

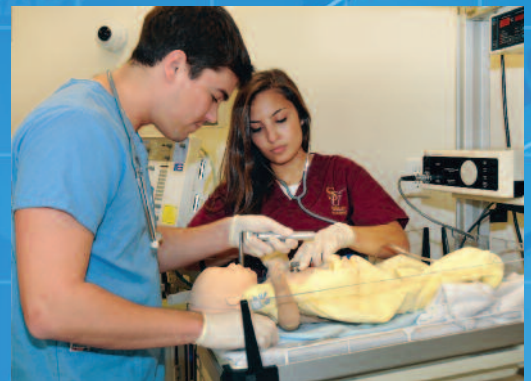
# Re:Search

Graduate Studies & Research at Salisbury University  
2012 Edition

PEDIATRIC MENTAL HEALTH

## The Inside Story

SU's Commitment to  
Healthcare Education  
and Research



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Undergraduate participants in SU's newest National Science Foundation-funded program visit the NASA facility in Wallops Island, VA. Read about their experiences in the field on page 19.

Volume 02 • 2012

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*Re:Search* is published annually for friends of Salisbury University by the Office of Graduate Studies and Research in conjunction with the Office of Publications, with the generous support of Salisbury University.

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“This edition celebrates several important milestones, marking 2012 as a year of ‘firsts’ for Salisbury University.”



Welcome to the 2012 issue of *Re:Search*, SU’s magazine devoted exclusively to the research, scholarly and creative activities of the University’s distinguished faculty and students. 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 this year is on SU’s commitment to healthcare education and research. The new Richard A. Henson Medical Simulation Center and Doctor of Nursing Practice program will enhance the University’s ability to provide excellent educational experiences for students and to serve the region by proactively addressing critical state and regional healthcare provider shortages. This edition celebrates several important milestones, marking 2012 as a year of “firsts” for Salisbury University. During the summer, some of the nation’s brightest students gathered at SU to participate in our first Research Experiences for Undergraduates (REU) program. SU is the first university on the Eastern Shore to host such a program, a testament to our ability to provide our students with outstanding inquiry-based learning experiences. This fall, SU’s first Fulbright Student Fellowship recipient will travel to Germany to begin his research, and our first cohort of doctoral candidates will begin their studies in the Doctor of Nursing Practice program. Other highlights include efforts to promote school readiness in early childcare, student entrepreneurship through the Perdue School’s Bernstein competition and initiatives to provide quality pediatric mental health care in the region.

Through their efforts, 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* celebrates some of our achievements and supports our reputation not only as *A Maryland University of National Distinction*, but increasingly as a University of *international* distinction.

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

Janet Dudley-Eshbach, Ph.D.  
President  
Salisbury University

# Simulated Patients: Providing Excellence in Healthcare Education

*Richard A. Henson Medical Simulation Center*



In 2010, SU was awarded \$937,035 from the Maryland Hospital Association's (MHA) Who Will Care? Fund for Nurse Education. The initial grant was intended to provide healthcare education in clinical areas not widely available on the Eastern Shore, particularly neonatal, pediatric and psychiatric-mental care. The MHA anticipates a nursing shortage of some 7,000 over the next few years. Salisbury University is working to address this issue. "The need for nursing staff trained in these areas is a critical concern," said Dr. Robert Joyner, associate dean of the Henson School of Science and Technology. "Currently, seriously ill infants and children must be transported to Baltimore-area hospitals, and access to quality mental health programs is practically non-existent."

Dr. Lisa Seldomridge, SU's Nursing Department chair and principal investigator on the initial grant proposal, soon realized that SU's existing space would not be adequate to support the kind of high-quality programs she envisioned for SU. With additional funding from the Henson School of Science and Technology, Salisbury University, and a generous gift from the Richard A. Henson Foundation, the

University purchased a 5,000-square-foot medical facility on Pine Bluff Road and turned it into a high-tech medical simulation center. From its inception, the project took less than two years to complete.

At the Richard A. Henson Medical Simulation (SIM) Center, students learn by taking part in simulated clinical events, which are monitored by SIM Center faculty and staff and video recorded for feedback sessions following the learning exercise. Students also have the opportunity to observe their colleagues in real-time and take part in a discussion and critique of the scenarios they observe as well as review their own recorded scenarios.

The use of medical simulation as a teaching tool is a growing trend in healthcare education. According to Joyner, there is a growing body of research and evidence to support the use of simulation as part of a healthcare training program. It exposes students to situations they otherwise would not have the opportunity to experience, such as dealing with life-threatening neonatal situations, premature birth or counseling a patient with mental illness.

"We see a greater level of confidence in nursing staff that had simulation experience as part of their degree programs," said Karen Poisker, vice president of Patient Care Services at Peninsula Regional Medical Center (PRMC). "There are fewer medical errors and a significant reduction in training time compared with individuals who did not have any simulation experiences." Many of SU's nursing and respiratory therapy students complete their clinical rotations at PRMC, and the facility is an employer of choice for graduates who remain in the area after completing their degrees.

## Simulating the Demands of a Real Hospital Environment

According to Joyner, the SIM Center is the only facility of its kind on the Eastern Shore.



The goal was to create a simulated medical environment that is as realistic as possible, which the University hopes will attract highly qualified candidates to its healthcare programs, particularly its new Doctor of Nursing Practice (D.N.P.) program. As students enter the center, they can place their books and belongings in a small, secured waiting area. "But as they turn the corner, it's 'game on.' The students are expected to act as if they are working in a real hospital," said Joyner.

With a few exceptions, the SIM Center does resemble a real hospital. There is a nursing station as well as specialized labs for LDRP (labor, delivery, recovery and postpartum), neonatal, pediatric and adult care. There is even a medical supply closet. One distinction, however, is the presence of control and debriefing rooms, where faculty and students can monitor the scenarios, which are video recorded and used to provide student feedback. Cameras and microphones are set up throughout the center, so students can be monitored and recorded from any angle as they move from one area to another. Joyner explained that evaluation of student performance during simulation can vary from the least sophisticated approach of watching a student perform tasks while the faculty member is standing next to them, to the most sophisticated high-fidelity approach of video recording the students' actions during a scenario and then reviewing the videos with the student to discuss various aspects of their performance.

"We were fortunate to have the support from the MHA, Henson Foundation and the University to develop a medical simulation center with this high-fidelity approach to simulation training. We are making every effort to provide our students the most realistic experience as possible," said Joyner. "Simulation is most effective when students experience the pressures of being alone with a patient and have to perform care without coaching. Our center provides an experience that prepares them for the rigors of work life in a real hospital, where you must act quickly and independently," he added. Furthermore, review of video recorded training sessions has been found to increase student self-awareness by enabling self-assessment and critique.

The debriefing room, equipped with a "Smart" board and wireless Internet access,



is a conference room where students and professors review and critique their simulations. "You have to believe that you are being monitored at all times," explained Joyner. "Big Brother' is watching."

"It can be a bit unsettling at first, but the students get used to it," said Seldomridge. Instructors can view the scenario live and then play back the recording to review and evaluate the student's performance. Additionally, the students can access and review their own videotaped scenarios at any time through a Web-based e-learning service.

The SIM Center features real hospital equipment, such as incubators, ventilators and other equipment used in hospitals today. It also has piped-in medical gases. "There is a safety mechanism that shuts the ventilator off if you put the wrong gas in it. This is an important concept that students must understand when troubleshooting this life-supporting equipment," explained Joyner. Even the storage room is considered part of the students' learning experiences at the SIM Center. The room is used for storing items for future simulations, but it also functions like a real hospital storage room, in which nurses must often locate materials and equipment quickly.



The Richard A. Henson Medical Simulation Center held its ribbon-cutting ceremony on December 1, 2011.

Through its relationship with PRMC, students also gain experience in working with electronic medical recordkeeping. "We are providing access to our training environment," explained Poisker. The students learn and practice bar coding, scanning medications, documenting medical conditions, placing a physician's order and transmitting orders. "As a result, we anticipate that the students will have less apprehension about using this technology when they work with real medical records during their clinical rotations and on the job," she added.

"Twenty or 30 years ago, you could walk into a hospital and start working, but today, it is very different," commented Joyner. "The technology is so sophisticated; students need hands-on training before they can set foot in a real medical environment," he said. At the SIM Center, students practice working with the same high-tech equipment they will use in a real hospital.

## Meet the Patients

The center's LDRP lab has one thing you won't find in a real hospital: a state-of-the-art, wireless newborn baby human simulator mannequin. Wrapped in a yellow blanket and resting in his incubator, this incredibly life-like infant can be controlled wirelessly from a remote location, making it easier to change his medical condition or vital signs during a simulation. "Baby Sim" also can be connected to an EKG monitor. He cries, breathes and coos. His head, arms and legs can move.

In addition to the wireless newborn, three human simulator mannequins currently reside at the Henson Medical Simulation Center: an adult male and two pediatric simulators. Designed and built by engineers and physiologists of CAE, industry leaders in medical education technologies, the three high-fidelity human



simulators can be programmed to convincingly replicate a full range of clinical conditions and patient responses. They can suffer a stroke or cardiac arrest. They can also mimic anaphylaxis – a condition in which the patient’s throat swells and breathing is obstructed during an allergic reaction. These “patients” can bleed, vomit and cough. They can even experience birth and death.

The newborn baby’s features are remarkably detailed; his skin is as soft as that of a real baby. In fact, the human simulators at the center are so life-like that at times, the students almost forget that they aren’t real. “When the baby is hooked up to a monitor and he is crying and wiggling while the students are doing an assessment, it becomes very real for them. When they expect the baby to respond in a certain way and it doesn’t, it’s just like a real kid,” explained Joyner.

Sporting a bowl haircut and a combination of baby and adult teeth, “Chucky” – as the high-fidelity simulator in the pediatric unit is affectionately known – closely resembles a real pre-adolescent child. “We can make him act like a real kid too and protest loudly when given a vaccination,” explained medical simulation specialist Thalia Van Opstall-May. The simulator is designed to look like a sick child – his hair is messy and his teeth are discolored and uneven. “He is a representation of what you typically see when working with a critically ill child or a child who may be the victim of abuse or neglect,” said Van Opstall-May.

