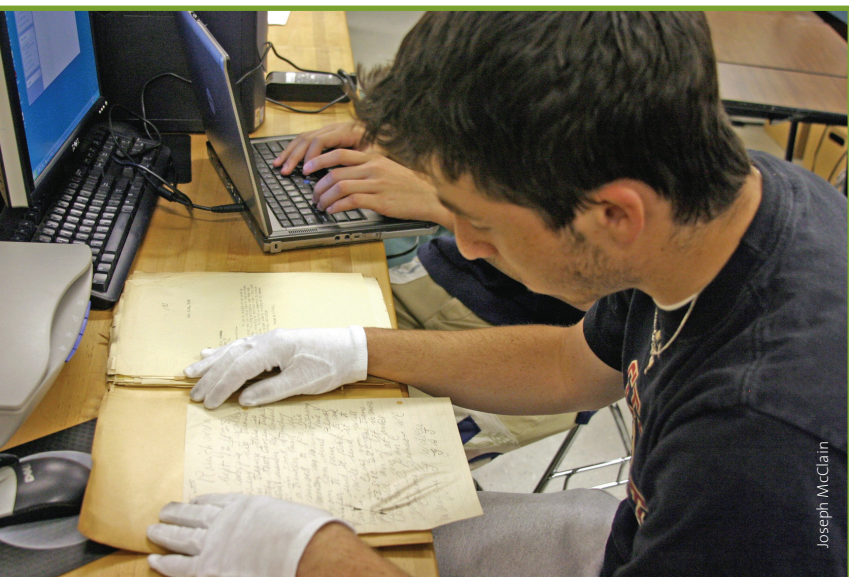
“It has incredible research value. African American women’s history is one of the toughest fields in terms of records,” said Huyck. “These people were poor; many of them had been enslaved.”

As the Sharpe seminar starts cataloguing and copying the documents, it becomes clear that the find will illuminate scholars’ understanding of life under Jim Crow. Correspondence to Maggie Walker—as well as copies of letters she sent out—will show the links the St. Luke organization had with other social and political organizations. The paperwork of the insurance arm of the order reveals data of a more personal nature.

“It tells us how people died. It tells us where people actually were. It tells us how everything actually worked,” Huyck said.

Clinger said that going through the documents—seeing the information on the death cards and letters signed by Maggie Walker—has helped her and the other students see the personal aspects of both Walker’s life and her businesses.

“I know history can be kind of boring to people sometimes,” she said. “But this brought a sense of adventure for the students. History can be exciting, not just in researching it but in these kinds of finds and processing them and getting to know this historical figure as a person—someone who did write letters, someone who signed her letters, sealed them and worked with these people that were going through these really difficult times.” **i**



Sharpe Seminar Program student Ian Garbarine '12 uses white gloves and a light touch to prepare for scanning one of the scores of recovered historic documents from the operations of the Independent Order of St. Luke.



Sometimes a glove must come off, as when Sharpe Fellow Amy Nicole Clinger '11 encounters a stubborn paper nail holding together some correspondence from Maggie Walker's files.



Heather Huyck watches as Jacquie Miles '12 opens a folder. The students will spend the summer cataloguing and copying the historic documents.

The students were exploring the attic of a building in Richmond when they came across piles of 1920s and '30s documents associated with the Independent Order of St. Luke, an organization led by Maggie Walker that was dedicated to helping improve the lives of African Americans during the Jim Crow era. The documents include letters from Walker, insurance papers and rare copies of the organization’s newspaper, doubling the number known to exist.

preserving the St. Luke Building just off of I-95 in downtown Richmond. During the early 20th Century the building served as an economic powerhouse in the Jackson Ward community. Through the Independent Order of St. Luke, Maggie Walker used her entrepreneurial skills to fill needs otherwise denied to African Americans during that era, creating insurance, a bank and a newspaper—the tools and institutions that helped people be middle class,” Huyck said. Under Walker’s 35 years of leadership, the order grew to include more than 100,000 mem-

were boxes in the attic; however, she had never been up to investigate them herself.

‘Just doing a video’

At the end of February 2009, a group of Huyck’s students were in the St. Luke Building with Ron Stallings as he gave an oral history.

“We were just doing a video of the owner walking through the building,” Lindsey Nicolai '12 said. “Mr. Stallings said, ‘You know, I’ve never been up to the attic yet.’”

So everyone decided to climb the narrow

of papers from the 1920s and '30s.

“At that moment, my first thought was one of disbelief,” Nicolai said. “After we had learned that many people thought these documents were lost forever, I thought it impossible that we had discovered even a few of those long-lost documents.”

Among their findings, the students discovered four copies of the *St. Luke Herald*. Previously, only four were known to be in existence. They also discovered stacks of the death cards, letters from Walker to other organizations and

by Joseph McClain

Discovery of a new bacteriophage means Crim Dell isn't just for photos anymore

It's a new form of life. It was discovered by a lab full of freshmen... and it came out of Crim Dell. The organism, a strain of bacteriophage, was found in the muck at the edge of Crim Dell, so the students agreed to name it CrimD. It's undoubtedly the only new form of life to be discovered at a campus landmark.

The discovery was part of a project sponsored by the Science Education Alliance of the Howard Hughes Medical Institute. The HHMI initiative organized freshmen at 12 select colleges into two-semester research courses on the genetics of bacteriophages—or just plain phages—which are viruses that infect bacteria. The lead scientists in this research-oriented lab are Margaret Saha, Mark Forsyth and Kurt Williamson, all faculty in the biology department.

Bacteriophages are one of the hottest topics in biomedical and clinical research circles. These bacteria-attacking viruses show immense potential as alternatives to antibiotics.

"This sort of discovery could lead to possible therapies," Saha said, "particularly for tuberculosis."

It gets even better

There's even more to the CrimD discovery. As the phage lab begins to examine individual genes of CrimD, the participants are finding genes that have never been found before in any virus.

"Some of these genes are clearly much more closely related to bacterial genes than viral genes," Forsyth said. "This has led to some wonderful student hypotheses on the acquisition of host genes during the infectious process.

Finding new genes in a genome this small really underscores a major point of a study like this—the genetic diversity that exists in the world surrounding us must be unfathomable. It's hard to imagine how many novel genes must be out there just waiting to be examined."

It all began in the dirt and mud near Crim Dell, just a stone's throw from the new Integrated Science Center. The students collected soil samples in the fall semester of 2008. Then, they walked back to the ISC to execute state-of-the-art lab techniques to isolate phages and prepare the phage DNA for sequencing—or genetic blueprinting—at Los Alamos National Laboratory.

Preliminary results from Los Alamos indicated that CrimD was a novel virus strain, previously unrecorded—but nobody could be sure. Forsyth said in January that the Los Alamos findings were "what's known as a draft." He explained that the draft contained all the units of the CrimD genome in three contiguous parts. An organism's genome contains the order in which the four building blocks of DNA—adenine, thymine, cytosine and guanine—are arranged in couplets known as base pairs, which make up the rungs of the spiral DNA ladder.

CrimD, with 59,798 base pairs, has a small

genome. By comparison, Forsyth said the specific bacterium that CrimD infects has four million base pairs. The human genome consists of some three billion base pairs.

Filling in the genomic gaps

As the second semester started, the lab began using a number of sophisticated bioinformatics techniques to verify their discovery, filling in gaps of the Los Alamos sequencing, and examining CrimD's individual genes.

"One of the first things the students did was to analyze the data to identify weak spots," Williamson said. "In other words, there are points in this genome that have been sequenced a fewer number of times. Typically you want '8x coverage,' so each region of the genome is sequenced eight times and at least seven of those eight times need to agree."

