

Re:Search

Graduate Studies & Research at Salisbury University
2011 Edition





Emily Thorpe (on the cover) and Jonné Woodard (above) are recipients of 2010 Environmental Protection Agency's Greater Research Opportunity fellowships. Read about their experiences in the field on page 22.

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Salisbury University is a proud member of the University System of Maryland.



“Salisbury University’s award-winning faculty have fostered a creative curriculum emphasizing undergraduate research.”

Welcome to the inaugural issue of *Re:Search*, SU’s first magazine devoted exclusively to the research, scholarly and creative activities of the University’s distinguished faculty and students.



At Salisbury University, scholarship, creativity and collaboration are fundamental to our mission and core values, and are crucial to the University as well as to the local and global communities we serve. The stories on these pages showcase our commitment to supporting individual efforts as well as collaborative projects that reach across academic disciplines and cross institutional, national and international boundaries.

A major focus of this first issue is the broad range of research and creative projects undertaken by our undergraduate students, including the recipients of the Environmental Protection Agency’s 2010 Greater Research Opportunity fellowships. Other highlights include efforts to promote reading literacy and support the fine and performing arts on the Eastern Shore, the relationship between farming and economic welfare in the Amazon, and the impact of global warming on aquatic life in Northern Iceland. These endeavors cover a broad range of topics in applied sciences, STEM fields, arts, humanities and social sciences.

Through their work, SU’s faculty, students and staff expand the boundaries of their academic disciplines, discover answers to real world questions, and enhance the quality of life in the local and state-wide communities, across the country and around the world.

Research and scholarly activity are integral parts of SU’s history and culture. *Re:Search* is a celebration of some of the proudest achievements of our faculty and students and supports our reputation as *A Maryland University of National Distinction*.

A handwritten signature in black ink that reads "Janet Dudley-Eshbach". The signature is written in a cursive, flowing style.

*Janet Dudley-Eshbach, Ph D.
President*



Understanding Effects of Global Climate Change on Arctic Fishes

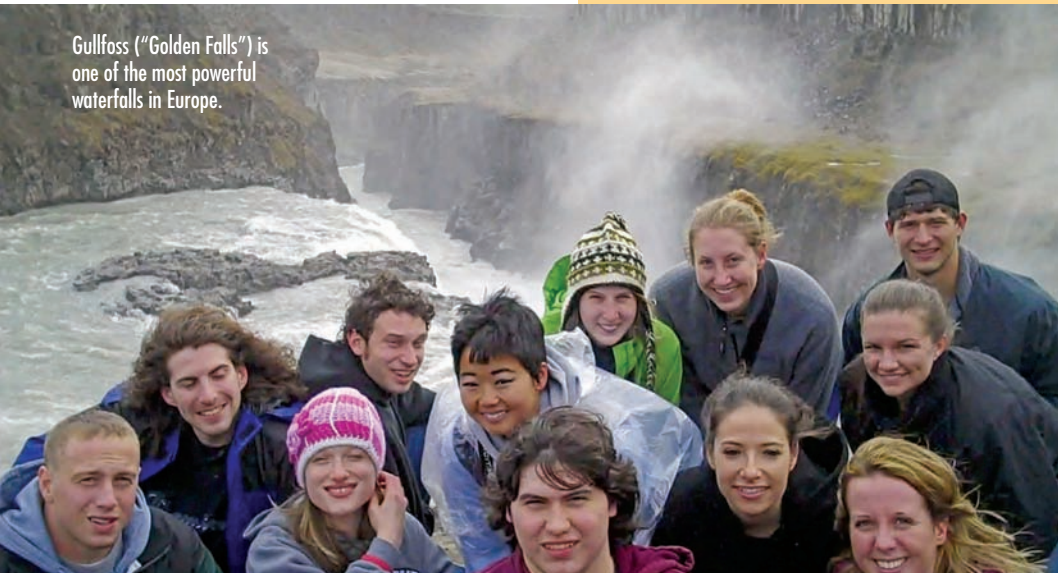
Have some species of fish living for thousands of generations in an environment free of thermal variability lost the ability to adapt to climate change? A team of student and faculty scientists from Salisbury University and Hólar University College in northern Iceland investigate the impact of global warming on the diversity of fish species in Arctic regions.

The current rise in oceanic temperature may dramatically affect the quality and diversity of life in many aquatic ecosystems, particularly in the Polar Regions, which tend to be more vulnerable to climate change than other regions. Recent data suggest that Arctic ecosystems have been severely disturbed by the rapid climate change that scientists have been tracking for several decades. Fish are among the species most dramatically affected by these changes.

Changing surface temperature is a natural characteristic of our planet. Over geologic time, the Earth has experienced periods of thermal fluctuation when life has flourished and when life has almost been completely eliminated. Currently, there is compelling evidence suggesting that global surface temperatures are increasing at a geologically rapid rate. What makes the current situation unique (and troubling) is that, unlike in the past, the temperature increase is occurring in the absence of any obvious natural input such as volcanic activity or meteoric collision.

In 2009, a report focusing on the biological consequences of recent climate change in the Arctic concluded that Arctic ecosystems have been severely perturbed by rising temperatures. As the temperature rises, the abundance and diversity of fish species and the distribution of fish populations are likely to change. The ability of animals to respond to rising environmental temperature is a major determinant of the disposition or survivability of a species during periods of geologically rapid climate change. While increasing temperature may be harmful to tropical animals because they live at temperatures close to their upper limits, temperate and polar species are equally at risk if they have lost the ability to acclimatize to new temperatures. For example, fishes inhabiting waters that do not normally undergo fluctuations in temperature may be sensitive to climate change if they have lost the ability to appropriately adjust their metabolisms and cellular structures.

Arctic fishes may be particularly sensitive in this regard because they have been living in a cold environment for thousands of generations. When challenged with a changing environment, the fish can either



Gullfoss ("Golden Falls") is one of the most powerful waterfalls in Europe.

As the temperature increases, some fish species will successfully adapt, others will not. Some may disappear altogether. This raises economic as well as environmental concerns as the reduction of fish diversity may negatively affect economies based on food production by Arctic and sub-Arctic fisheries. One key to the solution is to better understand why some fish species successfully adapt to climate change and why others do not.

swim to a new location with different conditions or remain in place. If they remain where the conditions are changing, they can either tolerate the change or acclimatize to it. The fluctuation in climate is tolerable if the metabolic and physiological machinery of the cells of the organism can continue to operate in a manner consistent with the continued survival of the cells (and organism).

Acclimatization, or the physiological adaptation of an animal or plant to changes in climate or environment, implies that metabolic and physiological adjustments must be made because the fluctuation lies outside the range of immediately tolerable conditions. Adaptation to the new condition implies a permanent and irreversible change in the organism's genome that permits continued survival and permanent and irreversible change within the boundaries of survivability. A universal response of animals to changing temperature is the restructuring of the molecules that make up their cell membranes. The purpose of this restructuring is to maintain an appropriate physical environment, or molecular order, within the cell membrane during temperature change. There are many such restructuring reactions and it is believed that they do not occur in chronological sequence, but instead proceed at different rates, begin at different times and have different durations after exposure to the new temperature. Some of these molecular remodeling events seem to have evolved as "emergency" responses that are later augmented or supplanted by other changes that persist until the next thermal challenge is encountered.

SU bioscience professor Dr. Eugene Williams and his team of scientists comprised of students and faculty from Salisbury University and Hólar University College (HUC) have taken an innovative approach to studying the long- and short-term effects of climate change on fish. Over the next three summers, the team will travel to Iceland to examine populations that have not experienced significant change in environmental temperature for many generations and conduct laboratory and field research to determine if such fish can tolerate temperature fluctuations. The team will also examine the extent to which some species have adapted to the temperature of their environment, along with the presence

Students (from left) Dan Wilkerson, Erin Williams, Kelly Beall, Ana Wiseman and Katie Green perform a bird count at Kolkuós (Northern Iceland, near Hólar). The horses, who have no reason to fear humans, came to investigate the researchers.



or absence of molecular, cellular and physiological mechanisms that facilitate acclimatization.

Few populations of fish have experienced constant temperature for extended periods, especially over many generations. Fishes living in the very deep sea, where it is constantly cold, are one example; others are fishes living in very stable warm or cold springs. Fish in these habitats are either difficult to capture or are exceedingly rare. However, there are two aquatic environments where water temperatures have remained nearly constant for thousands of years: those at the Earth's poles. Polar regions have been cold for a very long time and the range of temperature change has been very small. Fish have thrived in the icy polar waters for thousands of years.

"The analyses we wish to perform would be most robust if they were carried out using populations of a single species that has endured for many generations under different thermal regimes; a species that may have diversified, but that has not yet evolved into new species," explained Williams. The Icelandic Arctic charr is such a species, and it is very well-suited for the studies the team has undertaken. The charr appears to be rapidly diversifying, but it has not yet split into separate species and retains a high degree of phenotypic plasticity, the biochemical or physiological properties or characteristics that enable it to adapt to environmental change. The body shape, feeding habits and habitat temperatures make the Icelandic Arctic charr an ideal specimen for this study, as these characteristics provide evidence of the species' ability to adapt to climate change.

As the glaciers melted away from Iceland around 12,000 years ago, populations of

Icelandic Arctic charr were the only vertebrate inhabitants of myriad newly formed lakes, streams and rivers. These waters varied widely in resource type, stability and habitat diversity, which presented the charr with many novel opportunities for colonization. Under such conditions, these populations of fish have dramatically diversified in order to take advantage of various habitats and resources.

The Icelandic Arctic charr has also been found to thrive under a wide range of habitat temperatures with different populations occupying lakes with extreme temperature variances. Populations are found in spring-fed lakes that are constantly cold, as well as shallow lakes and ponds where water temperatures can vary from 2-3 °C to 20 °C or more in the summer. Scientists believe that these conditions may have existed for the past 10,000 years or so, which is sufficiently long enough for the fish to adapt to such dramatic climate changes, but apparently not long enough for them to have formed new species.

It is well known that salmonids (salmon, trout and charr) from diverse environments are exceptionally adept at adapting to new

A universal response of animals to changing temperature is the restructuring of the molecules that make up their cell membranes.

Students collect information at Héraðsvötn, meaning “waters of Héraðs,” a river in Northern Iceland.



temperatures. This attribute can be observed in individual fish and also in cells isolated from fish and maintained in culture. For example, cells isolated from rainbow trout have been shown to begin reorganizing and restructuring their cell membranes within six hours of transfer to a novel temperature. These characteristics of Icelandic Arctic charr make them ideal for studying the effects of climate change on the Arctic fishes. Individuals of the same species that have experienced very different thermal habitats for thousands of generations can be directly compared.

Williams and his team explore the molecular, cellular and physiological mechanisms that affect the fishes' ability or inability to acclimatize. “We believe charr from stable thermal environments will be unable to tolerate novel temperatures or restructure their cell membranes in response to a thermal insult,” said Williams. In the course of exploring this hypothesis, the team examines the mechanisms that permit cells, and therefore fish, to endure altered temperatures.

These experiments are the core of an international, student-training program between Williams and collaborators at HUC in northern Iceland. Under the supervision of Williams and his colleagues, students from both universities carry out the experiments as part of a student-training program focused on international science, collaboration and cooperation. The SU team works in partnership with colleagues at HUC. Drs. Skúli Skúlason and Bjarni Kristjánsson are fish ecologists and evolutionary biologists interested in speciation. They provide expertise in the areas of fish population structure and dynamics.

During the academic year, students focus on analyzing frozen fish tissues and

cells in culture. During the summers, the research involves experiments with live Arctic charr and the collection and preservation of tissue samples for later analysis. For each of three summers, research teams are made up of one or two graduate students from HUC and three to five undergraduate students from SU who spend six weeks at HUC.

Faculty/Student Research Collaboration

All of the experiments are carried out by a team of students from SU and universities in Iceland and other countries under the supervision of faculty from SU and HUC. Each student is engaged in meaningful scientific research throughout the program. During the academic year, students work in the laboratory at SU. During six weeks in each of the three summers, SU students work closely with a team of international students and faculty from HUC. A major objective of this project is to expose these young scientists early in their careers to a diverse community of globally engaged scientists so that they learn how to participate and operate in an international research environment.