“Medi-man” has functional eyes that can blink, close when he is “asleep” and open when he is “awake.” He can cough, speak, cry, sweat and bleed. He has pulse points in his wrists, arms and feet. Vital signs such as the patient’s systemic arterial blood pressure, EKG, heart rate and oxygen levels

can be monitored by a real hospital monitoring system. If you place your hand on his chest, you can feel him breathing. “You can start an IV in him and draw blood. The students need to see all of the physiology,” said Van Opstall-May.

Most high-tech human simulators are equipped with “veins,” blood lines in which students can insert an IV or draw blood. They are also designed so that simulated urine (usually water mixed with food coloring) can be placed in a bladder so students can practice catheterization. Simulation helps the students to hone their skills in performing these delicate procedures as quickly and painlessly as possible; the simulators can be programmed to react or express discomfort if a procedure is done incorrectly. The high-tech mannequins used at the SIM Center come with simulation scenarios pre-programmed. The software is loaded onto a desktop or laptop computer. “The scenarios were developed to follow the requirements of the nursing program, so they are set to fit right into the curriculum. Additionally, we can create new scenarios or alter the current set to meet a specific need,” said Joyner.

### Moulage: Bringing Realism to Medical Simulations

While the human simulator mannequins are, without a doubt, remarkable examples of human ingenuity and advanced technology, it is Van Opstall-May who breathes life into the center’s synthetic patients. In addition to programming patient responses, May practices the art of moulage, the molding or creating of realistic wounds, lesions or defects. The center can replicate just about any internal or external clinical condition found in humans.

Van Opstall-May has attended numerous medical conferences that include seminars on how to make false wounds and body

fluids. During one of these seminars, she learned how to make skin to match the mannequin, so realistic-looking wounds can be placed on the mannequin’s surface. “This is especially useful if you have a scenario involving a motor vehicle accident, where a patient may have lacerations,” she said.

Van Opstall-May also spends countless hours developing mixtures to realistically replicate blood, sweat, saliva and other human body fluids “One of the things I love about my job is thinking up creative ways to make the scenario come alive and to make the mannequin come alive,” said Van Opstall-May. Ordinary foodstuffs – such as cooked okra, lime juice and grated cheese – can be mixed to imitate the odor and consistency of everything from sweat and saliva to spinal fluid, she added.

While all of this seems unappetizing, Joyner and Van Opstall-May concur that realism is a vital component in creating meaningful learning experiences for the students. Human physiological responses, especially those associated with illness or injury, can be very unsettling. “It isn’t like what you see on television; real medical trauma can be ugly and frightening,” said Joyner. “Our job is to prepare our students to respond professionally in any situation, and this kind of realism helps us do that,” he added.

“The simulation capability of the mannequins, coupled with the scenarios developed by SU really help our students and staff to establish a whole picture of what it means to be a successful practitioner,” said Poisker.



Thalia Van Opstall-May

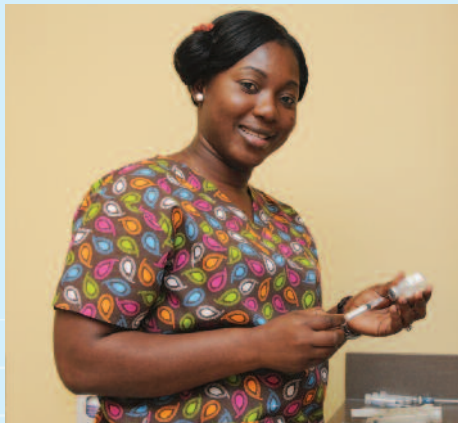
### Standardized Patients

In a mental health wing, students learn effective intervention techniques by interacting with standardized patients, specially trained actors who portray patients with various psychiatric conditions. The actors are given scripts developed by Henson School faculty. They create their roles, memorize their lines and act out conditions such as schizophrenia or Obsessive Compulsive Disorder (OCD). Some of the actors come from local community theatre groups, "but many are SU students," said Seldomridge. Although student actors who work as standardized patients are not all theatre majors (the only requirement is that they are not majoring in a healthcare-related discipline), SU is currently developing a program in which theatre majors can receive course credit for taking part in medical simulations.

In preparation for their roles, the actors attend rigorous training sessions. They review the scripts and receive instruction on specific aspects of the disorder they are portraying. Once they have been briefed, the actors take part in role play with faculty members playing the roles of the nurses. The sessions are videotaped, and the performances are critiqued by the faculty. They also have the opportunity to view the videos of past standardized patient scenarios.

Van Opstall-May described one simulation involving a patient with OCD: the patient re-positioned a chair about 15 times, washed her hands and continuously rearranged a stack of magazines on a coffee table. In another scenario, an actor portraying a patient in the manic phase of Manic Depressive Disorder spent the entire session curled up under a chair. "If you send young, inexperienced students into a real facility to assess mental health patients who might be screaming, hallucinating or compulsively re-arranging the furniture, they'd be overwhelmed," said Joyner. "The results could be disastrous for the student as well as the patient," he added.

The use of standardized patients helps build confidence in areas of study where students tend to feel the most anxiety, which for many undergraduates is in psychiatric and mental health care. "Most first bachelor students want the excitement of working in critical care or they want to work with babies," explained Seldomridge. "Very few start out wanting to work in mental health," she added, but now



students are beginning to express interest in mental health as an area of specialization. "In this way, we are addressing a significant need in the community," said Seldomridge. "Mental health is a critical shortage area, especially on the lower Eastern Shore."

In addition to the technical training, the lab offers opportunities for students to achieve one-on-one growth through the use of role playing to help them develop strong interpersonal communication and patient-provider relationship building skills. "In the healthcare field, you need to develop people skills as well as technical skills," commented Poisker. "Actively listening and showing empathy are just as important as clinical skills such as starting an IV, because you are dealing with people who are at their most vulnerable," she said.

### Community Outreach

The students at Salisbury University are not the only members of the healthcare community to reap the benefits of medical simulation. Wicomico County school nurses recently received training in respiratory assessment, tracheotomy care, invasive line care and dermatology, areas in which school nurses typically do not have experience or access to training. SU's SIM Center is helping school nurses keep up with high-level care.

Although most of the patients at the SIM Center are high-fidelity mannequins, real human beings are benefiting from this high-tech facility. The Human Performance Laboratory is utilized by graduate students in the applied health physiology program and other students who are learning to conduct human performance analyses and work with subjects in rehabilitation, fitness and/or sport performance. Currently, applied health physiology faculty member Dr. Tom Pellingier is working in partnership with a local endocrinologist to study blood flow and exercise in diabetic patients.

### Future Plans

SU hopes to acquire additional high-tech mannequins. Other expansion plans include a faculty-led clinic in which D.N.P. candidates work with real patients under the guidance of faculty mentors. "This will provide the community with much-needed health services while training our doctoral candidates," said Seldomridge.

The center is planning to conduct a simulation involving a mother, portrayed by a standardized patient, who has just given birth. "Traditionally, when we teach nursing students about labor, delivery and postpartum care, they either take care of the mom or they take care of the baby," explained Joyner. "The truth is, in real life, it doesn't work like that. There are actually two patients who need to be cared for simultaneously – the mom and the baby," he added.

Since the SIM Center opened in fall 2011, SU has already simulated about 85 scenarios, including resuscitation, respiratory therapy, mental health counseling and pediatric vaccinations, as well as an assessment on a live standardized patient. Approximately 150 nursing and respiratory therapy students have taken part in medical simulation training at the center.

"While it is too early in the program to have data on the effectiveness of employees who took part in simulation as part of their degree program at SU, our survey data indicates that the simulation experiences have had a positive impact on students' confidence in their ability to perform on the job," explained Seldomridge. This confidence is a quality from which SU's students and their future patients will reap untold benefits. ❖



Dr. Robert Joyner (center) with SIM Center students

# Riding the Changing Tide of National Healthcare

## *SU's First Doctoral Program: Doctor of Nursing Practice*

The Association of Medical Colleges predicts that the United States could face a shortage of up to 150,000 doctors over the next 15 years. Experts say that the greatest demand will be for primary care providers. In response to this demand, the healthcare industry will need to look for alternative ways to bring mid-level, primary care to a growing population.

"We are looking at a serious physician shortage in the future," said Karen Poisker, vice president of Patient Care Services at Peninsula Regional Medical Center (PRMC). "It takes 12 years to become a primary care physician, and there is already a lack of providers," she added. To address the ever-increasing need for primary care practitioners, Poisker believes that the role of the nurse practitioner will expand. "By 2015, nurse practitioners (NPs) will need to have doctoral degrees," she said.

Salisbury University is leading that charge in the region. This fall, SU rolls out its first doctoral program, the Doctor of Nursing Practice (D.N.P.). The University hopes that the program will help address the need for a more educated nursing workforce. "The D.N.P. has become the expected career development path for nursing practitioner professionals," explained Dr. Lisa Seldomridge, SU Nursing Department chair. "In the future, having a doctoral degree will be a requirement for those in advanced nursing practice, including NPs. Even if we double the number of medical schools, we still will not produce enough doctors to meet the needs of the population. The D.N.P. will help prepare leaders in nursing practice to guide



future healthcare reform," she said.

The curriculum, which was developed by Dr. Molly Parsons, director of SU Graduate and Second Degree Nursing Programs, focuses on using evidence-based practice and technology to guide administrative and clinical decisions, as well as policy development. SU's D.N.P. is one of only three in the State of Maryland and the only such program on the Delmarva Peninsula.

The D.N.P. program, which takes three years to complete in a cohort sequence, is a 38-credit post-master's option for students in advanced practice roles, such as nurse practitioners, clinical nurse specialists, nurse midwives, nurse anesthetists, nurse administrators and nurse educators. Students with bachelor's degrees can

complete the D.N.P. in five years. The curriculum includes some hybrid and distance learning courses, making the program a viable option for working professionals. While not as research focused as a traditional Ph.D., D.N.P. candidates will each complete a research

project as part of their graduation requirement.

"When looking at ways to address the impending healthcare shortages, it just makes sense to focus on healthcare training programs that can educate mid-level providers in five years instead of 10 or 12," said Seldomridge. "Nurses traditionally work closely with patients and are extremely well suited to guide and lead positive changes focusing on improving patient care. Nurse practitioners excel at treating the whole individual rather than just assessing the symptom," she added. Seldomridge sees the future of medicine going in the direction of more nurse practitioners with high-level degrees treating common medical conditions, while physicians focus on researching and treating unusual conditions and providing critical care.