The students used various techniques to get the CrimD genome in proper order and to address CrimD's weak spots, segments of 300 to 400 base pairs that didn't make the 8x cut at Los Alamos. The weak segments were examined using techniques such as the polymerase

chain reaction, a DNA amplification tool common in molecular biology labs. All members of the phage seminar learned to use state-of-the-art bioinformatics software supplied through HHMI to process the CrimD genome *in silico*.

"There's *in vivo* and *in vitro*, which everybody knows," Saha explained. "*In silico* is becoming much more commonly used to describe things done on a silicon chip in a computer, rather than at the lab bench." Saha said that the sheer amount of data in even small virus-sized genomes such as CrimD make *in silico* bioinformatics techniques necessary in today's research labs.

"You absolutely need computer computational power to analyze and make sense of these hundreds of thousands of bases and how they fit together or don't fit together to make up proteins and form genes," she said. "This can't be done easily by the human mind, but the computer programs make all the possible combinations and come up with the best series of alignments. This happens in microseconds. Then, of course, we have to curate that and look at it to make sure it makes biological sense."

'CrimD is cool!'

Between January and mid-March, the phage lab was able to establish CrimD's singular pedigree, although no one realized the particular point at which "looking good" had solidified into a certainty.

Looking (in vain) for eureka

"The problem with science is that there's rarely this 'eureka' moment," Saha said. "It's gradual. By the time you get to what should be your eureka, you realize that there was no one moment where you don't know, then one where you do know."

Even if the scientists can't always recognize the eureka moment, they do know that they have passed it.

"Oh, it's a new virus all right," Forsyth said. "In fact, it is not falling into any of the known clusters of the viruses that infect this species of bacterium."

In late March, the phage lab hosted a gathering of other freshman phage labs, which included a visit from Graham Hatfull of the University of Pittsburgh, HHMI's lead scientist on the project, and his staff. Hatfull's people took an immediate interest in the William & Mary phage.

"CrimD," one of them said, "is cool!" 



Freshmen in the phage seminar have excellent mentors in the form of Kurt Williamson and also Mark Forsyth (left) and Margaret Saha, who are helping Kasi Hartman with a preparation early in the process.



Students in the HHMI bacteriophage seminar learn a range of scientific techniques and practices, beginning with the importance of marking the site of a field sample and continuing through bioinformatics.



At Crim Dell, Sam Harvey and Kasi Hartman take samples of soil and muck. Soil sampling was the low-tech beginning of a process that included state-of-the-art techniques such as DNA sequencing.



Phage hunters (from left) Shartania Askew, Carolina Ruiz and Alexandra Nunes go through the process necessary to isolate bacteriophage from soil samples taken from various campus sites.

waiting for the **WORD**

Anthologist hopes ‘appetizer’ booklets spur demand for book

Henry Hart nods wryly at the paper-clamp-studded stack of manila folders, nearly a foot thick, sitting on the floor of his Tucker Hall office.

by Joseph McClain

“That’s all of it, down there,” he said. “The anthology is supposed to be about 1,200 pages long. That’s the whole manuscript, with my introductions, photocopies of different texts—plays, poems, short stories, essays and whatnot.”

The manuscript represents an anthology of American literature following World War II—and also more than two years of work for Hart, professor of English at William & Mary. His manuscript is the last in an omnibus series

of five volumes that together were to comprise the *Thomson Anthology of American Literature*. Publication of the entire anthology is being held in abeyance in the wake of a series of corporate takeovers in the publishing world. “Thomson was sold. Another division, Wadsworth, took it over,” Hart explained, and so the *Thomson Anthology* simply became the *Wadsworth Anthology*. “The anthology was supposed to be published in 2008. But then we found out the umbrella company, Cengage—which owns Wadsworth—had just bought the college division of the publishing company Houghton Mifflin.”

Watching the anthology market

At the time of the acquisition, Houghton Mifflin was just coming out with a new edition of the *Heath Anthology of American Literature*. “As a result, Cengage told Wadsworth that it couldn’t come out with our anthology,” he said. “I think Cengage believed that two anthologies would overload the market.”

But the project is not quite dead. Hart has sent photocopies of his foot-high manuscript off for typesetting: “They hired typists to type all of that stuff into computers,” he said. “I assume that my volume, along with all the other volumes, are in computers, waiting to be published.”

To keep the project alive, Hart said the director of the Wadsworth team came up with an idea to use an organizational element of the anthology as a marketing device. Early in the process, the general editor of the anthology, Jay Parini of Middlebury College, suggested that the anthologists take dead aim at the needs of literature instructors by preparing thematic sections.

“Jay basically started off by saying that we should have anthologies that collect a lot of the important texts from the different periods, and that we should also have sections that are organized around topics that professors and students like to discuss in class,” Hart said. “These are the hot-button topics: gender, race, religion and spirituality, war and violence, that sort of thing. We thought that professors could go right to those sections and use those sections in class discussions.”

Set out the hors d'oeuvres

While the anthology team was waiting for the corporate go-ahead for the whole project, they decided to put out a series of booklets centered around the thematic sections. Hart said the idea

was for the booklets to serve as “appetizers,” with hopes that they would whet the academic market’s appetite and nudge the anthology closer to publication.

The *Wadsworth Themes in American Literature Series* includes five pamphlets extracted from Hart’s post-World War II volume. Their titles are:

- *Race and Ethnicity in the Melting Pot*
- *Class Conflicts and the American Dream*
- *Exploring Gender and Sexual Norms*
- *Witnessing War*
- *Religion and Spirituality*

Each pamphlet is about 70 pages; each contains 10 or so short works or excerpts. There is also a common preface, giving an overview of the entire series of 21 booklets. Hart has written an introduction to each booklet, beginning the thematic exploration that will be fleshed out in papers and class discussion.

Not just poems and short stories

Many of the texts Hart chose for the booklets (and in the anthology) are not necessarily “literary” in nature and include essays, speeches and even journalism. Martin Luther King’s “I Have a Dream” speech is included, as is “The Ballot or the Bullet” speech from Malcolm X. Novelist Gore Vidal is represented by his anti-anti-gay/anti-anti-Semitic nonfiction essay “Pink Triangle and Yellow Star.” Gonzo journalist Hunter S. Thompson makes the cut, with a slice of post-9/11 apocalypticism that includes a phone call from Johnny Depp and a frenzied trip outside the house to fire a shotgun at an almost certainly imaginary intruder near the gas tank. It reads, presciently, like those post-Katrina blog entries.

“That’s what the editors wanted us to include,” Hart said, “not only poems and short stories, but also some chapters of novels, some non-fiction essays.”

Some of Hart’s selections are to be expected—Tim O’Brien is in *Witnessing War* and sections of Robert Bly’s *Iron John* are part of *Exploring Gender and Sexual Norms*—but there are a number of interesting thematic juxtapositions among the booklets. For instance the Martin Luther King and the Malcolm X speeches are in different booklets. The Malcolm X oration is in *Race and Ethnicity in the Melting Pot*; King’s is in *Class Conflicts and the American Dream*.

An eye to on-line

Hart says the booklets are being sold—they’re on Amazon.com—and he has heard from professors who are using them. The booklets are supported by an on-line resource center, accessible though an access code. The Internet is becoming a classroom staple: Hart says that when he calls on a student to read a poem in class, sometimes the student Googles the work on a laptop rather than thumb through a print anthology.

“I also know that printed texts are going the way of the dinosaurs,” he said. “One of

the plans of the publisher is to have an online version of the anthology. Perhaps they won’t go ahead with the print version, but maybe they’ll go ahead with an online version. At this point, I’m really not sure.”

Little to do...but wait

For now, there’s little that Hart can do other than trade snippets of news with the editors of

the other volumes, hope the “appetizer” booklets do their job, and continue to wait for word from the project’s director.