Taken together, the field experiments in Iceland and the lab experiments conducted at SU produce a “big picture” that is made of relatively straightforward and manageable projects that enable students to participate in important and relevant research and understand it as they contribute to it. The variety of experiments allows each student to have his or her own independent project, which contributes positively to the culture of research fostered by the University. These experiments provide students with opportunities to conduct rigorous experimental

measurements, interpret and analyze the results, decide what steps to take next, and ultimately disseminate their work to the broader scientific community by making presentations at local, regional and national meetings.

Williams and his colleagues have developed a set of experiments designed to challenge and engage the students. Many of these projects center on a fascinating phenomenon seen in Mývatn, a lake two hours from Hólar. Two natural springs feed the lake on its east side. One of these is a cold spring at a constant 6.6 °C and the other, only 5 kilometers away, delivers a constant supply of water at 27 °C. Lake water leaves via the River Laxá on the west side. This arrangement sets up a large temperature gradient in the shallow lake water between the springs and to the river. The fish that live there can behaviorally select their preferred temperature and are easily accessed with hand nets. This natural situation is a veritable gold mine for potential research projects dealing with behavior, ecology, physiology, cell biology and more.

The unique student/faculty collaboration gives students access to mentors with wide-ranging expertise, from molecules to ecosystems and including invertebrate and fish thermoregulatory behavior. Researchers are very confident that they can help all students who choose to work on the projects of their own design fashion interesting, meaningful and scientifically valuable endeavors.

Paving the Way for Study Aboard Science Programs

As part of its 2009-2013 Strategic Plan, SU identified international education and study abroad for students as a top priority. In particular, the University recognizes the need for study abroad experiences for science, technology, engineering and mathematics (STEM) students. According to several studies conducted by the Institute of International Education, since 1996, United States students in the sciences have been seriously underrepresented among those participating in study abroad programs. Students of the social sciences and fine arts and from business programs made up more than 60 percent of all students who studied abroad. Students from the physical and life

sciences never comprised more than 9 percent of the total in any of those years. This program helps improve that situation. In addition, instead of going to major population centers like London or Paris, students involved in this project travel the unique and less-well-tread grounds of north Iceland. Williams is confident that this program will encourage a good portion of students to pursue careers as scientists and give them self-confidence and other tools that are critical in successful science careers.

Enhancement of Student Professional Network

The daily interactions over a six-week period between undergraduates, graduate students and faculty from the U.S., Iceland and other nations build long-lasting personal and professional relationships that help serve both the students and faculty as well as encourage the students to mature into capable researchers. Initially, the camaraderie of this network of science colleagues encourages students to stay in science as a career. Later, these relationships and interactions make the transition from undergraduate to graduate to practicing scientist easier by giving them trusted colleagues from whom to seek advice and counseling during those transitions. The network relationships developed in this program are integrated into other student/professional networks in place at SU. For example, SU has a student chapter of the Washington Academy of Sciences (currently the only student chapter in existence) and participates in the Undergraduate Affiliate Network of the American Society for Biochemistry and Molecular Biology.

Faculty Mentoring and Student Research

As part of the student training program, a major mentoring activity will be guiding students through an international collaboration involving scientists from very different scientific disciplines and from different cultures. Survey data indicate that students believe the most important part of their research experience is the relationships they form with their mentors. Throughout this project, students are

engaged in every aspect of the scientific endeavor. "I provide as much help and guidance as each individual requires for each endeavor, and I remind them that what they are currently learning in the classroom and laboratory is not the 'final product,' but only the first pieces of a larger picture," commented Williams. "I teach them that the skills and techniques they are learning are tools that they can put in their personal toolbox – tools that can be deployed in the future to contend with whatever scientific problem they are addressing."

Williams has a strong track record for building solid professional mentoring relationships with his students. In the past 11 years, 28 undergraduate students under Williams' supervision have presented the results of their research at 19 major meetings. Thirteen of those students presented their work at the meetings of professional societies, including the American Physiological Society, the American Society for Biochemistry and Molecular Biology, the American Association for Gravitational and Space Biology, and the Society for Integrative and Comparative Biology. Many more have presented at local and regional meetings. Since 2004, 42 of Williams' students were granted a total of \$11,187 in Henson School of Science and Technology Undergraduate Research Awards. Five students participated in the Guerrieri Summer Research Program and were collectively awarded \$14,816, four students used the \$2,000 they were awarded through University Student Academic Research Awards to travel to meetings, and several were successful at procuring funds from sources off campus, including two \$6,000 Colgate-Palmolive Fellowships and a \$500 Sigma Xi Grant-in-Aid of Research.

In 2005, Williams was awarded the Outstanding Research Mentor Award at SU, and in 2006, he was the recipient of a University System of Maryland Board of Regents Excellence in Mentoring Award.

Cultural Transition From the U.S. to Iceland

To help the student researchers prepare for their trip to Iceland, SU hosts a series of seminars and open discussions describing

what the students can expect to encounter in Iceland. Participating faculty show photos of previous visits and discuss the food, dormitory and hotel accommodations, travel arrangements, currency, laundry, electrical issues (plug adaptors and transformers), and many of the details of Icelandic culture that may not be immediately obvious when they arrive (e.g., no tipping at restaurants and shoes are to be removed when entering homes). Most everyone in Iceland speaks English, so there is usually not a serious language barrier. In addition, Icelanders are very welcoming. They seem to genuinely like visitors and they put a lot of effort into seeing that their guests are well cared for and happy.

Williams and his colleagues strongly believe that the cultural experience of visiting Iceland is also a very important aspect of student training. Students have daily 30-minute lessons in Icelandic language and are immersed as much as possible in Icelandic culture. Group trips to see the work of local artists displayed in Skagafjörður Library and Archives, in the Safnahús in Sauðárkrúkur, and to the Glaumbær Folk Museum (with an 18th century turf-house farm) are included. Trips to Mývatn, Thingvallavatn, Thingvellir, Hvalfjörður, and the cities of Blönduós and Hofsós are also organized. During the weekends, the team has the opportunity to visit Reykjavik to explore the world's most northern capital city. Students also frequently enjoy horseback riding, river rafting and many hiking trails close to campus of HUC.



Dr. Eugene Williams and some of his student scientists



Bush Foundation Funding Renewal Enables SU to Continue Family Literacy Program

Former First Lady Barbara Bush continues to support SU's May Literacy Center. The center received a grant renewal from the Bush Foundation for the fall, spring and summer 2011. SU is one of only three grant recipients in the state to receive funding renewal. In the past, the Bush Foundation has only provided start-up grants.

Three faculty members from SU's Seidel School of Education and Professional Studies, Drs. Gwen Beegle and Joyce Wiencek of the Education Specialties Department and Dr. Chin-Hsiu Chen of the Teacher Education Department, initially received a \$49,974 grant from the foundation's Maryland Family Literacy Initiative in 2010. Wiencek acquired the \$49,000 grant renewal, which, along with additional funding from SU, will enable the center to continue its literacy program through next spring. The grant supplies

program funding, meals, staffing, giveaways and transportation, if needed. This spring, Wiencek and education instructor Kristina Belcher traveled to Louisville, KY, to present at the National Family Literacy Conference.

Wiencek and her colleagues saw a grant call for literacy, so they submitted a proposal. "We honestly did not expect to get funded, but we got funded the very first time we tried," explained Wiencek, who currently directs the program.

The funds support the "Promoting Literacy at Home: Parents and Children Talking, Reading, Writing and Creating Brighter Futures" program at the University's May Literacy Center, which primarily serves low-income families on the lower Eastern Shore. The focus of the program is to help elementary school children, ages 3-11, build their reading literacy skills. The children and their parents attend weekly sessions at the center and participate in field trips. Families also receive books and other materials to support literacy at home.

Since the program's inception a little over a year ago, the May Literacy Center has grown. Parents' word of mouth helps to keep the sessions full, but the center also has forged alliances with local area schools to help recruit participants, most notably,

IN THE COMMUNITY

Pinehurst Elementary and Prince Street Elementary, both located in Salisbury, MD. According to Wiencek, the staff, which consists mostly of graduate and undergraduate students, had planned for 20 families, but 23 families – that is, 23 adults and nearly 40 children – showed up on the first night of the summer 2011 program.

The program has also grown to help meet the family literacy needs of the area's Hispanic population. "A third of the families coming to us right now are Hispanic (Spanish speaking) and they want to learn English," said Wiencek. "So we've modified our curriculum to assist them. We hired a translator and we now provide bilingual texts for children and parents. That's a big step for us."

Along the way to becoming established, the program has met with and still works to overcome some challenges. One of the greatest challenges has been recruitment and retention, which is fairly typical of family literacy programs across the country. "You are dealing with a fragile population; some of the families are homeless," said Wiencek. "We work really hard to keep the families that we get. We call weekly to remind them and encourage them to come and even provide transportation if they need it." The center also connects families with other community services.

Through its community outreach efforts, the literacy center has built a strong relationship with Shore Up, an Eastern Shore organization dedicated to helping families, particularly parents who are trying to improve their educational situation.

According to Wiencek, the center's proudest accomplishment is the change in the children who participate in the program. Many have experienced marked improvement in their grades and test scores. "We have teachers who are asking the parents, 'what did you start doing that has made the difference,'" commented Wiencek. The program also has helped to change kids' attitudes about reading. Unfortunately, the testing culture in public schools today doesn't foster the love of reading, something the literacy center strives to do on a regular basis. In fact, each week, every child leaves the center with a book. The children are also given crates to take home, decorate and use to set up their own home libraries. "It's great to see kids excited about reading and

wanting to come," said Wiencek.

The grant renewal and additional support from SU will enable Wiencek and her staff to run the program through next spring, but the center is currently seeking alternative funding opportunities to maintain and grow the program. A long-range goal for the center is to expand to include literacy programs for children, teens and adults, and there is definitely a need for expanded literary services. Wiencek said that she gets calls every day from middle schools and high schools in need of tutoring assistance, but the center doesn't have the resources to accommodate them all. One high school called and asked for 25 reading tutors. The Reading Clinic, another on-campus literacy tutoring program that Wiencek runs, has a waiting list of some 30 children.

On the Eastern Shore, literacy is a much bigger issue than many people realize. Wiencek gets calls from all kinds of groups and individuals looking for help. Some of the calls she gets are from adults who have had issues in their lives such as problems with drugs and they realize that part of the reason they are in trouble is that they didn't have an education to help them make better decisions. Also, the influx of the Hispanic population has had an impact.

One of the problems is that literacy tutoring is very expensive, and many families simply do not have the resources to help their children. Most parents don't know how to help their children, which is what makes the program at the May Center unique. When the kids come for the evening, the parents have to be committed to coming

with their children. During each session, Wiencek conducts a 45-minute parent education workshop to help them understand what the children are doing and what the undergraduate and graduate student tutors are doing. After dinner (the center provides the participating families with meals), the parents and children work together to practice what they have learned.

All who participate – faculty, students, parents and children – walk away with a good feeling about the program. Some of the parents who accompany their children to the weekly sessions are grappling with their own negative experiences with reading. When they start to have positive experiences, it begins to change the whole family dynamic. If a parent feels good about reading and is willing to read with his or her child, then the child is more likely to enjoy reading as well.



Dr. Joyce Wiencek





Meet the Dean: Clifton Griffin

Dean of Graduate Studies and Research

Q: You have just completed your first year at SU in a newly created dean role. What appealed to you about SU and how has the experience been so far?

A: There is a very positive energy at SU! I felt it from my first visit during the interview process. Sure, we have challenges, but we have high-quality faculty, staff and students at SU who are very engaged, dedicated and empowered. The upper administration is very dedicated to growing research and graduate studies. During this tough economic time, creating a new dean position was a bold move. I am honored to be the first person in this role and have felt completely supported by everyone at SU. Therefore, the short answer is that SU is campus with very positive motion. The opportunity to contribute to success and see the results of your efforts was, and still is, very appealing. Equally important is to have a great community for my family to thrive, which we have in Salisbury.