### The Changing Landscape of Healthcare

Critics of D.N.P. programs say that a nurse with a doctoral degree will confuse patients, and that most patients will choose an M.D. over a D.N.P. in a private practice. "There will always be people who say that, but







there will be just as many who will prefer the D.N.P. provider who views the patient as a whole human being, not just 'the sore throat in room four,'" Seldomridge said.

There are a number of educational incentives available for practitioners who agree to practice in an under-served area such as Somerset County. The practitioner who runs the clinic becomes an important part of the community. Smith Island is another example of how the D.N.P. can meet a critical need for quality, accessible care on Maryland's Lower Eastern Shore. The only other option available to island residents is to take a ferry over to the mainland. "For these residents, if seeing a practitioner instead of a physician means that you will actually get to see somebody, that's huge," Seldomridge said. "The stereotypical notion is that the nurse is someone who checks your blood pressure, not someone who can prescribe medication or suture a wound," she added. "The D.N.P. prepares nurses to provide care at a much higher level."

The doctoral nurse practitioner is not meant to replace the primary care physician. A nurse practitioner will always have a different area of expertise than an M.D. "The State of Maryland is very clear about the scope of practice, and there are situations that a nurse practitioner could and should be managing," Seldomridge explained. The D.N.P. will offer nursing professions career opportunities in education and private practice at a mid-level care facility such as a clinic or in hospitals.

## Nurse Practitioners as Agents of Change

Healthcare organizations, including community hospitals seeking special designation such as Magnet status, will be focused on employing nurses with advanced degrees. Magnet status is awarded to hospitals by the American Nurses Credentialing Center, an affiliate of the American Nurses Association. To achieve Magnet status, a facility must have a percentage of its staff educated at the

master's level and generate research projects as well as a number of other nursing quality indicators. There is a growing body of research to suggest that patient outcomes in Magnet hospitals are better. According to Seldomridge, Magnet facilities report fewer deaths, infections and post-operative complications. "So in places where people have several facilities from which to pick, Magnet certification attracts patients," she said. These hospitals also look for staff with enough of a research background to be able to help them with research projects. "Although the D.N.P. is not a research-based degree like a Ph.D., you do develop research skills. It is unusual to have nurses with doctoral degrees, so the D.N.P. will give graduates a competitive edge," Seldomridge explained.

Nationwide, research is a growing trend in the nursing profession, and SU is providing local support in this endeavor. Ph.D. faculty currently sit on the research councils of Atlantic General Hospital, Shore Health System as well as PRMC. "We are on a Magnet journey, and one challenge we face as a community hospital is the emphasis on research, specifically in the area of nurse practice development.

Specifically, we are exploring procedures that improve patient outcomes," explained Poisker. "When you look at how much the healthcare industry is changing, we really need well-educated people who can offer expertise on best practices for improved patient outcomes and for improving the patient experience," she added.

The University has a long-standing relationship with PRMC. Many of SU's nursing and health sciences students complete their clinical rotations at PRMC and go on to begin their careers there. "We are very fortunate to have this relationship with Salisbury University. In the future, we will collaborate on program development and help SU design some of the sub-specialties as the D.N.P. program evolves," Poisker said.

The incoming D.N.P. cohort consists of 12 students, but SU hopes to eventually grow the program to a cohort of 15. Seldomridge describes the group as, "very diverse; we have students from many different backgrounds pursuing different career paths." In interviewing potential D.N.P. students, Seldomridge said the incoming candidates all have clearly defined goals regarding their research projects and career paths. "We were looking for people who could demonstrate a deep commitment to the program and to the profession," she commented.

Seldomridge said that most people who seek a D.N.P. have a specific goal in mind such as becoming a clinical educator or setting up a private practice, but there are some who seek this degree for more intrinsic rewards such as personal development. "Finally, the world is realizing that if you have a better educated workforce, things turn out better." ❖



## SU Continues Breast Health Action-Research Projects

### *Nursing and Psychology Departments Collaborate on Community-Based Initiative*

*By Dr. Tina Brown Reid, Assistant Professor of Nursing & Dr. Michèle M. Schlehofer, Assistant Professor of Psychology*

Breast cancer among women in Wicomico County is a pressing community concern. As detecting breast cancer early is vital to successful treatment, the American Cancer Society recommends that women engage in early detection efforts, including mammography and breast self-exams. However, the American Cancer Society consistently finds that ethnic minority populations are significantly less likely than their White peers to engage in early detection efforts.

Since 2007, we, along with several undergraduate students majoring in nursing and psychology, have undertaken action-research activities in the community to further explore this health disparity at a local level. The vision of the Salisbury University Women's Health Research Team is to educate the community about breast health, with the ultimate goal of reducing the impact breast cancer has on individual women, their families and the greater Wicomico County community. Furthermore, we anticipate helping women understand how to reduce their risk of breast cancer and access regular screenings to detect breast cancer when it is most curable.

Unfortunately, our research has mirrored national statistics. We have found that many women in Wicomico County, particularly ethnic minority women, do not regularly perform breast self-exams or obtain mammograms. Many area women lack understanding about how to determine if they are at risk for developing breast cancer, how to perform breast self-exams, or where and how to obtain mammograms. African-American and immigrant-Latina women are the most in need of outreach and education efforts in our community.

To address these disparities, the team's latest project consisted of an outreach effort in which we applied theories of



Nursing students Kelly Merkel and April Katsirbas participate in the breast health education project at the Salisbury Festival

health communication to develop messages to encourage women to obtain mammograms and perform breast self-exams. General information on breast cancer and information on local resources were distributed. For our outreach efforts, our research group set up a table at the Salisbury Festival in April. At the festival, we distributed informational literature on

breast health developed by our research team, materials provided by the American Cancer Society and Komen Maryland, T-shirts, and personal care items to females who appeared to be ages 40 and older. As part of the event, festival participants also were invited to take a short survey to assess their breast cancer risk. They completed the survey and provided their contact information for follow-up. After the Salisbury Festival, each participant's breast cancer risk information was computed using the National Cancer Institute Online Breast Cancer Risk Assessment Tool and the participants were provided with their risk information and further details on local resources.

Through the Salisbury Festival project, Salisbury University's Women's Health Research Team has made a contribution to the community by providing breast health education. Additionally, community outreach activities such as this are important vehicles for reducing cancer health disparities. ❖



## Social Work Gets "HIPP"

### *Behavioral Health Integration in Pediatric Primary Care (B-HIPP) Joins SU's Social Work Department*

*By Amy Habeger, LCSW-C, Lecturer in Social Work*

In response to rising health care costs, provider shortages, and the desire to streamline and centralize coordination within primary care offices, the United States has placed much emphasis on multidisciplinary integration. Primary care and behavioral health integration is of critical importance in rural locales such as Maryland's Eastern Shore, a region facing a critical shortage of mental health providers and child psychiatrists. Integration in primary care will aid in early intervention and education efforts as well as in reducing the stigma associated with mental illness.

The Health Resources and Services Administration (HRSA) has named Maryland's Lower Eastern Shore as a "Designated Mental Health Professional Shortage Area." To address the need for pediatric mental health providers in the region, Salisbury University's Social Work Department has joined forces with the schools of medicine at Johns Hopkins University and the University of Maryland to develop the Behavioral Health Integration in Pediatric Primary Care (B-HIPP) program. Funded by Maryland's Department of Health and Mental Hygiene, B-HIPP was developed to increase mental health access in pediatric primary care offices in Maryland. SU's primary goal is to create and implement a workforce-development model for second-year Master of Social Work (M.S.W.) students through coursework, specialized training and internship placements in local pediatric primary care offices.

Social workers are the natural connectors in the emerging primary care practice setting due to their generalist focus and the ease of the profession in adapting to the needs of the community. Social workers are trained holistically and with an ecological perspective, which supports and enhances the services provided in the pediatric primary care office. SU's M.S.W. program focuses on developing advanced direct practitioners to work with individuals, families and groups

with a high degree of autonomy and skill. The co-location of M.S.W. interns in primary care offices should increase collaboration across disciplines and communication between primary care providers and mental health specialists – both on site and in the community – and increase routine screenings and access to community mental health services.

"The Mental Hygiene Administration (MHA) sees the B-HIPP program as an ideal way to engage with SU ... to help embed behavioral health into primary care," explained Joan B. Smith, LCSW, MHA Child and Adolescent Division. "The program not only offers opportunities to expand behavioral health workforce development on the Shore, but it also provides support and consultation to pediatricians and families in settings that lend themselves to universal mental health promotion and early identification and intervention efforts," she added.

All the M.S.W. candidates participating in this pilot year have had relevant professional and internship experience and have expressed a strong interest in working with children, adolescents and families. The participating students serve varied generalist roles within the primary care setting, including screenings, assessment, consultations, brief interventions and case management.

M.S.W. candidates receive training to develop and strengthen the skills necessary to excel in this emerging field. The students participate in a hybrid learning experience prior to placement, which combines online content topics specific to childhood mental health and classroom time

spent on application and preparation exercises. Various community agencies and professionals, as well as primary care staff, take part in the pre-placement training program. Additionally, the students continue to build upon this knowledge through bi-weekly group supervision and training sessions during which they demonstrate integration of classroom knowledge and practical applications in the primary care setting.

Marisa Cooke, an M.S.W. student and B-HIPP intern, plans to pursue a career in the healthcare field working with families and children when she graduates. "I have always had a passion for working with children, and I am very eager to discover the ways in which the B-HIPP program will provide assistance to children and families on the Eastern Shore," said Cooke. "I feel extremely honored to have been chosen to be a part of this innovative program, and I am looking forward to the upcoming academic year."