“I really do hope that the anthology will go forward,” Hart said. “But I’m fatalistic about it. Because of the financial crisis, I know that this is a terrible time for the publishing business.” **i**

13 MUSTS

Henry Hart lists 13 works that absolutely, positively should be included in any post-WWII anthology of American literature. (He also explains why one didn’t make it.)

Death of a Salesman. Arthur Miller’s classic play about the tragic consequences of the American dream (and especially the dream of financial success).

“The Quaker Graveyard in Nantucket.” Robert Lowell’s allegorical poem in which Captain Ahab plays the role of a violent America that will stop at nothing to achieve its goals.

“A Good Man is Hard to Find.” Flannery O’Connor’s story set in the South that juxtaposes grace and violent crime.

“Howl.” Allen Ginsberg’s poem about the American counterculture—its visionary quests and mad excesses—before it officially became the counterculture of the 1960s.

“The Swimmer.” John Cheever’s short story that documents the epic journey of a suburban American that turns out to be a kind of alcoholic delusion.

“Daddy.” Sylvia Plath’s playful, but ultimately vociferous assault on the patriarchal tradition represented by her father and her famous husband, Ted Hughes.

“Diving into the Wreck.” Adrienne Rich’s examination of feminine myths, the destruction they have caused in the past, and the need to revise them.

A Streetcar Named Desire. Tennessee Williams’s ferocious drama set in New Orleans that centers on the dreamy, neurotic Blanche DuBois and the hard-hitting, realist Stanley Kowalski. (I included and wrote about this play, and then was told, as I remember, that Norton had the rights to the play and therefore I couldn’t include it. So, instead, I included Williams’s *The Glass Menagerie*.)

“I Have a Dream.” Martin Luther King’s stirring speech that urges all Americans to abide by their country’s foundational principles of freedom and justice for all.

Angels in America. Tony Kushner’s controversial play dealing with AIDS and many other aspects of 1980s America.

“Sonny’s Blues.” James Baldwin story that recounts the different ways two African-American brothers cope with racism.

“The Things They Carried.” Tim O’Brien’s candid story about the realities of the Vietnam War.

“Saint Marie.” Louise Erdrich’s tale of a young woman’s conflict between her Native American community and Christian obsessions.



A manuscript nearly a foot high represents two years of work for anthologist Henry Hart. He usually keeps it, neatly stacked, on the floor.

of five volumes that together were to comprise the *Thomson Anthology of American Literature*. Publication of the entire anthology is being held in abeyance in the wake of a series of corporate takeovers in the publishing world.

“Thomson was sold. Another division, Wad-

every *BREATH* you take

by Joseph McClain

Most of us think of respiration as a two-part process: We breathe in, then breathe out. Christopher Del Negro says that's not how it works.

"Under resting conditions, for most terrestrial mammals including humans, inspiration is the active process and expiration is passive. It's mostly accomplished through passive recoil of the rib cage and the diaphragm," he explained. "The only active part of breathing is the force to inspire, or breathe air in. Under standard conditions, the rhythm of breathing is the rhythm of inspiration."

By the same token, most scientists had thought for years that the rhythm of breathing

is generated by a set of specialized cells, cells with intrinsic rhythmic characteristics. The rhythm of the heart is regulated by such "pace-maker" cells and scientists believed the rhythm of breathing had a similar genesis.

Heart rhythm not a good model

This time, the scientists—or at least most of them—were wrong.

"The heart was the model for how we thought about breathing," Del Negro said. "We disproved that theory in 2002 in a sequence of papers."

Now, Del Negro and his colleagues have identified a promising candidate mechanism for the rhythm underlying respiration. In a paper published recently in the *Proceedings of the National Academies of the Sciences of the USA*, they describe how a comparatively small network of neurons in the brain stem work as a team to generate the rhythm of breathing.

Del Negro, an associate professor in the William & Mary Department of Applied Science, is co-first author on the paper, a culmination of five years of work, both experimental and theoretical. The experimental portions of the project were done in Del Negro's lab and involved several people, including John Hayes. Hayes did his Ph.D. work in the Del Negro lab and is now a post-doc in biology. The theoretical work consisted of mathematical modeling done by Hayes and Jonathan Rubin, a William & Mary math major who graduated in 1991 and is now a faculty member in mathematics at the University of Pittsburgh.

The neural spark plug behind the rhythm that is transferred to the diaphragm and other respiratory infrastructure is an example of a CPG—a central

pattern generator. CPGs are also involved in locomotion and chewing behaviors in humans

and other mammals. Del Negro said the respiratory CPG is a rhythmically active network of neurons located in an area of the brainstem known as the preBötzinger Complex, abbreviated as preBötC.

The preBötC network has two interesting properties. First, there's its size; Del Negro says the network may be as small as 200 neurons.

"We think that that's the lowest possible estimate; it must be at least 200," he said. "Other estimates have been around 1,000. So at this point, our estimate is somewhere between 200 and 1,000 neurons. This is not a large network. I would describe this as the worst possible estimation, except for all the others. We are one of the few groups who have actually taken the risk of saying, in print, how big we think it is."

The second aspect is how Del Negro's group believes the network does its job. Neurons, the nervous system's cellular messengers, can produce "bursts" of activity through specialized proteins known as ion channels. The neurons in the preBötC act in the same way, except they need to cooperate with each other to do their job of "bursting." He said that each neuron can't activate its own ion channels, but needs its neighbor to fire the necessary electrochemical bursts.

"It's as if you had a hundred dollars stapled to your back, so you can't reach it. But you could reach mine and I could reach yours," he explained. "These cells have sets of ion channels that they themselves can't access without synaptic input from a neighbor. So it's only once you connect the network that all the cells can have access to these burst-generating properties."

Labwork combined with modeling

The findings were a result of years of experimental observation coupled with mathematical modeling. In the lab, Del Negro recorded neural activity from the preBötzinger Complex from tissue slices. After enough experimental data are collected, a mathematical model can be constructed.

"Because breathing is so important, the preBötC retains its rhythmicity, even in the very thin specimen slices, which we preserve and look at under the microscope," he explained. "Because it retains its rhythmicity, we can go in with microelectrodes and make recordings from neurons that comprise the preBötC. If we

New research reveals a new paradigm for the neural origins of the rhythm of respiration.

can identify cells that are rhythmically active, we can record them, test them and find out what their properties are like. So on that basis, we can build mathematical models of how they operate."

Reconciling the model with the observed

Jonathan Rubin, at Pitt, took the lead on building the mathematical model, to formulate a theory that would explain and predict the behavior of the data collected in Del Negro's lab.

The interaction of the calcium ebb and flow with the cells in the CPG not only instigate the electrochemical burst that triggers inspiration, but also sows the biochemical seeds to turn the burst off.

"That was the innovative breakthrough," Del Negro said. "The reason we got motivated on this project is that the respiratory system can't be attributed to canonical, classical mechanisms of rhythm generation. This system is different from all the others that we know of."

Del Negro said this concept of collective



Del Negro and Hayes also collaborated with Jonathan Rubin, a mathematician at Pitt.

For a time, Del Negro says, the model was "sort of working, but it really didn't look right." There was a calcium-activated burst of neural activity, but the model fit awkwardly with experimental observations.

It was Hayes who refined the model—and the group's understanding of respiration—rethinking how calcium-activated bursts could start and stop. "Calcium elevates within the cell when the cells communicate with one another," Hayes explained. "But, what happens is the cells get too excited and then consequently they stop communicating very well. So the calcium drops and the bursts end."

network properties that drive rhythmic breathing may serve as a model for understanding the cellular bases of other rhythmic behaviors and functions.

"We believe that the essence of breathing comes from this network in the preBötzinger Complex, which generates the rhythm to inspire. That rhythm then is distributed to the muscle groups, like the diaphragm, that do the dominant work to breathe in. But, it's not just about breathing," he said. "There are so many different mammalian and human behaviors that are rhythmic: locomotion, chewing, swimming, breathing. The preBötzinger Complex provides us a model for us to study them." **1**

IMPORTANT NETWORKING

Lives—and even marriages—could be saved through a better understanding of how a network of cells in the preBötzinger Complex generate the rhythm of respiration.