The last year has, of course, “just flown by,” as they say. I often state that the learning process for the first few months was like trying to get a drink of water from a fire hose! Getting to know new people and learning about their aspirations and ideas have been thrilling. I can’t wait to see the great successes of SU in the future.

Q: Define your role as Dean of Graduate Studies and Research. How does it benefit SU faculty and students?

A: The top priority for me is to maintain and create processes and resources that allow SU faculty and staff to excel. Specifically, I hope that faculty, staff and students will come to recognize my office as the leading advocate for advancing graduate studies and research at SU. We are here to serve their needs and enable success. We are here to help build collaborations. We are here to help others succeed. The most effective growth of research and graduate studies occurs when it is grass-roots-based, when faculty have a passion for their discipline and students. So, we need to “feed the roots,” so to speak. Through investing in our Mini-Grant Program, we allow faculty to cultivate ideas and collaborate with others. We will grow these internal investments in faculty, and they, and their students, will benefit. As we expand undergraduate research opportunities, our students will have more exposure to experience-based learning and develop greater creative and critical thinking skills. By becoming a single point of contact for graduate education, our office will serve as a dependable resource for timely and accurate information.



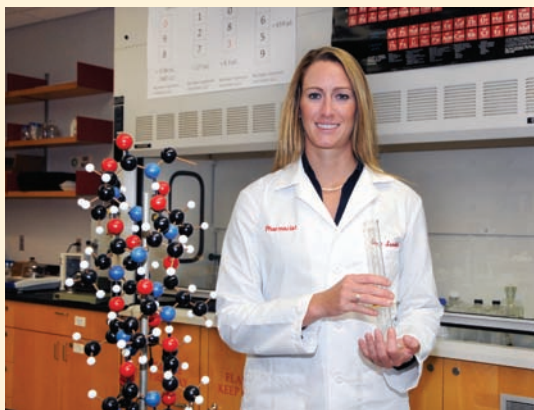
Q: What do you see as the greatest opportunities and challenges for growing research at SU?

A: Our greatest opportunity is our people. As I have said previously, we are an engaged campus and this engagement is only going to grow. As SU research and graduate studies grow in complexity and volume, there will be natural challenges that arise. We must build the infrastructure, people, business practices and resources necessary to sustain growth and bolster activity. Our ways of thinking must adapt to provide the most effective support. In just a few years, I believe that SU will be a campus of some 10,000 students offering at least two doctoral degrees, almost 20 master’s degrees and at least a dozen graduate certificates. Our research dollars will top \$10 million annually. We will be providing outstanding public service through continuing education and professional studies. These things can happen, and with them, we can maintain a strong sense of history, of who we are and what our mission is to the state and region. We are already *A Maryland University of National Distinction*, we are simply going to expand our areas of success.



Q: Given that SU is perceived as primarily a “teaching school,” how can research and scholarly activities benefit the campus?

A: SU has a strong and successful history, and we must be true to our mission. However, we can supplement and broaden this mission. Some of the best SU teachers are actively engaged in research and scholarship. By remaining current and relevant in their field, they bring “real-life” experiences into the classroom. Today’s college students are much more effective learners when they are “doing.” Therefore, undergraduates who work on research and scholarship outside of the classroom get to see theory and principles in action! Also, many of the grants awarded to SU are from programs dedicated to improvements in teaching and building capacity and successful students in critical areas, such as science and technology. Therefore, research and scholarly activities are simply an extension of our teaching mission.



Q: Why is it important to have a magazine dedicated to research and scholarly activities at SU?

A: By publishing this magazine, we are displaying some of our greatness. There are many fantastic research and scholarly activities at SU. It is important to communicate and celebrate the positive contributions that SU faculty are making to society. SU has research that stretches from our campus and local community, throughout the state, and to several foreign countries. I believe that people are going to be very impressed when they read about some of these activities. We are an engaged campus, and we must be deliberate in our communications about the activities of our faculty. News media and online sources play a pivotal role in our research communications strategies. However, it is still important to put information directly into people’s hands, especially our friends outside of academia. We have an obligation to inform the public about our activities. From a purely strategic perspective, the more others hear about our great researchers and scholars, the more opportunities that we will have for building collaborations and securing future funding. SU is like an undiscovered pearl. We are tucked away here on the Eastern Shore of Maryland doing great research and scholarship, and now we are going to dazzle the rest of the world with our brightness!

SU Provost Dr. Diane Allen (third from left) with the academic deans (from left) Dr. Dennis Pataniczek (Seidel), Dr. Bob Wood (Perdue), Dr. Clifton Griffin (Graduate Studies and Research), Dr. Alice Bahr (Libraries and Instructional Resources), Dr. Maarten Pereboom (Fulton) and Dr. Karen Olmstead (Henson).

Q: How do graduate studies and research benefit the local community, region and/or state?

A: First, from a practical perspective, more graduate students equals more members of the community who are contributing to the local economy. Life-long learning and the need for constant “retooling” are integral components of society. Most of the SU graduate students are part time. They are members of the community workforce. They are pursuing graduate degrees to be more competitive and to achieve necessary professional credentials. Additionally, SU is contributing to a more highly qualified health services community. Next year, our first doctoral degree will begin in nursing. This will provide more highly trained nursing professionals for our community. Our second doctoral degree is proposed for education, thereby strengthening our local teaching and service workforce. We are pursuing additional graduate certificates and degrees that will continue to bolster the competitiveness of our citizens from locally focused programs to programs with an international appeal.

As for the positive impacts of our research, simply read about the projects highlighted in this magazine. We are addressing real-world problems, at all levels. Our research and scholarly activities related to literacy and performing arts have a direct positive impact on citizens of our community and state. Our children benefit directly from these efforts. We have very effective GIS researchers exploring the use of spatial data on everything from broadband coverage to flood maps to emergency preparedness. This research is completely relevant and critical for citizens throughout the state and region. There is arguably no topic more relevant to the average citizen than climate change, and we have researchers at SU engaged on the topic. It is important for the community and state to understand that SU research and scholarship are relevant to them, and frequently these outcomes have a direct positive impact on their lives.



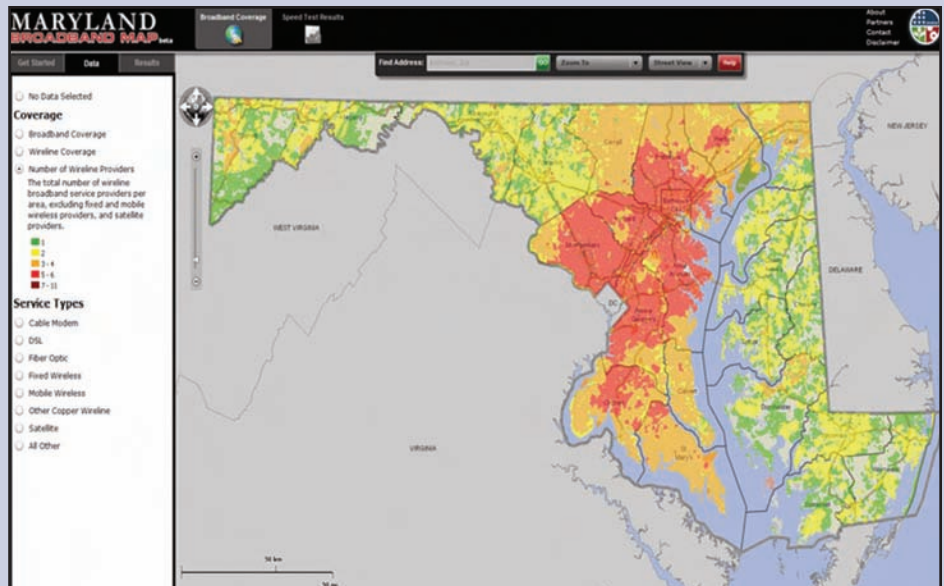
The Eastern Shore Regional GIS Cooperative

One Facet of SU's Commitment to Public Service

Knowing where you are is all the rage in 2011. From GPS units in your car that update the path to your destination based on real-time traffic to smart phones identifying the closest hospital or Chinese restaurant to social media sites identifying the names and pictures of people within a block or two of you who have similar likes and dislikes, location-based services are a huge growth industry. And behind the scenes of each of these examples (and infinitely more) are Geographic Information Systems (GIS). GIS comprise the hardware, software, data and processes that allow users to take one's location, determined on-the-fly using Global Positioning Systems (GPS), and combine it with the location of other features (roads, hospitals or Chinese restaurants) to answer spatial questions and solve spatial problems.

Of course, governments and businesses have known the power and the utility of GIS for some time. The ability to take maps of two completely different phenomena (say crime incidents and derelict houses) and overlay them so that you can see where the two phenomena relate in space has existed commercially since the late 1970s. Because that ability to overlay different maps can be combined with real-time locations from GPS-enabled devices, the opportunity for decision makers to have extremely pertinent information from which to make decisions is greatly enhanced.

However, not all organizations have seized that opportunity, particularly on Maryland's Eastern Shore. While Google Earth may be free to consumers, a



professional GIS and the precision data it requires are expensive, complicated and technical. Hiring someone in your organization with the necessary skill set to leverage the organization's investment in GIS technology and data involves a significant commitment of time and resources. Many local governments and small businesses of the type we have on the Eastern Shore simply don't have that level of resources individually.

To help solve this problem and bring the power of GIS to local governments, Salisbury University launched the Eastern Shore Regional GIS Cooperative (ESRGC) in 2004. The ESRGC was the brainchild of

Michael S. Scott, Ph.D., GISP, a professor of geography and geoscience at SU. Having grown up just outside of Salisbury, Dr. Scott observed the dichotomy

between the metropolitan core of Maryland and its rural hinterland.

While earning his doctoral

degree, he worked closely with local Councils of Government in South Carolina. These CoGs used collective resources from both state government and local governments to provide technical services to rural counties and municipalities that they could not afford individually. Upon returning to his Alma Mater, SU, in 1998, he realized that the counties of the Shore could benefit greatly from a regional cooperative approach to GIS. Once the Maryland General Assembly approved the formation of regional councils in the mid- and lower Eastern Shore in 2003, he proposed that the two new councils use GIS as an important value-added service that could be provided regionally. Thus, the ESRGC was funded by and continues to be partially funded by grants from the MidShore Regional Council and the Tri-County Council of the Lower Eastern Shore of Maryland.

In the ESRGC's over seven years of operation, it has completed over 100 GIS grants and contracts, taking in nearly \$5 million in revenue for the University. Every county and nearly every municipality on Maryland's Eastern Shore have taken



advantage of the seven full-time staff that operate the sophisticated GIS and mapping technology that the ESRGC makes available at a fraction of the commercial cost. And rather than compete with local businesses, the ESRGC has partnered with nearly a dozen large and small private firms to leverage the capabilities and cost of the ESRGC for their own clients. Beyond the value of the GIS services that the ESRGC provides, and the information that it generates for use by Eastern Shore decision makers, the ESRGC has conducted a number of innovative research projects that have advanced our knowledge about everything from wetland mapping to flood vulnerability to the availability of high-speed Internet service to the path of Captain John Smith's voyages in the Chesapeake Bay in 1608!

But perhaps one of the greatest contributions that the ESRGC has made to GIS regionally is the commitment to training the next generation of the GIS workforce. It is estimated that nearly 100 SU students, primarily majoring in geography, have held intern, graduate assistant or technician positions with the ESRGC since it was founded. The students in these positions have accomplished everything from capturing the location of sewer manholes and stormwater drains with GPS, discovering the land use along the Nanticoke River in the 1840s, mapping violent crime in the City of Salisbury, or sampling the strength of mobile wireless broadband signals across the State of Maryland. Many of these SU students work at the University, but some are placed on-site with local governments. Nearly all of our ESRGC alumni have gone on to fruitful careers in GIS, either on the Eastern Shore or elsewhere. In fact, all members of the ESRGC technical staff are SU alumni!