Interest in the B-HIPP program is mounting. The Social Work Department has solidified pediatric placements in Salisbury and Princess Anne, and through SU's satellite sites in Wye Mills, Elkton Station and Hagerstown, SU is uniquely situated to arrange primary care partnerships throughout the state. For the upcoming school year, Gateway Pediatrics and Chesapeake Pediatrics in Salisbury, and TLC (Three Lower Counties Community Services, Inc.) with pediatric offices in Salisbury and Princess Anne will host M.S.W. interns. The program is funded through June 2013, with the possibility of extending the project and expanding to include an additional pediatric care site. ❖



# BEACON Brings Multifaceted Research and Consulting to Delmarva

By Dr. Memo Diriker, Founding Director of BEACON

Imagine you are an elected official making important budget decisions that will impact the future of all the residents in your jurisdiction. How would you gather economic trend data? If you were starting a business, how would you identify potential customers, discover where the best workers live, and locate a commercial property that fits your needs and your budget? As a developer, how would you provide your clients with information about the economic, employment and fiscal impact of the proposed project? If you were a farmer interested in growing bio-mass crops to be used in alternative energy generation, who would conduct a feasibility analysis for you? These are the issues that the Business, Economic and Community Outreach Network (BEACON), an outreach entity of SU's Franklin P. Perdue School of Business, tackles every day.

The most visible aspect of BEACON may be the state-of-the-art office suite that occupies an entire wing of the ground floor in the new Perdue Hall, but its impact on the Eastern Shore extends far beyond SU's ever-expanding campus!

Colleges and universities have been called upon to use their research and knowledge to help solve contemporary issues, and BEACON is a perfect example of this concept in action. Its 10-year regional economic impact has been estimated to be around \$50 million, and the organization is responsible for creating or retaining over 1,000 jobs throughout the peninsula. BEACON teams participate in a wide range of grant and sponsored research projects, exploring research questions with regional economic and public policy implications. These teams use highly sophisticated research techniques, software platforms and modeling tools to examine the issues and concerns related to Delmarva. The dual mandates of community outreach and experiential education have brought Salisbury University faculty, staff and students together with the region's business and economic development leaders on a wide variety of projects and programs designed to provide resources and support



to area businesses as they attempt to leverage the changing demographics and economy of the Eastern Shore.

## The Graying of Delmarva

In the United States, the elderly comprise the fastest growing segment of the population, increasing almost three times as rapidly as the rest of the general population. The Eastern Shore is aging even more rapidly, thanks to the continued out-migration of youth and in-migration of retirees attracted to the region's climate and amenities. In Worcester County alone, an estimated one-third of the total population will be 65 and over by 2030. The magnitude and imminence of this "elderly boom" threatens the region's ability to ensure that seniors have access to housing, health care, transportation and services that help them maintain their independence. This trend also will have huge implications for the region's economy and labor market,

as businesses adjust to the reality of aging consumers and workers. Unfortunately, neither the nation nor the region is prepared for this "graying phenomenon." Generally speaking, resources and services for the elderly are not structured to reflect the realities of 21st century aging, such as assisted living and medical care.

Given these realities, BEACON – and its partners, MAC, Inc., the Community Foundation of the Eastern Shore and Worcester County Department of Economic Development – created an initiative to help the region stay proactive on this issue. Launched in 2004, GrayShore is a network of over 300 private, public and non-profit sector organizations that work with individuals ages 50 and over throughout the nine counties of the Eastern Shore of Maryland. Its objective is to educate regional service providers and decision makers about our aging population: both the demographic realities and the impact that these demographics will have on regional services, economy and workforce.

At a recent GrayShore event, Senator Ben Cardin praised BEACON's efforts to focus key decision-makers attention on this important demographic change that is happening faster than anyone expected. He added: "Preparedness is our greatest tool, and BEACON's GrayShore is giving the Eastern Shore the gift of preparedness."

## Bienvenidos a Delmarva

Migration is dramatically changing the demographics of the Delmarva Peninsula. Over the past 10 years, the region has experienced unprecedented growth. The Hispanic population, for example, has increased at astonishing rates, as high as 300 percent in parts of Lower Delaware and 200 percent in some jurisdictions on the Lower Eastern Shore of Maryland. Although many organizations in the region are reaching out to its immigrant communities, their needs often go unmet due to barriers such as language, culture and transportation.

In 2000, BEACON, with the enthusiastic

support of SU President Dr. Janet Dudley-Eshbach, addressed this deficit by establishing Bienvenidos a Delmarva (Welcome to Delmarva) to help area service providers prepare for the changing demographic on the peninsula. Bienvenidos a Delmarva brings together over 200 private, public and non-profit sector organizations that work with non-native born residents of the peninsula. The objective is to increase the capacity and the capabilities of these organizations as the numbers of new residents originally from outside the U.S. continue to grow. We are particularly proud of the way all four SU schools – and students, faculty and staff alike – have come together with the community to make Bienvenidos a Delmarva the great success it has become. Without the broad-based on- and off-campus collaborations, Bienvenidos a Delmarva would not be able to bring these important issues and the various stakeholders together. It is amazing to see prejudices and enmity slowly giving way to collaboration and cooperation each time we bring opposing sides together on a variety of hot-button issues related to these demographic shifts we are experiencing on the Delmarva Peninsula.

## Staying Ahead of the Curve

Good planning requires good information. However, as a region, the Lower Eastern Shore currently has no centralized repository of information pertaining to its most urgent business, economic, workforce and community development concerns. Area businesses must rely on a service system that is continually playing “catch up” to market realities and often misses opportunities for business and economic growth. BEACON is home to several initiatives that help fill this information gap.



Dr. Memo Diriker (back row, far right) and a group of BEACONites

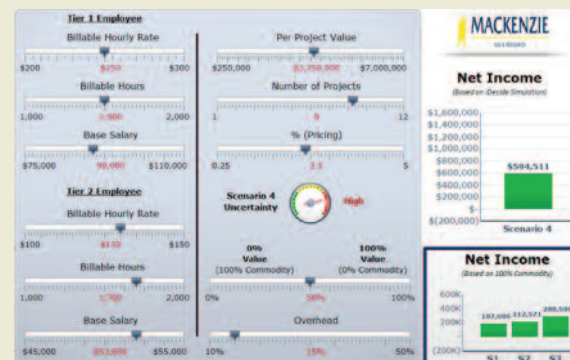
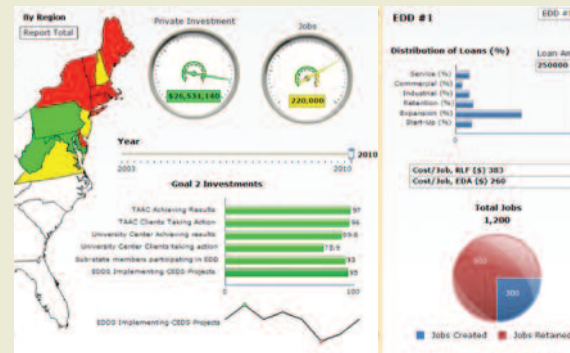
ShoreTrends is a quarterly economic trend forecasting effort maintained by BEACON. It gives regional business and public policy leaders a critical tool for developing the products, policies and programs needed to position the Eastern Shore of Maryland for prosperity in the 21st century. Local businesses can tap into information sources, including quantitative national, state and local data, as well as qualitative inputs from a very powerful regional online panel of opinion leaders and key informants in a way that is relevant to the economic realities of the Eastern Shore. Michael Pennington, the executive director of the Tri-County Council of the Lower Eastern Shore of Maryland, is a satisfied user of ShoreTrends: “What we have learned from the quarterly ShoreTrends surveys over the years has been used in developing our Comprehensive Economic Development Strategy (CEDS) plans and our 2007 and 2012 five-year Visioning Documents.”

GeoDash brings innovative, location-based executive dashboarding to decision makers in business, economic, workforce and community development. These online, interactive dashboards provide accurate, up-to-date information for public policy, economic development, and workforce and community development. Additionally, all of the data on the dashboards will be linked to multi-layer online maps using state-of-the-art GIS technology. GNAppWorks, an offshoot of GeoDash, migrates location-based executive dashboards to mobile platforms, such as smart phones and tablets, especially for decision makers in government agencies and nonprofit organizations.

ShoreEnergy is an initiative that brings together a diverse set of stakeholders from the ever-changing energy sector on the Shore to study trends and explore innovations to better serve the needs of the residents and commercial and industrial users of energy.

## On-the-Job Training

The student research assistants, known as “BEACONites,” work on faculty-mentored project teams for regional clients from the private, public and non-profit sectors. Projects include feasibility analyses, marketing plans, strategic



Examples of dashboard analyses performed by BEACON

plans, program evaluations and Web-based surveys. These students have a near-perfect record of job placement directly related to the work they do at BEACON. In fact, an estimated 90 percent of student research associates are placed upon graduation. Equally important is their one-, three- and five-year compensation levels, which are above their peers due, in large part, to the experiential learning opportunities offered through BEACON. Our greatest accomplishment is the growing success of our BEACONites in the years after their graduation. They are comfortably giving their Ivy League competitors a run for their money! ❖



## Meet the Provost: Dr. Diane Allen

Provost and Senior Vice President of Academic Affairs

**Q:** How do research and scholarly activity contribute to teaching and learning at Salisbury University?

**A:** Salisbury University has a reputation for developing scholarly research activities that benefit faculty and students, as well as regional, national and international communities. Faculty need to continually refresh and update their understanding of their discipline, and they accomplish this by involving themselves in research and scholarly work. Research enables faculty to keep abreast of emerging trends in their fields and bring real-world issues to the classroom. SU's faculty regard teaching their students as a top priority, and part of offering a world-class education is

providing faculty with opportunities to conduct relevant research in their chosen field. Faculty members who engage in research projects bring their knowledge, findings and experience back to their classrooms to inform their teaching and enrich student learning.

Scholarship and research create ways for faculty and students to actively engage in relevant, real-life questions and issues. Faculty who are actively engaged in scholarship and research add to the academic depth and richness of the campus. SU has a long history of developing programs that enhance learning through inquiry. Many student-learning opportunities, including the development of new courses, have grown directly from research initiatives. Decades ago, the Nabb Research Center for Delmarva History and Culture was developed in response to a need to provide research experiences and primary source materials to students. Today, the new Environmental Studies Department offers the campus community a concrete example of how research raises the level of teaching and learning, and enriches the student experience at SU. This new department was the culmination of collaborative research initiatives among faculty and students across several

academic disciplines.