"In neurodegenerative disorders, and often in elderly populations, cells die one by one through neurodegeneration or as part of the process of aging," Christopher Del Negro explains. "In these cases, people just drop dead in their sleep. You may be losing neurons one at a time in your preBötzinger Complex. If you lose neurons one at a time, you can go for weeks or months at a time, but as soon as you get to the breaking point, you go to sleep and then you die."

Sleep apnea can be a life-threatening condition, although the condition is generally less dire, but those who share a bed with an apnea sufferer (and the characteristic snoring) do plenty of suffering of their own. Del Negro's discovery could lead to relief for sufferers of sleep apnea, as well as for those afflicted with more serious disorders including Alzheimer's, Parkinson's and Lou Gehrig's Disease.

Christopher Del Negro of applied science (left) and biology post-doc John Hayes monitor respiratory function in Del Negro's laboratory.

basement to CEILING

Geologists do a whirlwind tour from the top of the Blue Ridge to the bottom of a Piedmont slate quarry.

Near Rockfish Gap, Virginia's Shenandoah Valley, Blue Ridge Mountains and Piedmont all come together, creating what amounts to a geological smorgasbord in a relatively small area. It's the perfect venue for the geology department's annual Senior Research Adventures field trip. Supported by the Mellon Foundation, these trips are a chance for the department's more advanced students to discuss their research projects *in situ* and for the younger geology majors to learn techniques, inspect a variety of formations—and learn that there is no such thing as Afton Mountain.

On a crisp weekend in late March, three vans of geologists made the trek. The vans made a handy surface for the map-assisted overview that began each presentation (1) as Graham Lederer '09 (center) shows what to expect in "basement" rock below Beaver Creek Dam while faculty Greg Hancock and Chuck Bailey hold the map. Bailey said the shear zone below the dam is a contentious one: "This is the kind of a place that makes geologists get hot under the collar, but I think Graham's studies have nailed it down pretty well."

The geologists climbed two peaks during the weekend, including a scramble out to the high top of Turk Mountain (2), where Jenny Whitten '09 (pictured) talked about her work on erosion rates in the Blue Ridge and Ali Snell '10 spoke on strain analysis from deformed sandstones. After the descent, soil geologist Jim Kaste began the first of a few soil-coring parties.

Faculty and older students taught newbies the basics of using a Brunton Pocket Transit (3), a compass equipped with a bulls-eye level, allowing you to measure the dip of a geologic feature as well as the direction it's running. There were plenty of opportunities to examine fossil tubes of skolithos worms, including this sample (4) in a piece of Antietam quartzite. Geologists use the deformity of the normally round worm holes to assess rock deformation from pressure and other forces.

Just off the Skyline Drive, Drew Laskowski '10 spoke about Blue Ridge structural analysis/ancient rift basin at the Moormans River Overlook (5). On the Piedmont, the group visited the Solite slate quarry, where Sarah King '09 spoke about the geochemistry of the Arvonian Formation and Bailey led the group in the "hand game" (6), a rough-and-ready method to determine how forces have shaped rock. Great vistas and impressive formations, but geology can be up close and personal, too (7): Corbett Wicks '12 watches Mary Kate Kearney '12 inspect a gneiss-bearing sample of rock through a hand lens. **1**

—text and photos by Joseph McClain



WMCAR celebrates 20 years

New lab, fresh artifacts...same solid **ARCHAEOLOGICAL** values

by Joseph McClain

The William & Mary Center for Archaeological Research held an open house in December to celebrate both its 20th anniversary and to show off its new lab in the basement of Trinkle Hall.

Open-house attendees looking for golden skulls or other Indiana Jones-type artifacts would be disappointed, says Joe Jones, center director—and no relation to Indiana.

“The thing about Indiana Jones and the Hollywood version of what archaeologists do blurs the lines between artifacts that are worth money and the kind of artifacts that have value to archaeologists,” he said. “Archaeologists typically see the information value of artifacts as very different from their monetary value or what antique collectors think of. We’re interested in things like nails and brick fragments and patterns of those things in the ground and what it tells us about what was there. We get excited about stuff that most people will look at and say, ‘Huuuh?’”

First step

The Center for Archaeological Research functions as William & Mary’s archaeological consultants, working on grants and contracts. Jones explained that a typical WMCAR project begins with governmental sensitivity to the past. Laws stipulate that roads or other projects built with federal or state funding be constructed in a way that will not destroy significant archaeological resources.

“The first step in all of that is to get archaeological consultants like us and send us a copy of the plans,” Jones said. “We sample the area where they’re proposing to build the road—doing shovel tests at regular intervals—to make sure there’s nothing significant there. And if there is, then this is all done far enough ahead of time so that they may be able to make management decisions to incorporate some sensitivity to the resources.”



Joe Jones unrolls a set of plans for expansion of a road. Many of the center’s projects involve investigating potential archaeological significance of areas slated for construction.

Not all WMCAR projects are advance work on roads, however. Center archaeologists have worked at sites near the Colonial Parkway and at the Northern Neck homestead of James Monroe. Whether they’re from shovel tests at a road site or the childhood home of a U.S. president, artifacts come into the lab in paper bags. Each bag is labeled with information related to the object’s provenience—contextual data about where and when the item was found. The bags are turned over to lab manager Debbie Davenport, who processes their contents and prepares them for curation and storage. The curation process begins with cleaning of the artifacts.

“I simply wash them,” Davenport said, although some materials just get a dry brushing. After cleaning, the objects are placed in partitioned drying trays, each item in its own square. Davenport makes sure the provenience information for each item stays with it—in the drying tray and throughout the entire curation process.

“I did some historical artifacts today that dated from 1775 all the way up to the 20th Century,” Davenport explained. “The appropriate person will get these artifacts, put them in plastic bags and then we catalog them according to a hierarchical system. That is then put into the computer. We generate inventories that are sent along to the archaeologists who study them and write reports.”

Tens of thousands of artifacts

Davenport presides over a collection that usually includes some 30,000 individual artifacts on a given day. The new lab in the basement of Trinkle Hall provides more storage space than the center’s old facility, which was at the edge of the old Common Glory parking lot. The old building was removed during construction of the new Alan B. Miller Hall at the Mason School of Business.

Jones and Davenport both said the additional space in the new Trinkle Hall lab will come in handy, especially in times which the excavations are more fruitful than usual.

“There was one project that we did that generated more than 10,000 artifacts unexpectedly,” Davenport said. “We did not know that was going to be part of our data recovery on that particular project.”

Show us the lab

The open house, Jones said, was partially due to the urgings of colleagues at the College who kept asking to see the new lab. As part of the observances, the staff prepared a comprehensive index of all WMCAR technical reports produced since 1988.

“Someone who might be interested in the archaeology of 19th-Century farmsteads can go through the index and right away find everything we have about sites like that,” Jones said. “This would lead them to a chronological list of reports.” Reports themselves are on file either in the lab or in the WMCAR offices on Richmond Road. Copies of the index were distributed at the open house.

A 1630s tobacco pipe factory

The open house also featured a poster session depicting some of the center’s more significant projects. One poster outlined the discovery of evidence of a commercial manufacture of tobacco pipes dating from the 1630s at what is now City Point in Hopewell.