As the ESRGC looks forward to helping to fulfill SU's public service mission in the coming years, there will continue to be ever-present challenges. As the technical sophistication of our clients has grown, so



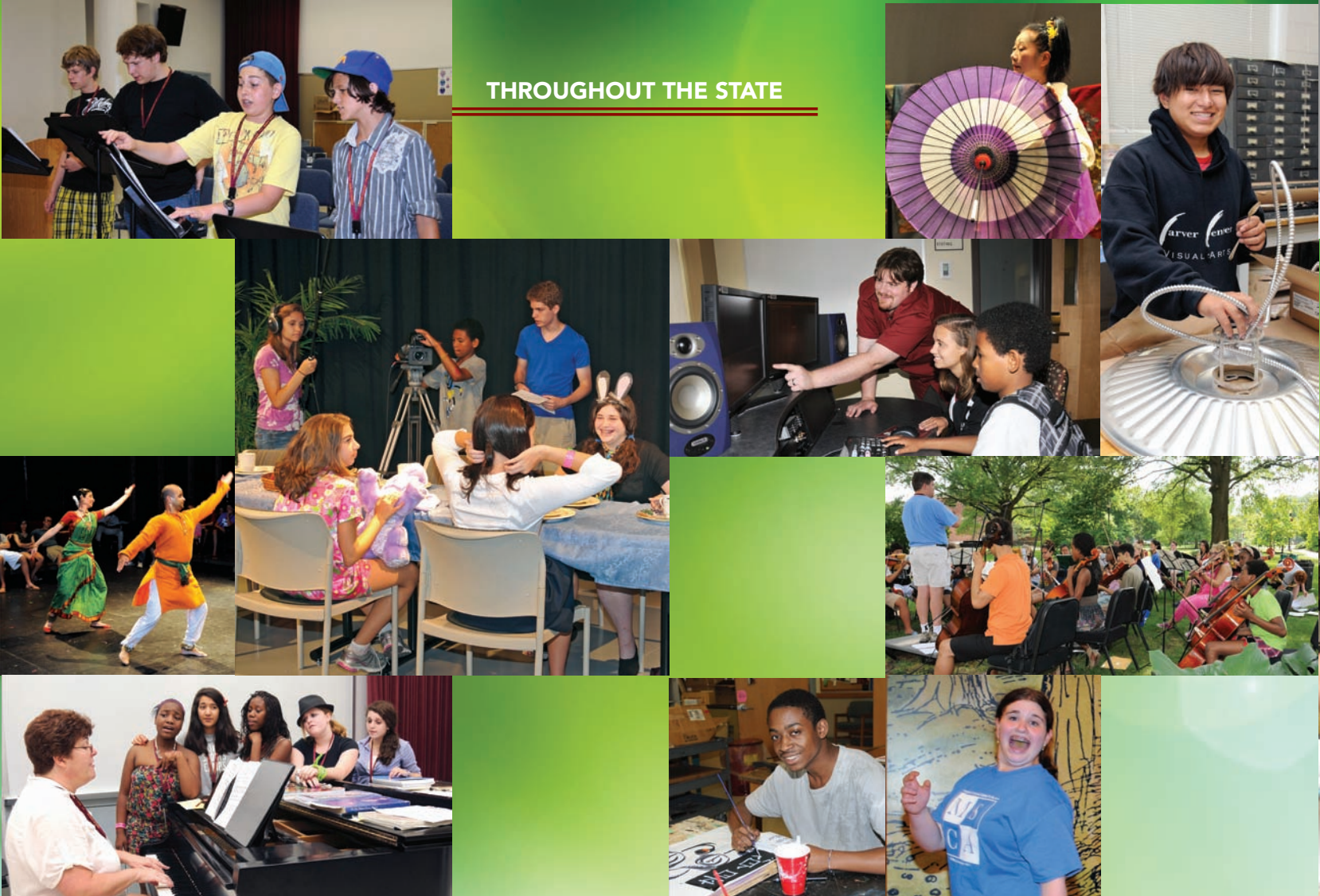
Dr. Mike Scott (right) and members of the ESRGC staff

have our capabilities. The ESRGC now has two full-time GIS programmers who create custom Web-mapping applications as well as mobile GIS-enabled apps. The race to stay one step ahead of the accelerating pace of technology continues. As more small businesses realize the predictive power of GIS modeling, the ESRGC will find creative ways to serve our entrepreneur community while continuing to support local governments. Finally, the ESRGC is being asked to take a statewide leadership role

regarding GIS standards and innovative research initiatives. While such attention seems rarely paid to those who choose to serve the resource-challenged periphery, rather than the prosperous metropolitan core, the consummate GIS professionals at the Eastern Shore Regional GIS Cooperative are up to the task.

For more information on the ESRGC and the services it provides, please see www.esrgc.org.

THROUGHOUT THE STATE



Maryland Summer Center for the Arts

Summer Arts Youth Program Returns

July 2011 marked the return of the Maryland Summer Center for the Arts (MSCA) following a one-year hiatus. Ninety-two young artists and performers gathered at Salisbury University for a two-week arts education program, providing talented middle and high school students across the state with an opportunity to study visual arts, music, musical theatre, digital video production and acting. In addition to taking classes in their chosen disciplines, the students went on field trips and attended workshops and performances by guest artists including the Shizumi Dance Theatre of Japan and storyteller Noa Baum. Field trips included the Shakespeare Theatre and Kennedy Center in Washington, D.C., and the Baltimore Museum of Art, among others.

The program is extremely competitive; students must audition for the chance to work with dedicated artists/teachers and other professionals. In 2011, approximately 200 students from around the state auditioned for a chance to take part in the program. The students who participated attended five to six hours of class each day

and lived on campus in a small-group, community-centered environment.

The students came to develop their talents and showcase their work. Students from all socio-economic backgrounds and ethnicities, kids from rural areas, small towns and big cities all came together to sharpen their skills, make new friends, learn, grow and have fun. Although most students were from Baltimore, Washington and the surrounding areas, some traveled a great distance in order to participate. "We had one student who came all the way from Allegany County, which is in the northwestern corner of Maryland – about as far from the Eastern Shore as you can get," said Robert Smith, SU theatre professor and program director.

Smith, who has served as the program's director since 2001, is a long-time veteran of the Summer Center program. He first became involved in the program in 1978. Similar programs have existed throughout the state for the past 40 years.

This year, the program was sponsored by funding from SU, a grant from the National Endowment for the Arts and donations from

individuals – some of whom were parents of Summer Center students. The program was placed on hiatus in 2010 as a result of massive budget cuts to state-funded programs. "Losing funding in 2010 was devastating for all of us – faculty, staff, counselors and students," commented Smith. "This year there were more scholarship applicants than ever before – people who truly deserved to be in the program but could not afford the costs. Many students came from families facing financial hardships – some parents had recently lost their jobs."

"It was truly remarkable that all of our staff returned this year after the 2010 hiatus. This speaks volumes about the dedication and passion of those who are involved," said Smith. Some Summer Center students kept in touch with Smith during the hiatus as well. He received numerous e-mails from students thanking him and his staff for such a rewarding experience. Many were elated at the prospect of participating in the 2011 program. In an exuberant e-mail to Smith, one three-year Summer Center veteran



wrote: "I literally jumped up, spun in circles and then cried because I was so excited."

More than half the participating students return for two or more seasons. Many start in seventh grade and stay through the end of their senior year in high school. Some even return as counselors and later as instructors. "It is very rewarding to see them grow from awkward middle school students into sophisticated young adult artists ready to begin their college careers," said Smith.

Although there were fewer students on campus than in previous years, Smith and his colleagues saw this as both a challenge and an opportunity. "The orchestra only had 30 members this year instead of the usual 60, so we couldn't do some of the full orchestral arrangements we had done in previous years," explained Smith. "On the other hand, the smaller number of students meant that each participant received more individual attention from the instructors. Also, the smaller ensemble enabled us to do some more chamber orchestra arrangements, only with a much fuller sound. We were able to do some really creative, challenging things with the orchestra students."

One of the unique aspects of the MSCA is the close friendships the students forge during the intense two-week session. "They

form very strong bonds with each other," said Smith. "They are together for only two weeks, but many remain friends for years," he added. One group of participants has even created a Summer Center Facebook page to help alumni stay in touch.

The Summer Center program offers participants numerous opportunities to perform publicly and showcase their work for each other and the community. This year, the program partnered with Barnes and Noble Booksellers in Salisbury. Students of acting, music theatre and orchestra had the chance to give live, in-store performances during the course of the two-week session's Outreach Initiative. The orchestra students also performed at the Baltimore Museum of Art Sculpture Garden and the Inner Harbor.

Smith commented that the experience is transforming for just about all who participate. For many middle school students, this is their first experience away from home. In addition to developing their skills as artists, they must also learn how to cope on their own and get along in a community living environment. They also develop practical living skills such as doing their own laundry and making healthy eating choices. "For some, this is also the first time they are with so many other students who

share their passions. In their home town or school, they may be considered unique or odd, but here, they are part of a supportive community of fellow artists," said Smith.

"The program is about the journey – the process of learning, not so much an end result," said Smith. The students don't work toward one final production at the end. Rather, they have the opportunity to learn new skills and methodologies, practice what they learn, take risks, and try out new ideas. "It's a safe yet challenging environment where we encourage them to take risks and even if they fail, it's okay because they have grown and learned so much in the process," said Smith. He added: "Having worked with this program for so long, I've seen how transforming the experience is for kids. That is what keeps me coming back year after year."



Robert Smith

The Evolution of Undergraduate Research at Salisbury University

By Nicole Ciarpica

For over a decade, Salisbury University has been passionately promoting undergraduate research on its campus and throughout the nation.

The University hosted the National Conference for Undergraduate Research (NCUR), first in 1998 and later in 2008, which is the largest professional organization in the country dedicated to undergraduate research. Salisbury is the only Maryland university that has ever hosted this national event and the first university in the country to host the conference twice.

"Their national reputation is what initially attracted me to Salisbury University," said Dr. Karen Olmstead, dean of the Henson School of Science and Technology. "What I have learned since coming to SU is that engagement of students in genuine and high-quality research experiences is a natural extension of the overall mission of excellence in undergraduate education."

Undergraduate research is one of the reasons Salisbury University prides itself

in being *A Maryland University of National Distinction*.

At the 2008 NCUR conference, 2,600 scholars representing over 300 different universities gave presentations of their research among their peers on over 56 different topics.

Dean Olmstead attended NCUR in 2008 when she was still working for a flagship university in the Midwest. "I was familiar with Salisbury University through its strong national reputation for undergraduate research, which is driven in part by student participation in and hosting of NCUR," Olmstead said. "I attended NCUR at SU to recruit graduate students, recognizing the strength of SU and other students participating in NCUR. These highly motivated, academically talented students are exactly the type you want to bring to your graduate programs and who are sought by employers."

SU was also the only college last spring to have multiple winners of the Greater Research Opportunity Fellowship, which encourages research in the fields of biology,



geology, chemistry and environmental studies. The Environmental Protection Agency could only pick 30 students nationwide to award these prestigious fellowships. The two winners last year, Emily Thorpe and Jonné Woodard, and the winner this year, Jessie Johnson, each received the fellowship worth \$42,700, providing funding for junior and senior years of college, paid internships at EPA facilities during the summer between those years, and a monthly living allowance.

This high level of achievement in undergraduate research is not typical at most universities. "We have very bright, outstanding students," said Dr. Mike Lewis, the faculty mentor for the three EPA winners. "We try to do things with our undergraduates that most universities only do with graduate students."

This April, Salisbury hosted its 10th annual Student Research Conference, an event that celebrates SU students and the research about which they are passionate. Student researchers gave over 100 15-minute presentations in front of faculty mentors, their peers and this year's speaker, SU alumna Diane Auer Jones '86.