Faculty engaged in their own research can also offer training and mentorship to their students by exposing them to relevant scholarly research. Students gain a deeper understanding of the world around them while learning research methodology and processes. SU's involvement in programs like its Undergraduate Research Conference, for example, provides students with hands-on training and experience presenting their work and communicating the importance of their research to academic and professional communities. The current Research Experiences for Undergraduates (REU) program is yet another example of how research grants and sponsored programs create new and challenging learning opportunities for students. Undergraduate students participating in this year's REU project are solving real-world problems and receiving hands-on training in an emerging field that is traditionally reserved for graduate students. Furthermore, the selection of SU as an REU site is a testament not only to the success of our faculty in securing sponsored funding, but also to the University's ability to provide outstanding research experiences to undergraduate students.



Provost Diane Allen (third from the right) and SU's deans at the May 2012 commencement ceremony



**Q:** How does sponsored research at SU benefit the local community and the University community?

**A:** SU has received many sponsored awards that are directly related to addressing community concerns, such as improving teaching in local schools, increasing the efficiency of the state's court system, and land-use changes in the state and region. Sponsored projects bring additional funds into the University, which allows us to enhance our academic programs for student success while providing valuable services to the regional communities. For example, research and sponsored programs in the area of reading literacy through the May Literacy Center enable the design of better instruction for teachers of community children and offer community outreach programs to area families. The Doctor of Nursing Practice (D.N.P.) and pediatric mental health internship programs are proactively addressing critical healthcare provider shortages on the Eastern Shore and across the state. In addition, research conducted by faculty in the Seidel School of Education and Professional Studies led to the development of a program that offers career development, resources and support to early childcare providers while helping to promote school readiness programs in early childcare, particularly in science, technology, engineering and math (STEM) disciplines.



**Q:** What is the future role for graduate education at SU?

**A:** I will be convening a summit this fall on graduate education to discuss our goals for the next five years and how we can strategically plan to meet those goals. I think it is safe to say that graduate education will grow at SU. Pursuing a master's degree is a natural "next step" for graduates of our highly acclaimed undergraduate programs. Having more graduate students and post-baccalaureate programs adds to the depth and richness of the academic experience of our campus. Graduate programs allow SU to offer advanced training to professionals on the Delmarva Peninsula. Our D.N.P. and our proposed applied doctorate in education will allow us to offer the highest possible training to professionals in these fields, which will result in better informed services for the citizens of our community.



**Q:** What areas provide the greatest potential for growth in graduate education at SU?

**A:** The development of doctoral programs will create new knowledge through research and will enable our faculty and students to explore a much deeper level of current research in their fields of study. Specifically, the D.N.P. will prepare nurses for positions in advanced practice, education and administration. The D.N.P. program's student research projects, the applied biology program, along with the newly created Graduate Research and Presentation Grant will further enhance graduate-level research at the University. Graduates of post-baccalaureate programs at all levels of study are more competitive as industries seek a better educated workforce. The fields of nursing and education are prime examples of this trend. Hospitals increasingly rely on research to improve patient outcomes, and teachers and school administrators employ research-based methodologies to raise the level of academic achievement in K-12 students.



During Research Awards and Pub Night, SU recognized those who had secured \$500,000 or more in grants



## Raising the Bar for Early Child Care on the Eastern Shore

*Lower Shore Child Care Resource Center Demonstrates Excellence in Long-Term Grant Funding*

The work associated with today's child care provider goes far beyond the "babysitting" of the past. Education reform initiatives such as No Child Left Behind and Race to the Top have called for more rigorous training for child care providers to ensure school readiness. "Child care providers are expected to do far more than make sure that young children are safe, fed and cared for during the workday," said Karen Karten, executive director of the Lower Shore Child Care Resource Center (LSCCRC). "They are expected to provide meaningful educational experiences and enrichment, in addition to adult supervision, while parents are at work."

### **Child Care Career and Professional Development Fund**

According to the National Association of Child Care Resource and Referral Agencies (NACCRRRA), the training and education level of a child care provider are the most important factors in providing quality child care. As programs strive to meet the changing expectations for the child care industry, some child care staff will choose to seek degrees. However, with the average annual salary of just \$24,000, most providers cannot afford the cost of higher education. "One of the barriers faced by programs seeking accreditation is the high cost of education; child care staff simply can't afford to go back to school," explained Karten. "Having degreed teachers in the child care workforce will be an essential piece of the quality child care puzzle."

Currently, child care providers must complete a 90-hour program consisting of two courses in basic child development and early child care curriculum, along with a few other courses to qualify as a lead teacher. "In the past, that was where many people stopped," explained Karten. "Once they met the minimum requirement, few child care providers went on to advance their professional development or to earn a degree."

Enabling providers to complete an early childhood degree is one way that the lower Eastern Shore region can prepare its child care workforce for the future of early care. For the past 11 years, the LSCCRC, through its unique partnership with Salisbury University, has received funding to help develop a



stronger, better prepared early childhood workforce. Since 2001, the center has been working diligently to provide training and support for early care providers and increase school readiness among children ages 0-5.

"Our goal is to increase the educational level of our local providers. This doesn't always mean that they have to obtain a college degree, but we work to provide them with educational opportunities so that they will continue learning new skills and gain more knowledge in the early care field," explained Karten. "However, our region has several child care programs working on Maryland State Department of Education (MSDE) accreditation and this process requires their staff to go back to school and earn a degree. The Career and Professional Development Grant is making higher education possible for our local child care workforce," she added.

In addition to providing financial assistance to degree-seeking child care workers, the center's affiliation with SU has enabled them to do something that is virtually unheard of in the child care industry – offer providers the opportunity to participate in professional development seminars facilitated by university professors and other experts in the field. Participants pay about \$15-20 for each seminar, making ongoing professional development affordable.

### From Crib to College

Experts in the field of early childhood education agree that what happens before a child enters kindergarten can determine the outcome of an entire academic career and influence a child's ability to grow into a happy and productive adult. Some experts have gone so far as to suggest that money invested in early child care now will be saved later, with fewer individuals entering the justice system or relying on welfare. Karten believes that it is never too early to start preparing children for school.

"Maryland students are tested beginning in the third grade, but in reality, college and career readiness starts at birth," she said. The first three years of life are the most critical, as that is when the brain is developing most rapidly. Most children are in child care during those crucial first years, so they need to be in a quality program."



With funding for an infant/toddler program, the center was able to hire an early childhood specialist who works specifically with providers who care for children ages 0 to 3.

### Early Childhood Mental Health Program

School readiness can influence a lifetime of educational experiences. But what happens when a child's first experiences outside the home are negative? Too often, children who display disruptive behaviors or lack the social and emotional skills needed for school are dismissed from child care, a traumatic event that can have a lasting effect on a child's academic success and self esteem.

The resource center's early childhood mental health program was developed to make sure that young children are ready for school so they can be successful throughout their academic careers. "We had a 3-year old who had been dismissed from care three times," said Karten. "When such young children are dismissed from care, they often develop negative attitudes about school that remain with them well into adulthood. The students who are struggling or dropping out of high school are usually the same kids who were dismissed from child care or were not ready for school back in kindergarten," she added.

Research also suggests that children

who start school with a deficit may never catch up to their more school-ready peers. "That is what we are trying to do, reach those at-risk kids early," commented Karten. Many of the kindergarten and pre-K teachers with whom the center works say that the most important success indicator for students entering their classrooms is not so much that they can read or count, but that they are socially and emotionally prepared for the school environment. They need to be able to sit with their peers and listen and learn. The reading and math will come, but not if they aren't ready to learn.

With funding from the Early Childhood Mental Health Consultation Grant, the resource center provides training, intervention services, clinical referral or other resources, and support for child care workers and parents struggling with a child who is at risk of being dismissed from child care. Staff social workers conduct on-site observations as well as meet with providers and parents to give them the training, resources and strategies they need to reach the child. "We found that since we started the program, fewer and fewer children were being dismissed," said Karten. "Of all the children who came through the program last year, which was about 80 kids, none of them was dismissed from child care. There are now 80 kids out there who are ready to succeed in school when they start kindergarten."

### School Readiness

Maryland implements the Maryland Model for School Readiness (MMSR) to determine whether or not kindergarteners are prepared for school. According to Karten, the state administers the Work Sampling System to assess what skills students learned prior to entering kindergarten. Through observation, data analysis and portfolio review, the MMSR measures the child's cognitive, social and emotional development. "It provides parents and teachers with valuable information about the child's basic academic skills and readiness to learn."

Programs and resources provided by organizations such as the LSCCRC seem to be having a positive impact on school readiness. According to the 2011-2012 Maryland School Readiness Report, in 2001, 49 percent of Maryland kindergarteners were entering school ready to learn; by

## STEM on Wheels

According to the Maryland State Department of Education, children enrolled in formal early education programs tend to be better prepared for school. In fact, the data show programs like pre-K are extremely beneficial. In 2011-2012, readiness in the domain of scientific thinking rose to 71 percent fully ready, up from 24 percent in 2001. Despite these gains, 18,500 (29 percent) children in Maryland require considerable or targeted support to successfully complete work in science, the domain with the least readiness.

After attending a symposium on school readiness, Karen Karten, executive director of the Lower Shore Child Care Resource Center (LSCCRC), realized that there were few resources available on the Eastern Shore to help young learners increase their science readiness skills. To address this critical need, the resources center developed the Mobile Science Museum, a program that brings a science museum field trip and educational presentation right to the child care provider's site. "This program grew out of what we saw as a big need in our community," said Karten. "We noticed that readiness in the area of scientific thinking was very low, so we created a series of science exhibits that we pack into a trailer."

The program began as a mobile hands-on science exhibit in which preschoolers investigate concepts related to the life sciences, chemistry and physics, but it has expanded into a science, technology, engineering and mathematics (STEM) program designed to engage very young learners in the STEM disciplines. The science unit sets up exhibits that encourage the children to freely explore and investigate, stimulating their natural curiosity. "It gives the providers a chance to interact with the children in a positive way and have scientific discussions that they might not otherwise have," explained Karten. The program also offers training sessions in the area of early childhood science.

The Mobile Science Museum visits local child care programs and is currently under contract to provide STEM lessons at all the public schools in the tri-county area. It was created in 2009 with funding from The Community Foundation of the Eastern Shore and the PNC Foundation, and it is now a fee-for-service program at a cost of about \$1 per child. "The providers love it," said Karten. "It is much easier than going on an off-site field trip."