“We found lots of fragments of these stylized craftsman clay tobacco pipes that were made locally in Virginia. It was a craftsman society almost. They were trading these pipes back and forth around the mid-Atlantic,” Jones said. “The pipemakers got very artistic in decorating the bowls. They appear in funny places, but you can trace them back to who the pipemaker was, based on the decorations. Archaeologists are only starting to understand these types of artifacts, because they weren’t well-documented. It was common knowledge at the time, but a couple hundred years later, there’s not a lot written about it. So it’s kind of lost, except for the archaeology.” **i**



‘These artifacts came in from the field in paper bags with all the provenience information on them. I process them, catalog them and curate them. You can see how each separate provenience is separated in these trays. Most of these are prehistoric artifacts. Most of what I usually work with are historic artifacts. I did some historical artifacts today that dated from 1775 all the way up to the 20th Century.’

—Debbie Davenport, lab supervisor

Lab Field & Library

William & Mary's grad students get a chance to show their work at the eighth annual research symposium

Graduate students from the College of William and Mary were joined by students from several other advanced programs for the College's eight annual Graduate Research Symposium.

"William & Mary graduate students work creatively throughout the year to prepare this impressive symposium that shares graduate research accomplishments with the community," said S. Laurie Sanderson, dean of graduate studies and research. "Support from the A&S Graduate Studies Advisory Board has been instrumental in the extraordinary success of the symposium."

Dozens of graduate students presented their work in sessions chaired by nearly 30 faculty in Arts & Sciences departments. The symposium occupied most of the space of the Sadler Center and generated an 88-page program.

Friday's activities were highlighted by a pair of featured lectures. Scott Nelson, Legum Professor of History, spoke on "What Do Scholars Do All Day?," while Mark Forsyth, associate professor of biology, took as his topic "Perception of the Host Environment by Human Bacterial Pathogens." Dennis Manos, vice provost for

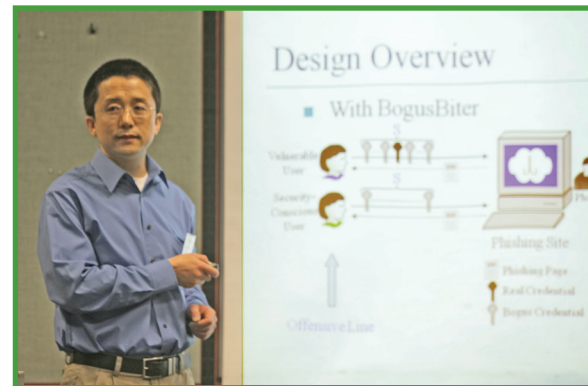
research and graduate and professional studies, delivered welcoming remarks over lunch. A networking reception capped Friday's session.

Awards for Excellence in Scholarship

The symposium culminated with an awards luncheon and ceremony on Saturday, presided over by S. Laurie Sanderson, dean of graduate studies and research; P. Geoffrey Feiss, provost of the College; and Taylor Reveley, president of the College. A number of awards, including two corporate prizes, were presented to acknowledge excellence in research by graduate students both from William & Mary as well as representatives of other universities.

To be considered for an award, presenters had to submit a 10-12 page paper describing their research. The papers were judged blindly by an independent panel of William & Mary faculty and Graduate Studies Advisory Board members.

The various awards for 2009, and their recipients, were:



Chuan Yue of applied science gives a presentation on advanced techniques to combat Internet "phishing."

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

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

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

Erik Spahr: The College of William and Mary, Physics. Advisor: Gunter Luepke. A New Look at Proton Conduction in Perovskite Oxides

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

Karl Mendoza, Biology. Advisor: John Griffin. Penny For Your Thoughts? How Neuroscience is Influencing Economic Thought: The Information Cascade Game Example

William & Mary Honorable Mentions

Derek R. Miller, Anthropology. Advisor: Frederick Smith. Breaking the Mold: Sugar Ceramics and the Political Economy of 18th-Century St. Eustatius

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

Visiting Scholars Award for Excellence in the Humanities and Social Sciences

Stephanie Crumbaugh, History, Johns Hopkins University. Advisor: Phil Morgan. American Indian Enslavement in Colonial New England

Google Earth now displays marine 'dead zones'

The newest version of Google Earth contains data on marine "dead zones" contributed by Professor Robert Diaz of the Virginia Institute of Marine Science, College of William and Mary.

Research by Diaz and Swedish collaborator Rutger Rosenberg shows that the number of dead zones—areas of seafloor with too little oxygen for most marine life—has increased by a third between 1995 and 2007.

The pair says that dead zones are now "the key stressor on marine ecosystems" and "rank with over-fishing, habitat loss and harmful algal blooms as global environmental problems."

Google Earth version 5, launched in February at the California Academy of Sciences in San Francisco, enables users to dive beneath the surface of the sea and explore the world's oceans. It is the first time the popular software package has provided data on the 70% of the Earth's surface

covered by water.

Since its inception in 2005, Google Earth has been downloaded more than 500 million times. The tool is available in 41 languages, and Google estimates that users spend 1 million hours a day using it and its sister product, Google Maps.

Users can access Diaz's dead zone data within Google Earth by opening the "Layers" pane and navigating to Ocean/State of the Ocean/Dead Zones

Each dead-zone location in Google Earth (marked by a skeletal fish icon) includes data on the nature of the dead zone (periodic, seasonal or persistent), its size, the date it was first observed, its impact on fisheries, its impact on deep-water ecosystems and a reference.

Diaz plans to continue to update his dead-zone database as new information becomes available.

—Dave Malmquist



Adam Potkay

The Story of Joy wins ACLA's Harry Levin Prize

The Story of Joy, by Adam Potkay, was named a co-winner of the Harry Levin Prize awarded by the American Comparative Literature Association.

Potkay is professor of English at the College of William and Mary and a recipient of a Plumeri Award for Faculty Excellence; he has recently been designated William R. Kenan, Jr. Professor of Humanities, beginning August 2009. The full title of his winning book is *The Story of Joy, from the Bible to Late Romanticism*. Published by Cambridge University Press, Potkay's 2007 book outlines an intellectual and literary history of joy, especially the treatments

of joy in works of literature, philosophy and religion. Emphasis is on British and German works from the Reformation through the Romantic period.

"I am surprised and delighted to receive this honor," Potkay said upon being notified of the award in early March.

The ACLA web site notes that books considered for the Levin Prize emphasize literary history or criticism, as opposed to theory, and should address more than one nation's literature. Awarded every other year, the 2009 Levin Prize will be presented at the ACLA Annual Meeting at Harvard University.

—Joseph McClain

Visiting Scholar Honorable Mentions

Kevin Barry, History, University of Delaware. Advisor: John Montano. *The Hebrew and Irish Gaelic Revival Movements: A Comparison*
Keara Goin, Anthropology, University of South Carolina. Advisor: Kimberly Simmons. *Megadiva: Sexualized Images of Women in the Dominican Republic*

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

Chuan Yue, Computer Science. Advisor: Haining Wang. *Anti-Phishing in Offense and Defense*

Honorable Mentions

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

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

Visiting Scholar Honorable Mention

Samy El-Tawab, Computer Science, Old Dominion University. Advisor: Stephan Olariu. *Intelligent Road Detection*

—Joseph McClain

William & Mary, VCU sign cooperative plan for CCB

The College of William and Mary and Virginia Commonwealth University are collaborating to take advantage of the research and expertise of their environmental science programs.

VCU President Eugene P. Trani and College of William & Mary President Taylor Reveley signed a memorandum of understanding on Jan. 26. The agreement states that William & Mary's Center for Conservation Biology will continue to draw upon its extensive academic programs in biology, bio-science and computational modeling, while providing a close connection with the considerable expertise within the VCU Rice Center for Environmental Life Sciences, including in the ecological and

environmental sciences, ecological genomics and conservation medicine.

"Research increasingly involves collaboration," Reveley said, "between individuals and between departments. Indeed, some of the newest and strongest collaborations will be between universities, such as the VCU-William & Mary Health Policy and Law Initiative and this exciting new partnership in conservation biology."