Jones shared a message of "Research – It's Not Just a Job, It's an Adventure." Her adventure started at Salisbury when she graduated with a B.S. in biology before earning her M.S. in applied molecular biology from the University of Maryland. Jones is a molecular biologist and currently the president and CEO of The Washington Campus. In 2005, she was selected by President Bush to help lead the higher education division of the U.S. Department of Education.

Salisbury students are researchers just like Jones was when she was an undergraduate. Doing research on topics that branch off from their main interest helps pinpoint which major they would like to pursue in graduate school. Undergraduate research is a hands-on experience that will give their applications to these schools a competitive edge. It also enhances the everyday academic experience.

"Undergraduate research absolutely transforms a dry academic exercise into something that's exciting. You're no longer just learning information. You're applying information with a goal of coming to understand something that nobody knows yet," said Lewis.



Undergraduate researchers also have the support from the deans of their schools, in particular—Dean Olmstead is joined by Dean Maarten Pereboom of the Fulton School of Liberal Arts, Dean Bob Wood of the Perdue School of Business, and Dean Dennis Pataniczek of the Seidel School of Education and Professional Studies.

"Undergraduate research is the norm in the Henson School, with students in every department actively engaged in projects ranging from health education to conservation genetics, animal behavior and physiology, chemical synthesis, planning and hazard mitigation, and computer networks and simulation," Dean Olmstead said. "We support and encourage undergraduate research primarily through our faculty who maintain active research programs."

The Henson School also has an endowed program, the Guerrieri Undergraduate Research Program, which provides funding for the purchase of supplies and stipends for students working on summer projects. The program recently received a one million dollar grant from the National Science Foundation, which provides more stipends and supplies for early research experiences for students during their first and second summers on campus.

"This summer, we have more than 20 students participating in funded research experiences. In addition to their work in the lab, field and community, our summer researchers meet regularly at 'brown bag' lunch meetings to talk about their experiences and for community-building activities like baseball games, beach trips and picnics," Dean Olmstead shared. "The summer research program has really grown over the past 10 years and has developed a strong sense of research culture among students and faculty."

This year also marked the 30th anniversary for the Thomas E. Bellavance Honors Program. This program offers Honors courses that introduce different learning experiences that are not available in the standard courses offered. It is another way for students at Salisbury to go above and beyond what is required for their degree.

Undergraduate researchers come from all different academic departments and among their biggest cheerleaders is their faculty mentor. These mentors encourage the spark of interest a student may develop for a problem they see, a question they

ENGAGED STUDENTS

want answered or an opinion they hold.

A devoted faculty mentor, Lewis teaches his students how to think critically. "With Emily Thorpe's topic about the Chesapeake Bay and restoration effect – it's a biology problem, a chemistry problem, a pollution problem, an economic problem, a historical problem, a philosophical problem, a sociological problem," Lewis said. "We take a problem through different classes and we try to academically discuss and work together to understand and solve these problems."

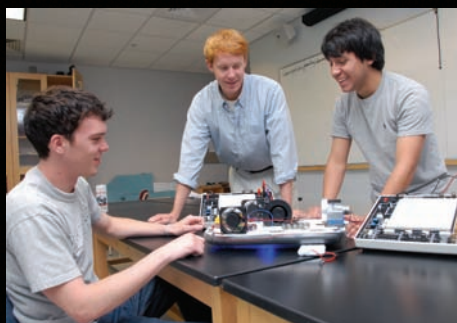
History major Amanda Tuttle's desire to start her undergraduate research was sparked by reading a book with which she disagreed. She read the *Mothers of Invention* by Drew Gilpin Faust, president of Harvard University, which argues that Southern women struggled with the new responsibilities they were faced with when their husbands were away fighting during the Civil War.

"I read journals and diaries from women who said otherwise. I used Faust's evidence against her in some places," Tuttle said. "I found that Southern poor women adapted gender roles to support the war effort by being nurses. There was also a ladies association that formed during the war to provide clothes, blankets, etc."

Tuttle became engaged in her research in Dr. Jay Carlander's history research seminar. The main assignment for the course was to write a longer research paper that allowed students to gain experience asking questions about the past, doing research and devising an analytical, evidence-based argument that challenges existing interpretations; a course taught more like a graduate seminar than an undergraduate lecture class.

"What pleased me the most about Amanda's participation in my seminar and her presentation of her research at conferences was that she exemplified this spirit of research. She, a junior history major at SU, challenged the thesis of Harvard's president – an authority figure if there ever was one – and thereby demonstrated that doing real research leads to confidence and bold thinking, something we need from every generation," Carlander said.

Tuttle presented her findings at NCUR 2011 at Ithaca College in New York and was approached by a professor at Harvard who was a member of the Daughters of the



Confederation. The professor was so impressed by the presentation that she suggested Tuttle send her research to the Harvard president.

"Salisbury professors are there to help you and promote all you can do. Professor Carlander pushed me to do NCUR, and without NCUR my whole college life would be drastically different," Tuttle said.

Troy Grube, an exercise science major and research assistant in the Laboratory for Human Performance, also presented his findings of an agility ladder coordination training experiment at NCUR.

"NCUR is a lot of fun. You are more in front of peers than professors at other colleges and it's less of a high-pressure situation. You are given 10 minutes to talk and 5 minutes for questions," Grube said.

Grube has always been an athlete who trained on an agility ladder, which promotes a wide range of different foot and movement patterns. The question he asked was whether training on an agility ladder improved one's ability to become an athlete and why. Using two groups of subjects from the Theatre and Dance Department, one group was trained on the ground and one lifted off the ground.

"We tested them for different abilities – we wanted to see how high their jump was, 40-yard dash, endurance, and then we trained them. The theory was that if we saw those things improved in the group lifted off the ground, the reason you get better working out on an agility ladder is because it helps the neural adaptations rather than physical adaptations from being trained on the ground."

Grube said that the results were trending in that direction, but the biggest finding was that more research needed to be done.

"As a research team, we conduct applied exercise research studies for the purpose of contributing new findings to the scientific literature in the exercise sciences, but also to provide hands-on learning opportunities for our students in exercise science," said Dr. Scott Mazzetti, director of the Laboratory for Human Performance. "The students can then build their professional resumes and this gives them better chances to earn paid graduate assistantships to premier graduate programs."

Of the five seniors working in the research lab last year, Mazzetti was

successful in helping to place all five of them in paid graduate assistantship programs.

Grube credits Mazzetti with making the project go as smoothly as it did. As the experiment called for human subjects, Grube had to have the project approved by the Institutional Review Board (IRB), which is concerned with the safety and ethical treatment of human subjects in research projects.

"Professor Mazzetti led me the whole way. He helped me come up with the idea, knew the channels to keep it moving, met with the IRB committee, knew how to say things and knew what they'd have to say," Grube said. "Had I been doing it alone, it might have put a hold on the entire project. He did more work than he's gotten credit for that's for sure."

Caitlin Conway, a physics major, also presented her project about the effects of human-generated sounds on saltwater fish, brackish water fish and freshwater fish at NCUR. She became interested in the subject because of the research of Arthur Popper, a professor at University of Maryland College Park.

"I chose to work with clownfish because they can't handle a lot of stress and damselfish that can handle change. They're very hardy," Conway said.

Conway wanted to simulate the effect air guns in the ocean have when they send out high frequency sounds to study ground surface, find oil and explore the ocean floor. She used a high frequency sonar ping in the 2 kilohertz range in the fish tank to simulate a low frequency boat engine in the ocean, which is in the 120 kilohertz range.

"I helped Caitlin design and build the system in order to run the experiments as well as the computer programming," faculty mentor Dr. Mark Muller said. "From the science side of the project, I helped Caitlin design the experiment following the scientific method. She ran all the experiments on her own."

The setup to measure this cause and effect was very advanced. To put it simply, there was an underwater speaker monitored with a hydrophone.

"I studied the fish's behavior prior to exposure, during and post exposure. With the yellow tailed damselfish, there were no signs of stress," Conway said. "But the clownfish showed aggression after the high



frequency was emitted. They grouped in threes at the bottom of the tank and attacked each other for about 30 minutes. This appears to be from the effect from the sound or could be due to the vibration."

Like other undergraduate researchers, Conway had to be very dedicated to her project to make time for it on top of her heavy classroom workload.

"This project made me work harder because I had to know more than what I was learning in class to do my research. It gave me a glimpse of what working in the real world is like," Conway explained. "I did this for the experience because in science and physics, if you don't have any experience your knowledge isn't useful in the workforce."

Caitlin Averill's research all started with a poster she had to make for one of her psychology of nursing classes. The poster represented her research to explain one of her patients in a creative way.

"My topic was a case study about a patient of mine who had a complex and experienced hallucinations. I looked at the hallucinations and the synopsis of those – how nursing students can assume diagnosis of schizophrenia when there are a lot of psychological illnesses that have features of hallucinations and delusions," Averill said. "As students, we pin hallucinations and delusions to schizophrenia and that can

hinder your therapy communication."

Averill said that her faculty mentor, Dr. Tina Brown, had the knowledge to help her show what she wanted to say, how to phrase things and to make sure the project had the research aspect it needed.

As a busy nursing student, it was hard for Averill to find extra time for research. She ended up missing three days of her clinical, having to make up 10 clinical hours. But she said she still wanted to do it.

"I learned different things I'd never hear about in the classroom," Averill shared. "For me, it was all personal. It was more of an accomplishment of doing something I never thought I'd do."

Undergraduate researchers have questions they want answered. The answer isn't in a textbook – they have to build their own conclusions.

"In ancient Athens, according to Plato, Socrates refused to take the experts' word for it; rather, he set out to examine important questions himself, regardless of what the authorities insisted was the proper way of thinking," Carlander said. "People pursuing research in this manner make democracy a messy, argumentative affair, but universities like Salisbury are places where we view that kind of aggressive, skeptical inquiry as one of our greatest strengths, and a force for the improvement of our society and our world."

SU Rolls Out Faculty Mini-Grant Program

Internal Grant Funding to Enhance Professional Development and Enrich the SU Community

In its ongoing effort to support the development of research, scholarly or creative programs that enhance faculty career development opportunities as well as SU's academic programs, the Office of Graduate Studies and Research recently unveiled its new faculty Mini-Grant Program. The mini-grant serves as a supplementary program, providing recipients with funding for expenses that may not be covered by existing internal or external research grant awards.

In addition to the new mini-grant, the Salisbury University Foundation, Inc. also sets aside a portion of its earnings, about \$30,000 annually, to provide internal funding for faculty and staff professional development and research. Faculty members use these funds to attend conferences, develop new programs for the University or other activities that enrich the quality of life for the SU community.

Researchers, scholars and artists from all academic disciplines and who have been appointed as tenure-track faculty (assistant professors or higher) are encouraged to submit their proposals to the Office of Graduate Studies and Research for initial consideration. The office awards grants based on creativity and scholarly and/or research significance of the proposed activities. Awards may be used for supplies, equipment, computers for field data collection, domestic and international travel, consultant fees, and more.

To date, SU has awarded nearly \$24,000 in mini-grants to faculty researchers from all four academic schools. This year's awardees are profiled here.

Does Community Media Belong to the Community? A Case Study of Women's Practices from an Urban Resettlement Neighborhood in India

Vinita Agarwal

Assistant Professor of Communication Arts

Agarwal will use funding from the Mini-Grant Program to research how community media in India represent local voices and traditions related to advocating for change in women's health and social practices. Study participants will include healthy women over the age of 20 from a neighborhood resettlement colony in Delhi, India.

A small but influential body of literature has documented the power of community voices, not traditionally heard in the mainstream media, to bring about meaningful social change. Yet the manner in which community media operates, and the degree to which it is effective in promoting the well being of the communities it represents, is not widely understood. Through interviews with local women in the resettlement community, Agarwal and her team will study the extent to which community media represents local traditions and voices specifically within the context of women's empowerment in health and social practices. By identifying the social and cultural practices affecting the health and nutritional status of marginalized women, the study will suggest ways in which messages on community media outlets can address these social and cultural factors.

Agarwal anticipates that the project findings will directly impact the way in which community media programs design and present public service messages about health and hygiene practices and nutritional choices. Additionally, the project will augment the growing body of literature examining the role of grassroots, community-driven media in influencing social and health-related behavioral change.