2011, the percentage increased to 83 percent. "We believe that the resource center is part of that," said Karten. "We are making sure that the child care providers have the resources they need to prepare children to succeed in school. Eighty-three percent is great, but our goal is to have 100 percent of Maryland students entering kindergarten ready and able to learn."

So, what was child care like before



educational reform? "Go back to 1998," said Karten. "There was very little training available to child care providers; the requirements have changed a lot since then." The Office of Child Care, a division of the MSDE, is responsible for issuing child care provider licenses. They review the program and inspect the facility. "It used to be that safety was their only main concern; you know, covers on all the electric outlets. As long as the children were safe, the program was approved," explained Karten. Today, these standards have really changed.

Part the MSDE's Race to the Top funding included an early child care grant. As a result, the state is now implementing Maryland EXCELS, a Quality Rating Improvement System. Child care programs will need to demonstrate new levels of quality. For example, according to the American Academy of Pediatrics, children under the age 2 should have no exposure to television at all, so the resource center advises child care providers to make sure that there are no televisions in use at their site for little ones. "We want to see meaningful educational experiences happening in child care," said Karten.

"The children should have lots of new experiences that stimulate their curiosity. We teach the provider, who in turn, provides the child with his or her first educational experiences."

## Proven Track Record

The Lower Shore Child Care Resource Center is sponsored by SU, with funding from various sources including the MSDE. The mental health program also receives some of its funding from the Board of Education. "We also work with the Judy Centers of Wicomico and Worcester counties, and other organizations that share our goal of school readiness," said Karten.

The resource center is the brainchild of Dr. Marvin Tossey, professor in the SU Social Work Department. He identified a strong need to provide area residents with access to quality child care programs and wrote the original proposal in 2001. The center has received funding each year since. "When we first opened our doors, we had three staff members; today we employ seven full-time professionals, as well as a part-time employee and student assistant. Students and interns use our library and resource room regularly. I come to work every day knowing that my work will be rewarding," Karten said.

Karten has a background in early childhood education and worked as a teacher before joining the center as its executive director. She also teaches undergraduate courses in early childhood development in the University's Education Specialties Department.

In a recent exit survey, graduating seniors who received bachelor's degrees in early childhood education as part of the center's grant funding indicated that their degrees were very important to their future, and that they plan to continue in child care, adding their new skills to the child care workforce. They also said that they would not have been able to get their degrees without the financial assistance provided by the center through the professional development grant.

The Lower Shore Childcare Resource Center is one of 12 resource centers in the state and is part of the Maryland Child Care Resource Network, a network of child care resource and referral agencies that provide services designed to improve the quality and availability of child care in Maryland. ❖

# Bernstein Award Celebrates 25 Years of Excellence

## Perdue School of Business Demonstrates Commitment to Entrepreneurship

By Dr. Stephen Adams, 2002-2012 Bernstein Award Director & Associate Professor of Management

The Bernstein Achievement Award for Excellence began 25 years ago through the generosity of Salisbury University alumnus Richard Bernstein. A successful local entrepreneur and founder of K&L Microwave and other enterprises, Bernstein established a first prize of \$5,000, the same amount he borrowed from a bank to start his first business.

Originally established as an exclusive Franklin P. Perdue School of Business event, the Bernstein Competition has expanded to include finalists from SU's other schools: Fulton School of Liberal Arts, Henson School of Science and Technology, and Seidel School of Education and Professional Studies. Winning plans have included a full range of businesses, such as social media, consulting, filmmaking, recycling, food service and information technology. About half of the winners have gone on to start the business they proposed in their plans.

The annual competition begins with an informational meeting during the fall semester, and students submit their full plans in the spring. A Perdue School faculty committee – comprised of representatives from accounting, information systems, economics and finance, and management and marketing – chooses the four finalists. The competition culminates with a public presentation, where judges from the business community, such as CPAs, bankers and entrepreneurs, choose the winner, runner-up and honorable mention. Our judges have included more than one Maryland "Entrepreneur of the Year." Indeed, just receiving feedback from the judges on their plans is priceless for the students.

"Entrepreneurship and innovation, both in start-ups and existing firms, are

requisite for success in today's global environment," said Dr. Bob Wood, dean of the Perdue School of Business. "The Perdue School faculty emphasizes and encourages entrepreneurial thinking across the curriculum."

Becoming a finalist makes the entrants part of an elite fraternity. The plans submitted by all finalists are kept and made available for the benefit of future entrants. They also share their competition experiences. At a 2011-2012 information meeting, 2011 finalist John Stockel, via Skype from London, shared his experiences with about 50 prospective entrants. Similarly, during the 2010-2011 year, 2010 winners Ryan Chacon and Charles Gray, co-founders of Knollege, LLC, and Hunter McIntyre offered advice to the next generation of entrants, as did 2003 winner Janet Wilson (Stripetech).

The Bernstein Competition is the quintessential collegiate event because it provides students the opportunity to do something new and daring. The best college education is one where students accomplish more than they thought they could. The competition is also mutually beneficial for the University and the business community. Local business people have generously provided invaluable guidance to the student competitors. Meanwhile, the terrific ideas the competitors generate, along with the work ethic they bring to each endeavor, serve as a reminder to the rest of the business community what a terrific resource they have at their doorstep in the Perdue School of Business. One form that relationship takes is through the Small Business Consulting course. Teams of students, including several who have entered or become finalists in the Bernstein competition, tackle particular

problems for local businesses, whether in the area of human resources, marketing or in creating a business plan.

An impressive number of recent Bernstein Award winners and finalists have parlayed their competition experiences into successful business ventures. Tim McFadden, a glassblower from the Baltimore area,



was a finalist in 2004. Armed with the advice he received from the Bernstein judges, he won the Bernstein Award in 2005 and was a semifinalist in the *Fortune Small Business Magazine* Student Showdown Competition, competing with entrants from such schools as Harvard, the University of Chicago, Stanford, NYU and Northwestern University. "If it wasn't for the Bernstein Competition, I probably would not have taken the initiative or the time to seriously research launching my business and would not have been successful," said McFadden. "I owe it all to the opportunities provided to me by Salisbury University and the Bernstein competition."

Last month, the "Independent We Stand" Web site featured AIR (Atmospheric Improvement and Renewal) Lawncare, the business that won the Bernstein Award for Zach Kline in 2011 after having been a finalist in 2010. "I am proud to be a locally owned business and now part of this national movement," said Kline. "Locally owned businesses are the backbone of our economy. They provide jobs, service and revenue in the form of taxes to the communities of which they are a part," he added.

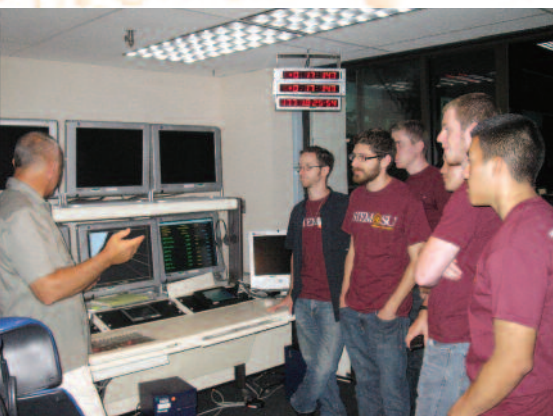
These are just a few of many success stories to grow out of the vision of a local entrepreneur. Stay tuned for the finals of the 2013 Bernstein Competition to see the next crop of young entrepreneurs! ♦



Bernstein award winner Tim McFadden and his hand-blown glass art

# Unparalleled Research Opportunities for Undergraduates

## Students Test the Limits of Parallel Computing



Recently, the National Science Foundation (NSF) selected Salisbury University as an official Research Experiences for Undergraduates (REU) site for computer and information science and engineering (CISE). During the summer, undergraduates from around the country converged at SU to participate in EXERCISE (Explore Emerging Computing in Science and Engineering), a unique interdisciplinary research project in which students applied parallel processing models – including GPU (graphics processing unit) computing with NVIDIA CUDA and MapReduce computing on Amazon EC2 – to tackle data and compute-intensive problems, such as network pattern detection, medical image reconstruction and GIS imaging.

SU is the first CISE REU site on the Eastern Shore of Maryland. “Most REU sites are found at large research institutions, demonstrating SU’s national recognition for offering excellent research opportunities to undergraduates,” said Dr. Clifton Griffin, SU’s dean of graduate studies and research. Over the next three summers, SU will serve as the host institution, along with substantial cooperation from the University of Maryland Eastern Shore and Johns Hopkins University.

### Parallel Universe

Parallel computing is a form of computation in which large data sets are processed by multiple units working simultaneously. Parallelism has been in use for a number of years, particularly in high-performance applications such as quantum physics, weather forecasting or climate research in which supercomputers process massive

amounts of data. Since power consumption and heat generation have become a concern in recent years, computer scientists have been exploring the use of multi-core processors that can be altered to enable a standard desktop PC to process the same amount of data as a cluster or super-computing system.

### Student Projects: Exploring GPU Applications

GP (general-purpose)-GPU computing refers to the use of a GPU in parallel with a central processing unit (CPU) to accelerate the processing of large amounts of data. The GPU accelerates applications running on the CPU by offloading some of the most intensive portions of code. The application runs faster because it is using the massively parallel processing power of the GPU to boost performance.

A GPU is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the building of images intended for output to a display. Originally designed for use in game consoles, GPUs are very efficient at manipulating computer graphics, and their structure makes them more effective than general-purpose CPUs for algorithms in which the processing of large data sets is done in parallel.

### Accelerating Medical Image Reconstruction

Electrical engineering students Pedro Bello from Florida International University and Mustafa Awwad from Old Dominion University are using a desktop PC, graphics processor and human ingenuity to harness the massive processing power of super computers. Under the mentorship of Dr. Enyue (Annie) Lu, associate professor of computer science at SU and principal investigator for the project, and Dr. Yuanwei Jin, associate professor of engineering and aviation sciences at the University of Maryland Eastern Shore, these students are implementing imaging algorithms on GPU processors to accelerate the image-reconstruction process for medical imaging applications.

“A task that takes days to complete can be completed in hours using GPU,”

explained Bello.