Launched in 2008, the VCU-William & Mary Health Policy and Law Initiative draws on faculty from the two institutions to conduct research, provide public service and offer joint degree programs that focus on solving topical problems in health policy, law and bioethics.

The mission of the Center for Conservation Biology centers around research aimed at ensuring the sustainability of bird populations. The CCB was founded at William & Mary in 1991 by a group that included its current director, Bryan Watts, as well as Mitchell Byrd, a pioneer in wildlife conservation issues. Byrd is Chancellor Professor Emeritus of Biology at William and Mary and remains active in field work after more than 50 years.

"We design and conduct research to answer questions critical to conservation progress," Watts said. Currently, the center conducts around 40 research projects each year, ranging from the effects of habitat loss to recommendations on land use to tracking of populations of sensitive species in various ecosystems.

The CCB is best known for its work with bald eagles in the East, including its annual census flights of eagle nests along the Chesapeake and its tributaries. The center was named a 2007 National Recovery Champion by the U.S. Fish and Wildlife Service for its involvement with the recovery of the bald eagle in the eastern U.S.

The VCU Rice Center, VCU's biological field



VCU President Eugene Trani (left) and William & Mary President Taylor Reveley sign while Bryan Watts (left) and Mitchell Byrd of the CCB look on.

station, is a 343-acre site in Charles City County overlooking the James River, midway between the two university's campuses, with a primary mission of enhancing science, education and public outreach related to large river ecosystems and their riparian landscapes.

The new collaboration will be renamed the College of William & Mary/Virginia Commonwealth University Center for Conservation Biology at the VCU Rice Center. Faculty at the center will hold joint appointments at both institutions. Watts will continue as director.

The CCB's eventual relocation to the Rice Center will place it adjacent to one of its frequent partner institutions, the Virginia Department of Game and Inland Fisheries. Watts said the new relationship with VCU will offer a number of opportunities for fruitful, collaborative research.

"We do a lot of work with eagles, ospreys, cormorants—water birds that depend on fish," Watts said. "And VCU is very strong in fish research. There's one natural area of collaboration that we want to take advantage of. There are many others we'll investigate."

—Joseph McClain

Two students win research fellowships from American Physiological Society

Two William and Mary students are recipients of summer research fellowships from the American Physiological Society, continuing the kinesiology department's excellent record with this competitive award for undergraduates.

Sarah Todd '10, a kinesiology major, will study the molecular signaling of blood flow with Robin Looft-Wilson, assistant professor of kinesiology at William & Mary. Daniel Sinden '11, a neuroscience and philosophy major, will serve his fellowship at the University of Virginia School of Medicine.



Sarah Todd '10 years; three in Looft-Wilson's lab and two working in the lab of Brennan Harris.

Each fellow receives a \$4,000 stipend to cover living expenses during the 10-week fellowship and will present their work at the society's Experimental Biology 2010 meeting, expected to attract nearly 14,000 scientists.

In Looft-Wilson's lab this summer, Todd will study how arteries respond to the mechanical effects of blood flow at the molecular level, work that has important implications for cardiovascular disease and stroke, which are promoted by disturbed or decreased blood flow.

"Cardiovascular disease is one of the leading causes of death in the United States. Also, with aging, your blood vessels deteriorate," Todd explained. "Professor Looft-Wilson is working with blood vessels and the signaling mechanism between different layers of cells, when they dilate and contract. When the blood vessels dilate and contract, it helps with flow."

Sinden will be working on a problem arising after the repair of blood vessels that have been closed up by the effects of atherosclerosis, or other cardiovascular diseases.

"A common method of opening them back up again is to use a wire mesh stent. The problem is that the blood vessels will grow over these stents, and get closed all over again," he explained. "I'm going to be researching how certain antiproliferative drugs that are applied to these stents can stop this overgrowing of the stent through changes in specific gene expression."

—Joseph McClain

APS fellowships are awarded to only 24 undergraduates nationally each year, and William and Mary's kinesiology department has hosted five APS fellows during the past four

Joseph McClain



Courtesy Mohamed Noor

H. Allen Orr '82, '85 (left) and Mohamed Noor '92 give a thumbs-up at the ceremony.

Two alumni are among 13 scientists awarded Darwin-Wallace Medals

Two William & Mary alumni were among 13 of the world's scientists who received the Darwin-Wallace Medal from the Linnean Society of London.

Awarded once every 50 years since 1908, the Darwin-Wallace Medal is one of the highest honors in evolutionary biology. The 2008 class of recipients included College alumni Mohamed Noor '92 and H. Allen Orr '82, '85. The presentation, made in London by Linnean Society President David F. Cutler, coincided with the 200th anniversary of the birth of Charles Darwin on Feb. 12.

"It is extraordinary that two graduates of the College of William & Mary are among 13 recognized by the august Linnean Society of London, which dates to 1788," said William & Mary President Taylor Reveley.

Noor is a professor in the biology department at Duke University. Orr is University Professor/Shirley Cox Kearns Professor in the biology department of the University of Rochester.

The Darwin-Wallace Medal honors "major advances in evolutionary biology since 1958." The 2008 announcement of the awards commemorated the 150th reading of the joint Darwin-Wallace paper "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection" at the Linnean Society of London in 1858.

While at William & Mary, both Noor and Orr were students of Bruce Grant, an evolutionary biologist who taught and conducted research at the College from 1968 until his retirement in 2001. Both Noor and Orr went on to conduct graduate work at the University of Chicago under another of Grant's students, Jerry Coyne '71.

Coyne, Orr and Noor came through Grant's lab almost exactly 10 years apart and each of them

participated in research projects with Grant. Even though each had Grant as an undergraduate mentor, all three worked on quite different projects.

"My interest changed around," Grant explained. "It's the nice nature of William and Mary that you can pursue your interest. Jerry is now known as Mr. Speciation; he actually developed his interest in speciation back then, because that's what I was interested in at that time. When Allen worked with me, I was working on local mate competition in parasitoid wasps, which is what Allen worked on. By the time Mohamed worked with me, I was working with peppered moths and so he worked on that."

Both Noor and Orr have used the study of various species of *Drosophila* (fruit flies) to advance science's understanding of speciation—genetic changes that permit species to adapt to changes in their environment and that can eventually result in the formation of new species. Noor was the first to demonstrate experimentally the concept of reinforcement, an important component of natural selection. He also contributed to the sequencing of the genomes of 12 species of *Drosophila*.

Orr combined his lab studies of *Drosophila* with theoretical work. He is the co-author, with Coyne, of the definitive book *Speciation*. Orr also is an active voice in the refutation of intelligent design and creationism.

"This is a huge deal. The award has only been given to about 40 people in the last 150 years," said George Gilchrist, Marjorie S. Curtis Term Distinguished Associate Professor of Biology at William & Mary. "The 13 honored at this time are among the most influential scientists in the world. It is a testimony to the life and work of Bruce Grant that two of his undergraduate students are among the recipients."

—Joseph McClain

Literature study shows VIMS faculty on the cutting edge

A new analysis of the worldwide scientific literature shows that professors Deborah Steinberg and Jim Bauer of the Virginia Institute of Marine Science are at the cutting edge of their fields.

The analysis, conducted as part of Thomson Reuters' Essential Science Indicators, shows that Steinberg and Bauer's work helps define a "research front"—a cluster of highly cited scientific papers in areas of emerging interest.

Thomson Reuters' research-front analysis is based on identifying the most-cited papers in more than 11,000 scientific journals during the latest five-year period, and then determining how often these papers have been cited together by other research authors. According to the company, this process identifies areas where important work is being done and where the scientific community is focusing its attention.