Teaching New South Womanhood: Education, Race and Religion in the Modernizing South

Sarah Case

Associate Professor of History

Case is currently working on a book titled *Teaching New South Womanhood: Education, Race and Religion in the Modernizing South*. Through a detailed study of three schools — The Lucy Cobb Institute, Spelman Seminary and Hindman Settlement School — the work explores the evolution of women's roles and duties, racial and class divisions and women's relationships to citizenship and state in the antebellum south.

Case's research examines how women of different classes and races used their education to challenge social expectations and assert public authority. Sensitive to ways in which gender intersects with ideologies of race and class, the study considers how education served to reinforce differences among women. Perhaps more importantly, however, it also illustrates ways in which education allowed women to cross racial and class boundaries and challenge social hierarchies and conventions. By emphasizing the actions of women as teachers, mothers and activists, as well as examining the shifting ideologies of womanhood, Case's manuscript brings a fresh perspective to the social, political and economic upheaval of the post-Civil War South and to the history of southern progressivism. The study also illustrates how women contributed to post-war political and cultural reconstruction.

Using education as a lynchpin, the study examines the efforts of women to reconstruct their own social identities, while striving to create their vision of the New South within a fully unified nation.

Arabidopsis Responses and Mutants Resistant to Nordihydroguaiaretic Acid (NDGA)

Patti Erickson

Assistant Professor of Biological Sciences

Erickson will use mini-grant funding to further her research involving the study of the functions of Nordihydroguaiaretic acid (NDGA), a phenolic compound produced by the Desert Creote Bush (*Larrea tridentata*). This compound has been found to have anti-oxidant properties and has been reported to inhibit inflammation, viral replication, bacterial growth and cancer progression. The role of NDGA in *Larrea* is unknown, although it is found throughout the plant and its secretions, and it can constitute up to 15 percent dry weight in leaves. This species of plant produces a large number of phenolic compounds in addition to NDGA, so extensive biochemical analysis is required in order to fully explore the variations of NDGA within the plant.

Since *Larrea* is a slow-growing plant, with a large, uncharacterized genome, it is difficult to study the role of NDGA in *Larrea* using molecular and genetic approaches. Therefore, Erickson and her team will use the fast-growing, genetically tractable plant, *Arabidopsis thaliana*, which lacks NDGA, as a model system to study the function of NDGA.

The project will serve to strengthen collaboration within the Biological Sciences Department and expand the range of experiments being performed in order to understand NDGA biology. Additionally, the project will provide research opportunities for students, as well as generate publishable data for presentations at conferences and peer-reviewed articles.

A Method for the Chemical Synthesis of Octahydroindoles (OHIs)

Stephen Habay

Assistant Professor of Chemistry

Habay will use funding from the Mini-Grant Program to investigate the synthesis of important alkaloids used to relieve pain and treat diseases such as malaria, cancer and Parkinson's disease. Alkaloids make up a large class of naturally occurring compounds produced by plants, fungi and bacteria. Many of these compounds are of great interest to scientists and pharmaceutical researchers, but the availability of a number of medically significant alkaloids is often limited to the very small quantities produced by living organisms.

During an investigation of how to synthesize alkaloid compounds known as decahydroquinolines (DHQs), Habay and his team of undergraduate student researchers discovered a previously unknown chemical reaction that produced a different, yet medically critical, set of alkaloid compounds known as octahydroindoles (OHIs). Habay's experiments and data collection will be extremely valuable to many chemists in their efforts to obtain larger quantities of alkaloid compounds used in the production of a variety of medicinal products. Furthermore, the potential impact of this project is of great importance to the SU community because the key chemical reaction under investigation was discovered in an SU laboratory by an undergraduate student, and it has an excellent chance for becoming a patented and published procedure for synthesizing medicinal compounds.

The Mini-Grant Program will provide funding for materials and supplies critical to the completion of the project, which will be carried out exclusively by undergraduate chemistry students under the supervision of Habay.

Social Work Student Awareness, Knowledge and Skills of Cultural Sensitivity and Competence

Batya Hyman,

Associate Professor of Social Work

This study examines the attitudes, knowledge and skills regarding the cultural sensitivity of undergraduate and graduate students in SU's Social Work Department. Hyman will research how well-intentioned individuals develop the capacity to work effectively with people who are different from themselves.

According to the Council on Social Work Education (CSWE), baccalaureate- and master's-level social work programs must graduate professionals who engage diversity and difference in practice. The council defines diversity as the intersection of multiple factors including age, class, color, culture, disability, ethnicity, gender, gender identity and expression, immigration status, political ideology, race, religion, and sexual orientation. This policy must be addressed by all social work programs in order to maintain accreditation.

One of the most important goals for SU's social work programs is to enable students to recognize the extent to which a culture's structures and values may oppress, marginalize, alienate or create privilege for certain groups. Students completing a social work program at SU should also gain sufficient self-awareness to eliminate the influence of personal biases and values when working with diverse groups of people, as well as understand and communicate the importance of difference in shaping life experiences.

The purpose of Hyman's project is to ensure that SU's social work graduates acquire the skills, attitudes and knowledge about diversity needed to be successful in their chosen careers. The ultimate goal is to use the data gathered during the study to develop a diversity course to be taught in the undergraduate and graduate social work programs.

Funding from the Mini-Grant Program will be used for travel expenses, to conduct graduate student focus groups at three different locations, data analysis software and transcription fees.

Health and Behavior Study Follow-Up

Karl Maier

Associate Professor of Psychology

Maier will use funding from the Mini-Grant Program to follow up with subjects who participated in a health and behavior study completed between 2008 and 2010. Maier worked with student researchers to build and implement a large, computer-based survey, consisting of questionnaires designed to measure a range of psychological conditions, including stress, depression, hostile personality style, etc. The researchers also collected

anthropometric data such as height, weight, body mass index and waist circumference.

The original participants will be invited back to examine changes in their psychological measures and their health risks over time, using the same survey and anthropometric assessment. In addition, the new study will include blood pressure and heart rate measurements, key variables in health risks that were not assessed in the original study.

Funding from the Mini-Grant Program will cover monetary compensation for participants as well as travel to present findings at meetings and conferences. The research team plans to present its findings at the annual meeting of the American Psychosomatic Society or the Society for Behavioral Medicine. The project will also provide undergraduate students with research opportunities such as interacting with participants, data management and analysis and longitudinal research, all of which are essential for preparing for post-baccalaureate studies.

Comparison of 11 Weeks of Resistance Training with Recreational Versus Maximal Concentric Muscle Actions on Exercise Energy Expenditure and Body Composition

Scott Mazzetti

Associate Professor of Exercise Science

Mazzetti and his team will investigate how energy expenditure is influenced after resistance training, and how different contraction intensities will affect energy expenditure in women.

Medical costs for overweight or obese Americans are estimated to be approximately \$147 billion annually. This data, combined with an increasing incidence of obesity indicate a significant need for research initiatives that can help improve preventative measures for obesity. The American College of Sports Medicine and the American Heart Association recommend strength training for a minimum of two days a week as a component of a successful exercise program. Resistance training can increase muscle mass, which may result in an increased resting metabolic rate, but most research suggests that energy expenditure during exercise is the most beneficial in terms of weight loss or obesity prevention. Unfortunately, nearly all resistance training studies report only modest reduction in body fat.

Studies on male subjects conducted by Mazzetti demonstrated that energy expenditure increased during and after resistance exercise when performed with maximally explosive contractions, which require the lifter to raise the load smoothly, without jerking or bouncing. The influence of explosive contractions on energy expenditure has not been examined in women, although obesity is more prevalent. Mazzetti will compare changes in resistance exercise energy expenditure following 12 weeks of weight training with either maximally explosive or recreational contractions in overweight women. This represents a novel approach to studying the efficacy of resistance training as a preventative measure for obesity in women.

Employee and Employer Perceptions of the Chinese Labor Contract Arbitration Committee; Case Study of the Unionization of Wal-Mart in China

Patrick McDermott

Professor of Management

McDermott will use funding from the Mini-Grant Program to expand his field research work on labor relations in China. McDermott and his team will return to Dalian and visit other cities as well. Since 2007, when McDermott began his initial study, the Chinese government made significant changes to Chinese labor contract laws to be more favorable toward workers. McDermott will measure the effectiveness of these changes. Using data from the 2008 study as a baseline, he will determine how labor contract disputes are resolved and draw conclusions about the overall effectiveness of the process and the influence of these changes. McDermott will analyze settlement rates, amounts of money and other related aspects of the mediation and arbitration processes.

While in China, McDermott also plans to collaborate with leading Chinese labor law scholar Professor Liu Cheng of Shanghai University to study the Chinese government's efforts to organize the workers of Wal-Mart into a union. If the Chinese government is successful, the results of this research could lead to a groundbreaking business case study, as well as provide international research opportunities for students studying business and finance.

Funding from the Mini-Grant Program will provide McDermott and his team with travel and accommodations for 10 days.

Vascular Dysfunction in Animal Models of Muscular Dystrophy

Victor Miriel

Associate Professor of Biological Sciences

Muscular Dystrophy is a family of diseases caused by genetic mutations that lead to skeletal and cardiac muscle dysfunction. The skeletal and cardiac pathologies associated with these genetic mutations are well known and documented, but recent research suggests that vascular dysfunction also contributes to the skeletal and cardiac dysfunction. However, few studies have been done to test vascular dysfunction in patients with Muscular Dystrophy.

Miriel's project focuses on determining the extent and location of vascular dysfunction in animal models of Muscular Dystrophy. The experiments will involve the use of mice that have been genetically altered to mimic the mutations found in the disease.

While SU students have a wide variety of research experiences from which to choose, there are few experiences involving the basic biomedical science of human diseases, yet student demand for this kind of research is high. This project will provide students with exposure to methods used in the study of the basic cellular processes that contribute to human diseases. Additionally, the mini-grant funding will provide Miriel and his team with the resources needed to improve the efficiency of data collection as well as provide the preliminary data required to develop competitive grant proposals to agencies such as the American Heart Association, the Muscular Dystrophy Association and the National Institutes of Health.

Long-Term Thermal History and the Plasticity of the Response to Temperature Change in Icelandic Arctic Charr

Eugene Williams

Professor of Biological Sciences

Williams will use mini-grant funding to continue the faculty-student collaborative research projects in Iceland. Williams and his team of scientists comprised of students and faculty from SU and Hólar University College in Iceland have taken an innovative approach to studying the long- and short-term effects of climate change on fish. Over the next three summers, the team will travel to northern Iceland to examine populations that have not experienced significant change in environmental temperature for many generations and conduct laboratory and field research to determine if such fish can tolerate temperature fluctuations. The team will also examine the extent to which some species have adapted to the temperature of their environment, along with the presence or absence of molecular, cellular and physiological mechanisms that facilitate acclimatization, or the physiological adaptation of an animal or plant to changes in climate or environment. (See the related article on page 3.)

Williams will use funding from the Mini-Grant Program to purchase the laboratory supplies necessary for extracting RNA from fish tissues in order to examine the long-term physiological effects of climate change on Icelandic charr. These experiments will be carried out by undergraduate students under the supervision of Williams.



AROUND THE WORLD

Transitions on an Amazonian Tropical Frontier

Using Fieldwork and Interdisciplinary Research to Draw Lessons for Deforestation Policy

By Jamison Douglas

Thanks to continued funding from the National Science Foundation, an interdisciplinary team of 25 faculty researchers and students from Salisbury University (SU), North Carolina State University (NCSU), the University of California - Santa Barbara (UCSB) and selected Brazilian universities conducted the fourth round of a household survey of over 600 farmers in the Ouro Preto do Oeste region of Rondônia, Brazil. Spearheaded by Dr. Jill Caviglia-Harris, an SU professor specializing in environmental and natural resource economics who initiated the project in 1996, the 2009 team employed cutting-edge survey technology and modern geospatial mapping techniques to better understand the relationship between land use and economic welfare in the Amazon. After nearly 15 years in the region, the researchers have developed a better understanding of the links between land cover change, government policy and household decision making that together define the overall rate of tropical deforestation in the Brazilian Amazon.