“Cluster computing can cost millions of dollars in terms of hardware and software, energy consumption and cooling systems,” explained Awwad. But GPU computing is attractive because it can be done with a dedicated video card and a consumer PC. “The most expensive GPU is about \$1,500 U.S. dollars, so you get the power of a super computer at a fraction of the cost,” said Bello.

The students’ project was to develop a mathematical formula for determining the most efficient method for using GPU computing to process large data sets. “What is new and challenging is figuring out how to predict the best model for optimizing GPU performance,” said Jin. “The circuits were originally developed for the gaming industry, which requires processors capable of rapidly reproducing high-resolution images, but it is more complicated than simply installing a GPU and running an application,” he explained. “We take the same algorithms and modify them for other applications such as medical imaging,” Awwad explained.

The team worked with Medical Ultrasonography, which uses broadband sound waves to produce images, and Magnetic Resonance Imaging (MRI), which uses powerful magnets to polarize and excite hydrogen nuclei water molecules in human tissue, producing a detectable signal to generate images of the body. In both applications, image reconstruction speed is a critical consideration.

During the course of the 10-week program, the students were given MATLAB software codes and a specific GPU processor, and they worked out calculations to determine the optimum processing speed. Bello and Awwad’s work may lead to a better understanding of how to implement GPU computing given a particular architecture and the degree of parallelism required to achieve the desired performance. “The high-level question is ‘what is the maximum performance possible using parallel processing with GPUs?’” said Jin.

“The time needed for a software programmer to manually re-write all the code for optimum performance is tremendous,” explained Bello. “Our formula will enable developers to predict how to get the best performance; it will save a lot of time.”



## Applications in Geographic Information Science (GIS)

William Kostan, a computer science and mathematics major from the University of Virginia, and Sean Kirby, an engineering major from the University of Maryland Eastern Shore, are using GP-GPU computing to speed up the processing of large data sets for capturing detailed, high-resolution images covering large geographic areas. GIS relies on powerful computer systems capable of capturing, analyzing and displaying geographic data identified according to location. Applications in this field include scientific research, natural resource management, city and route planning, land cover and change detection, law enforcement, oil and gas exploration, and natural hazards.

New sensor technologies allow data collection for GIS applications at an ever-increasing rate. The need for systems capable of processing large amounts of data will only increase as better sensors continue to increase the amount of data collected. "The data collection industry has outstripped the processing capacity of GIS," explained Dr. Arthur Lembo, SU associate professor of geography. "In order to move forward, GIS science will need to find ways to more effectively work with massively large data sources," he added. The solution may be found in GP-GPU processing. As a result of CUDA and other similar parallel computing platforms and programming models, programmers can develop their own applications that take advantage of parallel



processing on the GPUs.

Under the mentorship of Lembo, Kostan and Kirby explored raster-based functions in GIS using GPU computing and adding parallel computation capabilities to ArcGIS systems. Raster data models incorporate the use of a grid-cell data structure where the geographic area is divided into cells identified by row and column. The students use multiple cards in a single, standard desktop PC computer that can achieve over 1,000 simultaneous processes and discover the potential benefits and limitations of the GP-GPU approach for GIS applications.

## Producing High-Resolution Images in Record Time

The team is working on developing algorithms for processing seamless, high-resolution images covering large geographic areas. One of the GIS problems the team is working on is generating high-quality images. Generally, you would have to choose between detail and area coverage. GPU computing provides the data-processing power needed to generate finely detailed images of a county or region. Lembo's vision is to bring parallel computing into the mainstream: "We are using ordinary equipment, PCs that can be purchased at retail stores like Walmart to demonstrate that an individual or small business can access this technology and it is more cost-effective than cluster computing."

## Embarrassingly Parallel

Lembo and his students have been focusing on basic terrain and can process data 30 times faster using parallel processing. "Large data sets such as those used for GIS-image processing are embarrassingly parallel," said Lembo. "A process that would normally take 30 minutes to complete can be done in one minute, while even larger sets that would take a full day can be processed in about an hour."

The students said that their biggest

# SU's New Environmental Studies Department

*Collaborations Transform Lives Around the World*

SU's environmental studies program has been the fastest growing major at the University since its formation in 2004. Now, with more than 100 majors, it shows no signs of slowing down. Environmental studies officially became a department on July 1, 2012, with six tenured or tenure-track faculty members assigned to it by spring 2013. Among those joining the department are Drs. Mike Lewis and Jill Caviglia-Harris.

As recent recipients of the prestigious Wilson H. Elkins Professorship from the University System of Maryland (USM), Lewis and Caviglia-Harris will collaborate on several environmentally focused initiatives that they believe will have far-reaching benefits. With funding from the Elkins award, Lewis and Caviglia-Harris plan to develop an on-campus organic farming teaching laboratory, design a field research station for studying the regional environment, and bridge existing faculty research on Brazilian deforestation and development with student research and learning experiences.

## Campus Organic Farm

The development of sustainable and resilient local agricultural systems has recently captured the attention of academics and the news media alike. At Salisbury University, faculty members have addressed this trend through the development of courses, including a philosophy course, that includes a small



garden project, and a course on community gardens directed by a sociologist. Student activism on campus has resulted in less wasteful practices in Dining Services and other areas. In spring 2011, Jay Martin, an organic farmer and leader of the local food movement, introduced a course on organic farming. Additionally, students volunteer at organic farms in the community, participate in the farmers markets and have started a garden club.

Building on this energy, Lewis has begun conversations with the University's Dining Services personnel, campus administrators, environmental studies faculty and local farmers on the development of a self-supporting, on-campus farm, which would provide a portion of its vegetable crops to the student dining hall. Faculty members in environmental studies and other departments also are committed to using the farm both for their own courses and for developing educational outreach programs for local K-12 students and community members. "This farm will be unique on the Eastern Shore, and a rarity nationally, as it is far more typical for campus farms to exist on land-grant institutions or private schools," Lewis explained.

## Nassawango Field Station

The largest Nature Conservancy holding in Maryland is its Nassawango Creek property, ranging from old-growth bald cypress swamps to upland second-growth pine forests. SU faculty in environmental studies, biology and geography have used this property for research and course field components. In the midst of the Bear Swamp portion of this property is a small clearing with an old farm house. The Nature Conservancy and Salisbury University are involved in discussions about how to create a field station there that will be used for the administration of courses, student and faculty research, and as an environmental education site for the community. The Elkins award assists in moving this process forward, with planning for the field station to include a range of sustainable design features incorporated into the structure.



## Brazilian Deforestation and Development

Since 1995, Caviglia-Harris has been investigating the long-term impacts of deforestation undertaken by small-scale farmers in the Western Brazilian Amazon. Her research merges survey panel data with remote sensing and geographic information systems (GIS) data to study the causes and consequences of land use change on human welfare and poverty along with the impacts of these decisions on ecosystems services. A principal objective of this study is the development of a long-term, spatially referenced data panel that is available to researchers and students for methodological and policy research.

The Elkins Professorship will enable Caviglia-Harris' research team to draw upon this database to develop a team-taught course in the Environmental Studies Department, exposing undergraduate students to an interdisciplinary topic of global interest, eventually with hopes to develop an undergraduate summer research experience. A champion of undergraduate research, Caviglia-Harris often involves students in her work. "Through this initiative, we will bring cutting-edge, faculty research into the undergraduate classroom in a sophisticated and methodologically rich fashion, thus elevating the program's offerings along with the department's national reputation," she said. ❖

# On a Winning Streak

## Five Students Receive EPA-GRO Fellowships

Environmental studies majors are among the most engaged students on campus: half of its graduates have studied overseas, nearly a third have completed the Honors Program, more than half have participated in internships with regional agencies and employers, and just under 20 percent complete double majors. Perhaps most notably, five students majoring in environmental studies have been awarded nationally competitive Environmental Protection Agency (EPA)-Greater Research Opportunity (GRO) Fellowships in the past three years, an extraordinary feat for any program, let alone a young one. Dr. Mike Lewis, an environmental historian, has been a driving force behind the development of SU's environmental studies program and has provided guidance and mentorship to SU's EPA fellowship applicants.

This year, sophomore environmental studies majors Keyyana Blount and Amanda Stone received this prestigious award. They join graduating seniors Emily Thorpe, Jonné Woodard and junior Jessica Johnson as EPA-GRO fellows. "We are on quite a run," said Lewis. "The success of our students might give the impression that these awards are easy to come by, but this is not the case. The EPA is very selective. These outstanding SU students are among the best in the country," he added.

Fellowships are open to college sophomores majoring in any field linked to the EPA's mission, including the sciences, social sciences or interdisciplinary programs

such as environmental studies. The EPA awards only 30 to 40 fellowships per year throughout the United States, and up to \$48,900 is awarded over a two-year period. These awards cover all expenses for the last two years of college, as well as a monthly living allowance and a paid summer internship conducting research in an EPA field facility. "The EPA awards are the most lucrative and prestigious fellowships available for students studying any aspect of the environment," Lewis said. "Keyyana and Amanda are to be congratulated for their excellent work. They represent the very best of SU, and we are fortunate to be able to work with such students."

This summer, Johnson worked for the EPA lab in San Francisco on the Navajo Nation Abandoned Uranium Mine Superfund Division Project, where a team of environmental scientists has been testing homes for uranium. The EPA hopes to gather enough evidence to hold the mining companies responsible, as well as develop outreach programs to send to the Navajo Nation. The team is testing home sites that were once transfer stations and areas where rocks were stored for pick up by the government. "This experience is beyond anything I could have imagined," Johnson said. "I can actually see environmentalism changing people's lives." ❖



Keyyana Blount



Amanda Stone



Jessica Johnson

*"The success of our students might give the impression that these awards are easy to come by, but this is not the case. The EPA is very selective."*

— Dr. Mike Lewis



# Regional, National and International Research and Scholarship Thrive at the Nabb Research Center

By Dr. G. Ray Thompson, Director and Co-Founder of the Nabb Research Center

Delmarva holds the most complete span of original records anywhere in British-speaking Colonial America. After the establishment of Jamestown in 1607, the Eastern Shore was one of the earliest settlements in Virginia. As settlement on the peninsula grew, the Eastern Shore was divided into three separate units: Delaware, Maryland and Virginia. Salisbury University's Nabb Research Center holds more than 1,700 maps that reflect the changing views of Delmarva's physical landscape, and it is unique in that it traces this tri-state area's history from the earliest surviving documents preserved on microfilm, in transcribed publications and in scholarly research.