Steinberg and Bauer were recognized for their contributions to a research front in the "Biological Effects of Ocean Chemistry." This front

Study assesses dollar impact of boaters on local economy

A survey of recreational boat owners who make Hampton their home port concludes that these boaters bring \$55 million to the city and help create nearly 700 full-time jobs.

The study, conducted by Tom Murray and James Kirkley of the Virginia Institute of Marine Science, College of William and Mary, and Doug Lipton of the University of Maryland, was commissioned by the city of Hampton. The authors surveyed both Hampton residents and non-residents who keep boats in the city to determine the economic impact of their boating-related activities. The city plans to use

has experienced the largest increase in journal articles within the geosciences this year.

Steinberg, a biological oceanographer, authored or co-authored four journal articles related to her on-going collaborative study of the ocean's "twilight zone"—the dim layer from 300 to 3,000 feet where little-known processes affect the ocean's ability to absorb and store carbon dioxide accumulating in our atmosphere. These articles have been cited by other scientific papers more than 60 times since their publication in 2007 and 2008.

Steinberg's role in the multi-institution "VERTIGO" project was to identify plankton species living in the twilight zone and to understand differences in the food webs that propel the marine carbon cycle.

Bauer, a chemical oceanographer, was co-author of a paper reporting on the results of the Southern Ocean Iron Experiment, or SOFeX, one of the largest oceanographic experiments ever mounted. This paper has been cited 179 times since its 2004 publication in *Science*.

SOFeX, a 2-year collaborative effort among 17 leading U.S. oceanographic institutions, brought 3 ships and 45 tons of equipment and supplies to the waters around Antarctica to determine how the Southern Ocean would respond to iron enrichment. Sprinkling iron onto the ocean surface has been touted as one way to help curb global warming—based on the idea that this iron "fertilizer" can boost the rate at which marine plants remove carbon dioxide from the atmosphere.

Steinberg and Bauer's citation successes add to those of other VIMS researchers. An earlier analysis of articles published in coastal science journals between 1971 and 2003 showed that VIMS researchers Bob Diaz, Hugh Ducklow and John Milliman had authored three of the 10 most highly cited works during that span.

"Having a publication cited by many other authors is a sure sign that your work has value," says VIMS Dean and Director John Wells. "VIMS is extremely proud that our scientists continue to have such a demonstrable impact on the global research community."

—Dave Malmquist

the study as it considers whether to change its tax policies towards recreational boats.

"The number of boats docked at Hampton marinas has risen steadily from 1,313 in 2002 to 1,796 in 2007, the most recent year for which we estimated impact," says Murray. "Central to this growth was the relocation of non-resident watercraft to Hampton marinas corresponding with the change in the city's watercraft tax regime."

Other major findings of the study, emphasized in a report from the Boat Tax Subcommittee to the Hampton City Council Finance Committee, also point out that the city gains \$2.29 million in additional tax revenues from spending by recreational boaters. The



Customs House Marina.

report also noted that boats 33 feet and longer generate more than 70% of the spending and tax revenues from non-resident boaters.

—Margaret Pizer

Howard, Allison receive Outstanding Faculty Awards

Two William & Mary faculty members received the state's highest honor for professors from the State Council of Higher Education for Virginia.

Christopher Howard, the Pamela C. Harri-man Professor of Government and Public Policy, and Lizabeth Allison, the Dorman Family Term Distinguished Professor of Biology and director of graduate studies, are among only 12 professors out of 101 applicants statewide to receive the Commonwealth's Outstanding Faculty Awards. The awards recognize the finest among Virginia's college faculty for their demonstrated excellence in teaching, research and public service.

"This is a very appropriate recognition of two of William & Mary's most able professors," said William & Mary President Taylor Reveley. "Liz and Chris are not only splendid teachers and scholars, but also marvelous members of our university community. It is grand to see them added to the long line of William & Mary faculty who've won this great honor."

Including this year's awardees, 33 William & Mary professors have received the honor since the awards' inception in 1987, more than any other university in the state. Honorees were introduced on the floor of the Virginia General Assembly before receiving their awards during a luncheon ceremony.

"One of the great pleasures of working at William & Mary is the extraordinary talent, commitment, and dedication of the faculty to not just fine teaching, but great teaching," said Provost P. Geoffrey Feiss. "The College faculty's enviable record of success, year after year, in receiving these highly sought-after, prestigious awards is one important indicator that others recognize the superlative skills of our faculty."

Howard, a leading expert on U.S. social policy and tax policy, has taught at William & Mary for 16 years. He has won two national research fellowships, published two books and numerous articles, contributed to various edited volumes and served as an advisor to myriad students.



Christopher Howard



Lizabeth Allison

Howard also took an active role in the College's Sharpe service-learning program, challenging students to address inequality and poverty in the Williamsburg community. After two years in the Sharpe Community Scholars Program, he was selected as the Robert J. Sharpe and Jane A. Sharpe Associate Professor of Civic Renewal and Social Entrepreneurship.

"I still remember what it was like as an undergraduate and graduate student," he said. "I had some very good teachers myself and try to remember what I valued in them in terms of being treated fairly and honestly and with respect and with a certain amount of good humor as well."

Howard received his undergraduate degree from Duke University in 1983. He later received both his master's degree and doctorate in political science from Massachusetts Institute of Technology. He has received several honors and awards including *Choice* magazine's Outstanding Academic Title of 2007 for his book *The Welfare State Nobody Knows*.

Allison, too, is highly respected by her peers and has received a number of awards and honors in addition to this one.

"It means a lot to me because part of what's important to me is balance in my life," she said of the Outstanding Faculty Award. "It's important for me to try to be excellent as a teacher and really reach my students, but I also love research—that's equally important to me—as are other things I do the rest of the day—the service and outreach—and this award is about all of those things."

continued on page 28

continued from page 27

Allison, who has been at William & Mary for 11 years, is an internationally-recognized leader in the field of “traffic control” in normal and cancer cells. She has received over \$1.8 million in research grants or contracts and has published her findings in major scientific journals with her students—both undergraduate and graduate—as contributors. The college textbook that she wrote is widely used, and her teaching skills inspire students at all levels. She promotes diversity in the scientific community and has created partnerships with local historically black colleges and universities. Because of her leadership skills, she was recently asked to serve on the Planning Steering Committee for William & Mary’s new strategic plan.

Allison received her undergraduate and master’s degrees in biological sciences from the University of Alaska. In 1989, she completed her doctorate in zoology/molecular and cellular biology from the University of Washington. Among the honors and awards she has received over the years are the Grace J. Blank Teaching Award from William & Mary in 2000 and the Alumni Fellowship Award for Excellence in Teaching in 2002.

—Erin Zagursky

VIMS dedicates Andrews Hall, Seawater Research Lab

The Virginia Institute of Marine Science dedicated two new research buildings—Andrews Hall and the Seawater Research Laboratory—in an April 16 ceremony that highlighted the many contributions made to VIMS and the College of William and Mary by the late Senator Hunter B. Andrews and his wife Cynthia.

Andrews Hall is a state-of-the-art 4-story building that includes 39 laboratories, a distance-learning classroom, an electronics shop, conference rooms and spaces for faculty, technicians, students and visiting scientists. It currently houses programs to enhance aquaculture, better manage blue crabs, restore sea grass, track contaminants, control invasive species, model Chesapeake Bay dynamics, unravel food webs, understand climate change, explore alternative energy and develop autonomous underwater vehicles, among many other programs.

The dedication speakers, many of whom were personal friends of the Andrews, gave heartfelt thanks for the couple’s dedication to marine science, VIMS, William and Mary and the Commonwealth. Senator Andrews was among the Commonwealth’s most compelling advocates for higher education and marine research during 32 years in the Virginia Senate.

Cynthia Andrews’ own passion for marine research made her a valuable member of the VIMS Council for many years.