When many people think about the Brazilian rainforest, their imaginations drift to romanticized images of lush, verdant tropical foliage filled with towering trees, creeping vines and orchids, colorful species of noisy, lyrical birds and chattering monkeys that are bathed by daily thunderstorms. However, for the faculty and students conducting research in the Ouro Preto do Oeste region of Rondônia, Brazil, their image of the deforested Amazon is much different: cattle pastures reminiscent of west Texas are bisected by dusty, unpaved roads and barbed wire fences extending across newly exposed rolling hills and rocky outcrops that are parched by a strong dry season tropical sun. It is within this context that the interdisciplinary team set out each day in July 2009 to better understand the extensive deforestation that may set the stage for this advancing frontier.

Forest Conversion in Brazil

Tropical deforestation is a striking form of land cover transformation that has attracted the attention of researchers across multiple disciplines seeking to explain and predict the progression of the deforestation frontier. Brazil has the largest, contiguous area of dense tropical forest in the world, and despite numerous policy initiatives to slow deforestation, Brazil's National Institute for Space Research (INPE) estimates that approximately 18 thousand square kilometers has been cleared each year since 1990. Currently, nearly 20 percent of the

Brazilian Amazon is deforested. Much of the clearing results from small farmers in land reform settlements that have increased in size from 5 million hectares to almost 36 million hectares since 1995. Thus, the fate of the remaining forest lies at the intersection of agricultural households and current and future land use decisions along "old" and "new" settlement frontiers.

These frontiers are visible as an "arc of deforestation" that advances at a rapid pace, leading researchers, politicians and citizens within Brazil and abroad to worry about the loss of biodiversity, the impact on climatic change, as well as the piecemeal removal of one of the world's greatest ecological treasures. Global media continues to expose the public to frequent images of forest fires and anthropogenic alterations of the landscape, but what is really going on and why are people still deforesting their land?

Drs. Caviglia-Harris; Erin Sills, an NCSU forestry economist; and Dar Roberts, a UCSB geographer, were awarded over \$500,000 from the National Science Foundation to study the local drivers of forest conversion on the Amazonian frontier. While many team members had extensive experience in the Brazilian Amazon, most students, including the Salisbury University team members, had never been to Brazil. Their common aim: to see first-hand how deforestation in a region with one of the highest deforestation rates in Brazil impacts the socio-economic welfare of its inhabitants and to refine techniques to monitor and measure the dynamics of land cover change.

Fieldwork in Rondônia, Brazil

The underlying goal of the project was to develop an interdisciplinary approach to understanding the complex processes that determine not only the rate of deforestation but also the farming choices made by the peasant households who have migrated to this region. The team, which included economists, geographers and agronomists, each played an important role in data collection and analysis. The economists were primarily focused on developing and administering the household survey to over 600 local residents. The hour-long survey included questions ranging from agricultural production to health and education. The geographers were primarily concerned with improving the classification algorithms used to extract land cover (such as identifying land that is pasture from land that is forest) from remote sensing satellite images, in addition to constructing and updating the geographic data used to map and navigate the region. The Brazilian agronomy students, most from areas outside of the Amazon, were interested in learning Amazonian agronomy techniques firsthand. To accomplish these varied tasks, the group divided into three teams: the local survey team, the geospatial team and the regional data acquisition team.

The Household Surveys

The typical field day began with a brief breakfast meeting at 6:30 a.m. each morning. The survey team, including 12 interviewers and five managers, was led by Caviglia-Harris and members were allocated their assignments of approximately 10-20 surveys each in this meeting. For the first time in this long-term project, surveys were administered via Computer Aided Personal Interviewing (CAPI) software on ruggedized laptops instead of using pen and paper. In 2009, the survey team expanded the sample and conducted interviews with over 600 farmers who live and work in the study region. Caviglia-Harris stated: "The surveys are extensive and include various questions ranging from how the farmers use their land, how many cattle they own, to their impacts on the region. The interviewers asked them about their total income, total amount of durable goods owned, how much they consume and when they do it. The data gathered were used to reveal local deforestation drivers and the probability of adopting sustainable agricultural methods."



The use of these laptops changed many aspects of the fieldwork, including the debriefing meetings that ended each day 12 hours later. The survey management team was responsible for aggregating and storing the data and running error-check algorithms to maintain internal consistency across interviewers. Katrina Mullan, an NCSU post-doctoral student specializing in data management, created the code and algorithms necessary to run daily data

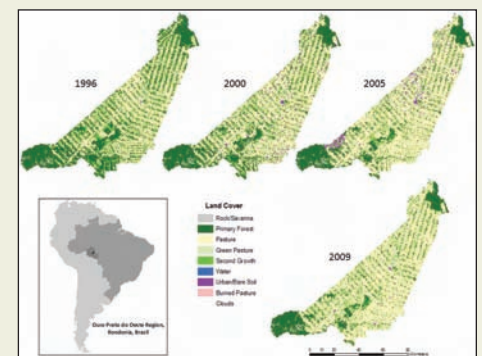
checks. "I constantly have to reevaluate what I should be checking for. Every day we learn more about the farmers in this region and what they are doing and adjust our checks accordingly," explained Mullan.

Geographical Analysis

The geospatial team, led by Daniel W. Harris of SU's Department of Geography and Geosciences and including Salisbury undergraduate Brian Klitch and Michael



Migrant Routes to Study Region



Land Cover Change in the Study Area: Survey Years



AROUND THE WORLD



Toomey (a Ph.D. candidate at UCSB), collected biophysical and infrastructure spatial data daily throughout the study area. These data were collected via global positioning systems (GPS) and coordinated with additional regional-scale data sources, including cadastral maps and satellite imagery in a geographic information system (GIS). This process links survey data spatially with the remote sensing images classified by Toomey and co-principal investigator Roberts. Their classification technique uses a 26-year, continuously updated series of satellite images obtained for most of the state of Rondônia to discern 10 categories of land cover (including forest, secondary forest, pasture, among others). Data collected in the field continues to refine pixel quality and enables a review of the accuracy of previous classifications. The geospatial team also spent time in the field mapping local roads and improving the positional accuracy of the satellite images relative to each surveyed lot.

Regional Data Collection

Finally, the regional data acquisition team – including Charlie MacIntyre, a master's student at NCSU, and Toomey on loan from the geospatial team – met with governmental agencies, health organizations, education institutions and other secondary source agencies to compare the primary data being collected in the study region to regional and national data. The team used these meta data (summarized secondary information) and primary data sources, such as previous surveys in the study region, to add to the strength and credibility of the research.



Combining the Data

The data collected by the three teams were combined to generate an extensive overview of current deforestation trends and to illustrate how the individual as well as the individual's land is affected over time. These analyses offer insights into the causal processes and agents of deforestation and produce policy recommendations given concrete, empirical insight.

Given the team's on-going multidisciplinary research, they hope to use data collected at both the household and satellite level to present a more comprehensive picture of the human side of forest clearing by linking local decision-making to regional and basin-wide patterns. Using first-person accounts in the form of

resident interviews and technology-based visualizations employing GPS, GIS and satellite imagery, the team hopes to create a multi-modal representation of Amazonian deforestation phenomena.

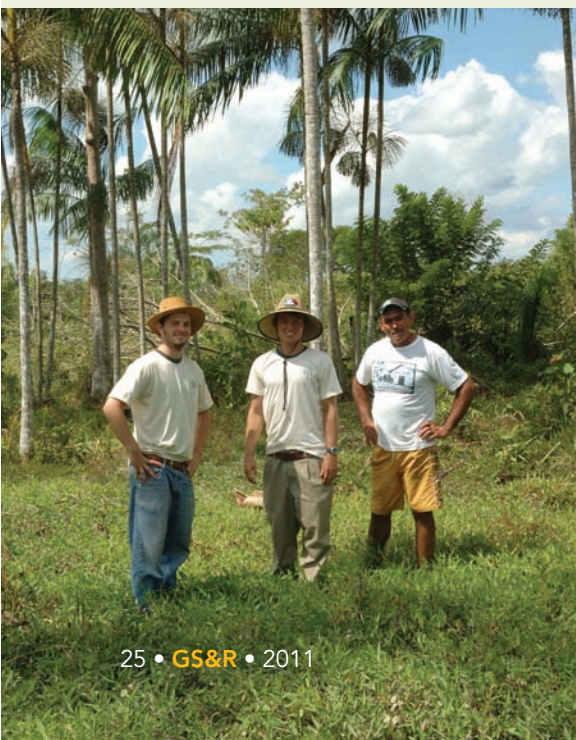
Personal Experiences in Brazil

Located in Brazil's arc of deforestation, the study region represents an entirely different sort of Amazon than that depicted in children's magazines, bumper stickers and even zoos. In the 1960s, government programs enticed farmers in southern Brazil to come to Rondônia with promises of free land and a better life. Responding to these incentives, and supported by the construction of two federally funded highways, immigrants came to the Amazon and brought with them traditional agricultural methods from more temperate climates. From 1964-2005, the national land reform agency (i.e., INCRA) settled 84,434 families, mostly in new settlements, to the detriment of the existing tropical forest. Since then, these regions have experienced some of the highest deforestation rates in Brazil and soils have been stripped of their nutrients. Land unsuitable for agriculture and government incentives to pasture cleared areas has resulted in a countryside resembling the pastures and scrub of the Texas Panhandle.

Simon Hall, an SU research assistant, had never been to any part of Brazil before going with the team in 2009. He expected the picture-perfect imagery of dense forest and untouched landscape. Instead, he was met with bright red roads, billows of dust and dirt, and a vast pastoral countryside. "It's kind of startling to see how much of the land has actually been transformed into pasture. It seems like the more places I go, the bigger the farms are and the more pasture they have," explained Hall.

Not all of the team was new to Brazil. Toomey had previously worked in parts of northeastern and southwestern Brazil. He described a similar reaction to the Ouro Preto do Oeste landscape. "I've been, actually, a bit surprised by just how much contrast there is in terms of some of the huge expanses of pasture we have here. You can really feel like you're driving across Wyoming or Nebraska."

For co-principal investigator Caviglia-Harris, the land in 2009 had changed drastically since her first study of the region in 1996. Over the past three household



survey waves, she found that the forested land per lot has decreased from 17 hectares in 1996, to 12 hectares in 2000, to 7 hectares in 2005, to less than 5 hectares in 2009. What could spur the rapid change? During her 15 years in the study region, Caviglia-Harris has learned: "The Rondonians feel that development is what they should do. They think 'the south of Brazil did it, all of United States and Europe did it, why shouldn't we?'" And with deforestation, the inhabitants have experienced benefits regarding their quality of life.

Caviglia-Harris has tracked considerable increases in income and general welfare since 1996. Wooden shacks and manioc fields have been replaced by tile-roofed houses, milking facilities and reliable electricity. "Farmers have cell phones now. How they got the entire infrastructure together so quickly is very surprising," she added.

The Deforestation Debate

Each member the Ouro Preto do Oeste research team gained a better understanding of the deforestation debate that defines the Brazilian Amazon. Experiences on the landscape and with the people who live there informed these new perspectives. Reading a satellite image is much different than conducting an interview, face-to-face, with a farmer, as Toomey has experienced: "When you don't see a place in person, when you're just looking at an image taken by a satellite, or you're just reading some of these reports or just even looking at photographs, it is not the same. Being able to picture it in my mind, contextualize everything that I hear, being able to talk to people – all of those aspects have been some of the most important and rewarding aspects of my experience here."

Though the United States and Europe may be hesitant to admit it, the fact remains that over 90 percent of primary forests have vanished. What is the cost of progress and how might a Rondonian farmer's definition of progress differ from an environmentalist? After spending a summer with the people whose livelihoods depend on these forests, Mullan reiterated the local reasoning for cutting the forest: to make way for better lives. "This is part of the process of development. People need a way to make a living, and they are doing what people elsewhere have done for hundreds and hundreds of years."

The idea that the forest merely stands in the way of a better life contrasts with a much



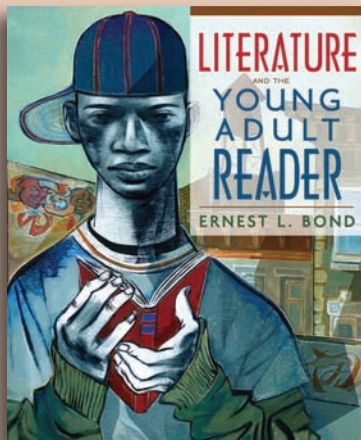
different ideology expressed by the indigenous, Amazonian viewpoint of preserve and protect. Simone Bauch, a Brazilian Ph.D. student from NCSU, joined the research team in 2009 and had never been to the study region. "I feel a lack of an Amazon culture here. I mean everyone is from south of Brazil, so you don't have the same foods as in other parts of the Amazon, and you don't have the same lifestyle. You have mostly a lifestyle that has been brought here by people elsewhere," explained Bauch.

So who really decides what happens to the tropical forest? In the case of Ouro Preto do Oeste in Rondonia, Brazil, the axe is literally in the hands of independent farmers. However, by law, Congress is responsible for deciding who gets an axe and where and how much that axe may cut. Currently, the Forest Code of 1965 contains forestry legislation more befitting to its time of conception. Amendments to the code throughout the years have been heavily debated, yet none have been implemented due to differing views of an optimal Brazil. Co-principal investigator Sills contends that the Brazilian government must be careful in such alterations, as any changes in forestry legislation will ultimately

be responsible for how people view and treat the land. Even now, Brazil's Communist Party and powerful agriculture caucus are attempting to pass a bill that would essentially legalize deforestation in protected lands. Sills indicates that this political pressure may have already led to an increase in deforestation. Brazilian land deforested through May 2011 totaled 165 square kilometers compared to just 96 through May 2010. She added: "21 percent of this deforestation was in Rondonia ... in an arc just north of our study area."

The research team finds that policy directed toward incentivizing education for sustainable agricultural methods may create the best outcome at the international, national and local levels by providing incentives to leave forest standing while also providing a source of income for residents. As the data gathered from surveys, spatial analyses and studies continue to improve deforestation knowledge at both the theoretical and applied levels, there is hope for Ouro Preto do Oeste, and others who follow in that region's footsteps, to experience a better life without destroying the Amazon.

FACULTY BOOKS

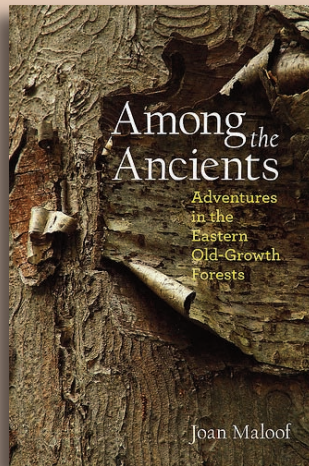


Literature and the Young Adult Reader

By Ernie Bond
Associate Professor,
Teacher Education Department

Bond, Carnegie Foundation's 2007 Maryland Teacher Educator of the Year, has long been an advocate for connecting to students and is a well-respected reviewer for tradebook offerings of new, young adult literature (YAL). Linking these two passions, Bond has written a delightful and contemporary new text for YAL courses. Bond's own wide reading and uncanny ability to recognize what middle school students will and should read plays out in rich text sets and authentic classroom features designed to help teachers captivate both motivated and reluctant readers. This YAL text provides a fresh and exciting experience for pre-service and in-service teachers as it leads them to the newest and best offerings of literature available for adolescents today.

Pearson, 2011

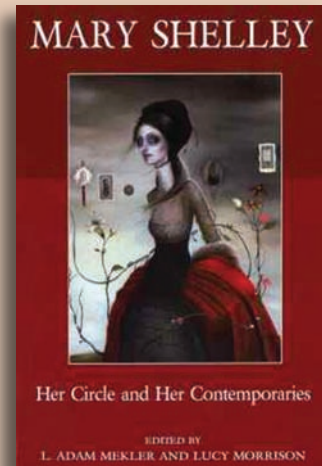


Among the Ancients: Adventures in the Eastern Old-Growth Forests

By Joan Maloof
Professor, Biology Department

Most residents of the eastern United States never get to see an old-growth forest. They think perhaps these forests are too far away, or they don't know how to find them. Maloof's *Among the Ancients* remedies this. In her intelligent, lyrical book, Maloof takes readers to 26 forests – one in each state east of the Mississippi River and all open to the public. She tells readers how to get there and what they will find when they arrive. On this journey – from giant hemlock groves in Pennsylvania to a lonely stand of pines in Wisconsin – readers come face to face, perhaps for the first time, with old growth: the forests with the largest trees and the richest diversity of life. They camp with Maloof under “the Big Tree” in Alabama and paddle to the magnificent Patriarch in Delaware; they dodge poisonwood sap in Florida's *Lignumvitae* Key and tangle with a bat in the Michigan wilderness. They also see the forests from the human perspective: who had the dream, who drew the line, who said “no” to the loggers. And they learn about the vital link between old-growth forests and our own survival. An immensely readable natural-history primer, *Among the Ancients* is also an adventure story and an impassioned plea to preserve and support the few untouched stretches of forest that remain.

Ruka Press, 2011



Mary Shelley: Her Circle and Her Contemporaries

Co-authored and edited by Lucy Morrison
Professor, English Department

This collection of essays expands critical consideration of Mary Shelley's placement within the age we call “Romantic,” wherein her texts converse with those of her family, her circle and her contemporaries. Several essays address particularly how her texts interact with those of her husband Percy Bysshe Shelley, revealing new depth and breadth to their literary partnership. Others investigate interdisciplinary perspectives, such as her pieces in *The Liberal* or the ways in which the figure of Scheherazade haunts her works, while several essays also consider Mary Shelley's textual relationships with contemporaries such as Thomas Moore and John Polidori. Still others tackle topics such as geopolitical relationships and the growth of opera as an art form, considering Mary Shelley's commentary upon such contemporary issues, while William Godwin's textual relationship with his daughter is further investigated. This collection suggests Mary Shelley's texts merit further investigation not only for what they reveal about their author and her oeuvre, but for the ways in which they illuminate our understanding of the contexts in which they were composed.

Cambridge Scholars Publishing, 2010

The Promise of Plant Probiotics

Plant/Microbe Interaction May Yield Significant Agricultural Benefits

By Mark Holland, Ph.D.

Professor and Biological Sciences Department Chair

There's a lot of talk these days in the media about probiotics. Television ads for yogurt and other products containing lactic acid bacteria and *Bifidobacterium* have made these microbes into celebrities. While there aren't any hard and fast criteria at this point that define probiotics, the Food and Agriculture Organization (FAO) and World Health Organization (WHO) have developed an operational definition for them: Probiotics are: "Live microorganisms which when administered in adequate amounts confer a health benefit on the host." It should come as no surprise that we humans aren't the only organisms that benefit from relationships with the right kind of bacteria. My lab studies what might be called the probiotics of plants.

Methylobacterium is a genus of bacteria (also called PPFM bacteria) that seems to be associated ubiquitously with plants. These bacteria are found in relatively large numbers on all kinds of plants and in seeds. Given the amount of plant biomass on Earth, they must be among the most abundant organisms on the planet. If you eat lunch today at the salad bar, you will no doubt consume some of them. Go swimming in lake water or digging in your vegetable garden and you likely will be inoculated with them yourself. We first learned of these bacteria some 20 years ago and soon thereafter began experimenting to discover what role, if any, they play in the lives of the plants they live with.

One of the first things we discovered was that some of the metabolic activities of the bacteria are pronounced enough that they can fool you into thinking that the plant is responsible for them. This suggested to us that the PPFMs might be used in a kind of genetic engineering strategy. That is, engineering the bacteria to produce a desirable enzyme or other useful metabolite could allow us to alter the metabolism of a plant simply by inoculating the plant with the engineered PPFM. This is a much simpler and quicker method of changing plant metabolism than conventional plant breeding or plant genetic engineering. The U.S. Patent Office agreed with us and awarded a patent



to our procedure in 1993.

As a follow up to this work, we decided to find out how plants operate in the absence of a normal PPFM population. We soon showed that seeds cured of their PPFMs no longer germinate well or develop normally, but re-inoculating the cured seeds with a population of the bacteria restores germination and growth. The surprising conclusion to this story is that sometimes poorly stored or aged seeds fail to germinate because their bacteria have died, not because they are themselves dead. This discovery led to another patent application – and a second award.

Over the years, additional patents have followed. Two of these relate to increases in crop yield obtained when PPFMs are applied to the leaves of plants during the growing season. Another patent deals with improvements in the nutritional quality of plants brought about by inoculation with elite strains of the bacteria that overproduce useful amino acids or vitamins. Still another relates a strategy for manipulating male fertility in plants and suggests a practical method for applying this to the production of F1 hybrid seed in some of our most important grain crops. We even have a patented strain of virus, a so-called bacteriophage, that effectively removes PPFM bacteria from plants. To date, our research has resulted in seven awarded patents and a handful of provisional patents with additional intellectual property disclosures in the pipeline. Some of these awards are shared with colleagues from other universities and with undergraduate student inventors who have worked in my lab.

All of this technology has been licensed to the CST Technology Group, LLC. of Port

Washington, NY. They have been testing the PPFMs under a variety of field conditions and on a number of different crops from soybean to microalgae, both here in the United States and internationally. Last year, they began commercial distribution of the bacteria. It is our hope that these probiotic technologies for plants, which began in a small way at SU, will someday help to feed the growing population of our world.

Even after years of research, we still can't claim to know everything about the relationship between PPFM bacteria and plants. Nor have we probably tapped out the potential applications of the bacteria in agriculture. At present, there are two undergraduates and three graduate students working in the lab on various aspects of the PPFM story; there are days when it seems this project is just beginning – not 20 years in the works.

Any discussion of current goings on in my lab would be incomplete without including a pitch for the Biological Sciences Department's new master's program in applied biology. While our investigation of plant probiotics includes many basic research questions, there is also an emphasis on the application of our findings to the solution of real-life problems. This is what applied biology is about, and our graduate program shares this goal. Students in the M.S. program are trained to think in terms of practical skills acquired, problem solving and the business of technology development. The activities of my lab fit right into this model. For more information about the M.S. in applied biology, visit the Biological Sciences Department Web site at www.salisbury.edu/biology.

SU Student Research Conference



The Salisbury University Student Research Conference (SUSRC) celebrated its 10th anniversary with a plenary lecture by former U.S. Assistant Secretary for Postsecondary Education – and SU alumna – Diane Auer Jones. Her talk, "Research – It's Not Just a Job, It's an Adventure," began a day celebrating student scholarship, and artistic and professional achievement as participating students shared their knowledge and developing abilities. Dr. Don Spickler of the Mathematics and Computer Science Department was named Outstanding Research Mentor for 2011. Since 2003, with Spickler's guidance, some 21 students working on 15 different research projects have presented at the SUSRC.





Graduate Studies at Salisbury University



GRADUATE PROGRAMS

- Applied Biology (M.S.)
- Applied Health Physiology (M.S.)
- Business Administration (M.B.A.)
- Conflict Analysis and Dispute Resolution (M.A.)
- Education (M.Ed.)
- Educational Leadership (M.Ed.)
- English (M.A.)
- Geographic Information Systems Management (M.S.)
- History (M.A.)
- Mathematics Education (M.S.M.E.)
- Nursing (M.S.)
- Reading Specialist (M.Ed.)
- Social Work (M.S.)
- Teaching (M.A.T.)

CERTIFICATES

- Health Care Management
- Middle School Mathematics
- Teaching and Learning with Technology
- Teaching English to Speakers of Other Languages (TESOL)

DOCTORAL PROGRAM

- Doctor of Nursing Practice (D.N.P.) (Available Fall 2012)

www.salisbury.edu/gsr