The 45,000 square-foot Seawater Research

The value of working with original documents

When the Spanish archivist Peio Monteano produced a 13th-Century ceremonial on the coronation of English kings, Kimberly Bassett knew that this was an opportunity few other researchers—let alone undergraduates—ever get.

“He just pulled it out and slapped it down on the table like it was no big deal, and I was trying my hardest not to breathe too hard on the ornately decorated pages of Latin,” she said. “The realization that even most of the scholars studying these works wouldn’t get to see them in person was pretty incredible.”

Bassett was one of three William & Mary undergraduates who joined history Professor Lu Ann Homza on a research trip to Pamplona, Spain over Spring Break to peruse two sets of archives and get a better understanding of Spanish history through the hand-written accounts of the people who lived it.

To prepare for the trip, which was funded by the Mellon Foundation, the students took a once-a-week paleography seminar with Homza during the fall 2008 semester to learn how to read the handwriting. Finally, the group left for Spain on March 6 and returned on March 14.

During the trip, the students visited the Diocesan Archive of Pamplona and the Royal and General Archive of the Kingdom of Navarre. They were each required to read texts and “then work to contextualize them,” said Homza. Bassett, a sophomore



Courtesy/Lu Ann Homza

Students (from left) Amanda Scott, Eric Schmalz and Kimberly Bassett examine a manuscript from the very early medieval period at the Diocesan Archive, Pamplona, Spain.

majoring in history and Chinese, focused on the role of young children during witch trials. Eric Schmalz, a junior history major, also investigated the trial documents in the archives. Amanda Scott, a senior who is majoring in both history and Hispanic studies, researched clerical misbehavior during the trip.

Bassett said that she felt honored to be included in Homza’s research and benefit from her international connections.

“I think it’s a perfect example of William and Mary’s ideal professor-student relationship, where the professor not only teaches factual information, but also becomes a close mentor,” she said.

The students presented their findings at the first undergraduate research symposium in Medieval and Renaissance Studies.

—Erin Zagursky



Cynthia Andrews speaks at the VIMS building dedication.

Laboratory, fed by an intake from the York River, provides 900 gallons per minute of treated seawater to support state-mandated research on finfish and shellfish.

An “acre under roof,” it includes a multi-pur-

pose space with numerous holding tanks, a disease-challenge facility and a high bay for handling large oceanographic instruments. It also features biological safety laboratories that will allow VIMS scientists to study aquatic pathogens and waterborne pollutants, including their effects on animal and human health.

The two buildings were financed by a higher education bond passed by Virginia voters in 2002.

“Andrews Hall and the Seawater Lab have transformed our campus and modernized our lab capabilities,” says VIMS Dean and Director John Wells. “They are central to our mission of providing research, education and advisory service in marine science to government, citizens and industry in the Commonwealth, the nation and the world.”

—David Malmquist

beginnings

A look at new and exciting work starting up at William & Mary.

SCORS

The scientific approach to solar energy on campus

by Joseph McClain

The idea is to harness the sun to generate electricity, but first the people in SCORS had to know which photovoltaic technology is best to use. And to determine that, they first needed to know more about the weather.

“We found out that depending on the conditions—the humidity and the temperature—different types of solar cells will work better or worse,” explained Irina Novikova. She, along with Eugeniy Mikhailov and Seth Aubin, are the three members of the physics department working most closely with students in SCORS.

SCORS is the acronym for Solar Cells On the Roof of Small, an enterprise to evaluate the viability of using solar panels to supplement campus electric power. SCORS is one of the experimental initiatives funded by the William and Mary Committee on Sustainability, a blue-ribbon panel charged with implementing a College policy to make improvements to the campus environment.

Itself an activity of the William and Mary Society of Physics Students, SCORS is using the flat rooftop of Small Hall, the physics building at William and Mary, to test various solar technologies to determine the optimum setup for use in Williamsburg. SCORS is approaching the problem with an open mind regarding what the final product might be.

“As scientists we think that the most efficient is the one which generates the most power per dollar,” Mikhailov said. “But our report might also include proper choice of inverter, the best battery for storage of energy, wiring system price and so on.”

A model for solar power

Once the best system is found, the goal is to incorporate a large-scale solar station into the scheduled renovation of Small Hall, thereby establishing a model for other solar projects across campus.

The task of identifying the best photovoltaic panel for the unique weather conditions of Wil-

liamsburg should have been a straightforward evaluation of manufacturers’ literature and technical specs, but it didn’t work out that way. For example, the largest panel being evaluated by SCORS has a manufacturer’s rating of 176 watts, which Mikhailov explained represents peak power on a sunny day.

“We haven’t seen that number yet—and for a cloudy day, we are getting barely 30 watts at peak,” he said.

“There are several technologies and all of them will tell you they are the best,” Novikova said. “So to really make an educated choice about what kind of system is best, we need to know what kind of weather we expect. That’s why we need a weather station.”

An eye on the weather

The need for detailed, local weather data became clear early in the process. SCORS received COS funding in December and soon got started, meeting with Alan Compaan, a photovoltaics thin-film researcher from the University of Toledo. Five test panels arrived over winter break. Four of the panels are small five- or six-watt devices, such as you might see attached to an illuminated roadside highway sign. The largest, the one rated for 176 watts, is about the size of a tabletop. The test panels represent a range of vendors and technologies, from multicrystalline silicon to thin-film copper indium gallium diselenide.

The weather station was installed in February, with data transmitted to a computer inside the Small Hall rooftop observatory. Much thought went into the next challenge: how to mount the panels.

“Mounting is the hardest thing in terms of research involved,” Novikova explained. “It sounds simple—you hook the battery up and you measure what comes out—but the tests have to be very carefully designed to give meaningful results.”

By spring break, the testing procedures were

worked out and the SCORS team began mounting their test panels. As a temporary measure, the large panel had been set up, resting flat on a couple of pieces of boards.

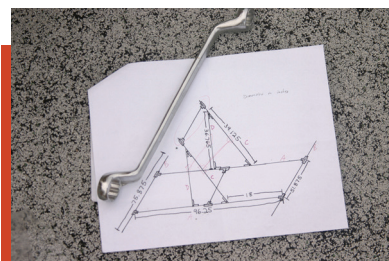
“The most efficient mounting is perpendicular to the sun,” Jeffrey Brown ’09 explained as he and other SCORS members assembled a mounting rack fabricated for the big panel in April. “The sun moves, though, but we figured a dynamic system—to follow the sun—would be too expensive.”

The rack for the large panel was designed to be inclined to match the sun’s altitude. Novikova said the output of the five test panels will be monitored throughout the summer, and SCORS will use the data in calculating the final design.

Mikhailov said the final design will likely consist of an array of 100 to 200 solar panels. The number of panels is limited by budget, rather than the rooftop area of Small Hall, he added. There are a number of practical, as well as scientific, considerations yet to be addressed. For example, SCORS will have to work with the requirements of maintenance personnel and the wiring system is a project all its own. The final design may or may not include a battery system, as well.

“At the current rate, Small will eat up everything we can provide,” Mikhailov said, “but we might consider battery storage for the power interruption cases. Our scientific equipment desperately needs reliable power. There are couple of setups which must be on for all 24 hours.”

SCORS is one of a number of campus sustainability projects, funded through a student “Green Fee” that was announced by William & Mary President Taylor Reveley in the Spring of 2008. The solar cell project was one of the first five projects approved by the Committee on Sustainability, chaired by Lynda Butler, Chancellor Professor and interim dean at the School of Law and Dennis Taylor, professor at the School of Marine Sciences. **1**



On the breezy Small Hall rooftop, a wrench holds down the plans for the panel mounting rack.



Sabina Samipour ’11 inspects the large solar panel destined for the Small Hall rooftop.



Mounting of the 176-watt panel on its rack, just after Spring Break.



The SCORS weather station sits near the observatory, providing a stream of meteorological data.