## From File Cabinet to Center

For the past 30 years, students and community members have benefitted from the wealth of historical resources of the Nabb Research Center, yet few know how it grew from a single filing cabinet to its present identity as the Edward H. Nabb Research Center for Delmarva History and Culture.

The seeds of the Nabb Research Center were planted in the late 1970s at what was then Salisbury State College. Concerned that a lack of awareness of the career possibilities afforded by a history degree was leaving many students reluctant to enter the discipline, SU introduced several new courses in local history, museum studies and material culture, which were designed to teach students to locate, analyze and interpret a multitude of primary source materials. The success of the new courses made apparent the value of establishing a research center. Despite the historical and cultural richness of the region, students still struggled to locate materials, as there was no central facility dedicated to the collection and preservation of original records from Delaware and the Eastern Shore of Maryland and Virginia at the time. The Nabb Center was created to fill this void.

By 1988, the Delmarva Historical Archives had outgrown the file cabinet as well as the offices in which it had initially been housed. Additional space in Holloway Hall was allocated for the archives, but the blossoming repository soon outgrew even

this space, as historians and community members joined students in regular use of these valuable materials. In 1992, the collection was moved to the East Campus Complex of the Salisbury University campus, where it continued to grow. In 1997, Dorchester County attorney and philanthropist Edward H. Nabb endowed the research center with \$500,000, allowing it to expand to the 13,000 square feet of operational space that it currently encompasses. The facility was renamed the Edward H. Nabb Research Center for Delmarva History and Culture in honor of this generous gift.

Today the center's holdings include archival material, artifacts, family histories, photographs, manuscripts, maps, newspaper clippings, obituaries, rare books and reference stacks, with more than 8,000 monographs and serials relating to United States history, the Delmarva Peninsula and the greater Chesapeake region. An extensive microfilm collection, consisting of more than 4,000 reels of primary research material, includes court records and other public and private records.

## Regional Archives Inspire International Scholarship

The Nabb Research Center houses materials of scholarly interest to students in nearly all disciplines, and it continues to embrace the primary mission of promoting and facilitating academic scholarship relating to the history and culture of the Delmarva Peninsula. Students from various programs of study at SU and our neighboring school the University of Maryland Eastern Shore – including history, English, anthropology, cultural geography and environmental studies – utilize its resources.

The manuscripts and artifacts housed at the Nabb Research Center capture, record and preserve historical time and place. The Nabb Research Center's collections tell the story of the history and culture of the Eastern Shore. Scholars, both national and international, utilize the center's vast and rich collections for dissertations and publications.

One such scholar is SU graduate student and recent Fulbright Student Fellowship recipient Charles Overholt. This fall, he will

travel overseas to study and conduct research at the 485-year old Philipps-Universität in Marburg, Germany. Overholt, who is currently pursuing a master's degree with a concentration in European and world history, will explore the role of the Hessian soldiers during the American Revolution.

Overholt will work under the mentorship of Drs. Holger Gräf and Christoph Kampmann, two leading scholars who have been editing, translating and publishing the letters of Hessian soldiers stationed in America and the diary of well-connected Hessian officer and landowner Baron Gilsa. Overholt will assist with the ongoing project and use the primary documents to explore his own questions about the Hessians.

The inspiration for Overholt's research stemmed from his experiences at the Nabb Research Center. As a graduate assistant employed at the center, Overholt wrote historical narratives about local subjects, based on his analysis of original documents. One of his first tasks was to transcribe the faded handwritten pages in an early 19th century German bible.

Overholt's work at the Nabb Research Center fueled his existing desire to understand the multi-layered nature of Germany history. He studied German language, culture and literature, which added a new dimension to his understanding of what has made Germans "tick." He learned how to read not only modern German scripts, but also the more traditional scripts, which he knew he would have to read if he were to advance to the Ph.D. level. On his own, Overholt learned to write *deutsche Kurrentenschrift*, an old form of German language handwriting based on late medieval cursive writing, and *Sütterlin*, the last widely used form of *Kurrent*, the old German blackletter handwriting.

Overholt spent countless hours at the Nabb Research Center pouring over many pages, and he began transcribing the handwritten sentences, making them understandable to a population who has long been unable to read such script. It was this knowledge of arcane German handwriting as well as his knowledge of the language that caught the attention of Gräf and Kampmann.





Fulbright winner Charles Overholt at work on the water

The contributions of the Hessians in America during and after the American Revolution are a topic not widely studied at American universities, primarily due to the lack of original sources. Overholt's work will result in an invaluable addition to American historical scholarship. "The story of these auxiliary forces combines my interest in German culture and trans-Atlantic history with my fascination with American independence and my own heritage," Overholt said. He hopes that his work will enlighten the American public on the true story of the Hessian soldiers who helped America fight for its independence.

In addition to his work at the Nabb

Research Center, Overholt was also inspired by his grandfather's stories of his travels to Italy and southern France while serving in the U.S. Navy during World War II, and he credits his father's advice to "make a living with your mind, not your back" for motivating him to continue his studies. Over the years, Overholt has worked alongside his dad, a waterman, crabbing and net fishing in the Chincoteague Bay and other tributaries. Combining interests, he recently was instrumental in creating a Nabb Research Center exhibit on the Shore's shanty boats and bygone gunning clubs, which opens this fall at the center. ❖

## A Look at Early Medical Practices

Medical records of Eastern Shore doctors, dating from 1632-1900, provide a remarkable insight into the tools used during this era. Estate inventories of early physicians also help in the understanding of the daily lives of those who lived on the Eastern Shore. Contained within the early records of Somerset County (1680s) are administrative accounts that tell about family health, medicines prescribed and detailed information such as the precise technical names of certain medicines.

On the Nabb Research Center's Reading Room shelves are a number of monographs relating to historic health issues. For example, *The Medical Annals of Maryland from 1799-1899*, compiled for the Centennial of the Medical and Chirurgical Faculty in Baltimore, includes a detailed account of many Eastern Shore doctors from the 19th century onward. *Public Health Papers and Reports of the American Public Health Association*, published in 1900, provides a detailed account of the yellow fever epidemic and changing practices of the health care profession. *Epidemics in Colonial America* by John Duffy deals with smallpox, diphtheria, scarlet fever, as well as respiratory diseases and childhood illnesses. The Nabb Research Center holds a valuable collection of doctors' valises and medical equipment that would have been used daily by the country doctors on the Shore.

Among the gallery exhibits curated at the Nabb Research Center is "The Native Americans on Delmarva at First Contact, 1600-1700," an exhibit that illustrated in graphic detail the horrible deaths of Native Americans who had not been "seasoned" to European illnesses and diseases. "Life on the Eastern Shore, 1607-1907" was another popular exhibit with a component on local medical history and practices. "Main Street Salisbury, 1886-1936" currently showcases items used by rural physicians and medical supplies found in a typical drugstore from 1886-1936. Past lectures at the center have included an in-depth look at Civil War medical practices and an upcoming fall 2012 presentation on DNA, especially as it relates to women's health and their understanding of themselves and their ancestors. ❖

19th century medical kit



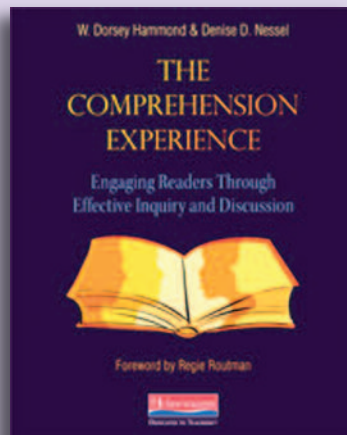
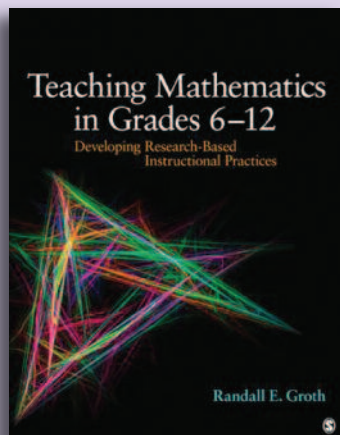
**Teaching Mathematics in Grades 6-12: Developing Research-Based Instructional Practices**

By *Randall E. Groth*,  
Associate Professor of  
Mathematics Education

Groth explores how research in mathematics education can inform teaching practice. He shows secondary mathematics teachers the value of being researchers in the classroom by constantly experimenting with methods for developing students' mathematical thinking and then connecting this research to practices that enhance students' understanding of the material.

Part I introduces secondary teachers to the field of mathematics education with cross-cutting issues that apply to teaching and learning in all mathematics content areas. Part II is devoted to specific mathematics content strands and describes how students think about mathematical concepts. The goal is to have secondary math teachers gain a deeper understanding of the types of mathematical knowledge their students bring to grades 6-12 classrooms and how students' thinking may develop in response to different teaching strategies.

*Sage Publications, 2012*



**The Comprehension Experience**

Co-authored by  
*W. Dorsey Hammond*,  
Professor Emeritus  
of Teacher Education

Co-authored with education consultant, mentor and writer Denise Nessel of Australia, *The Comprehension Experience* explains how to teach effective critical thinking processes and promote discussions of K-12 students with fresh, research-driven practices. According to Hammond and Nessel, readers must do more than master skills and learn strategies; they must have highly engaging, deeply satisfying experiences with narrative and informational texts.

Hammond and Nessel are both experienced in research and classroom practice. "Most important," they assert, "is to promote readers intellectual and emotional engagement with texts every day through effective thinking and discussion." The authors also provide classroom dialogues to describe instruction in action.

*Heinemann Publishing, 2011*

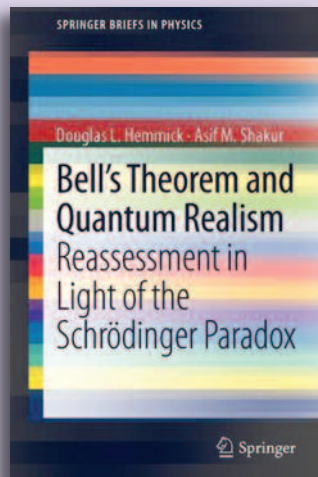
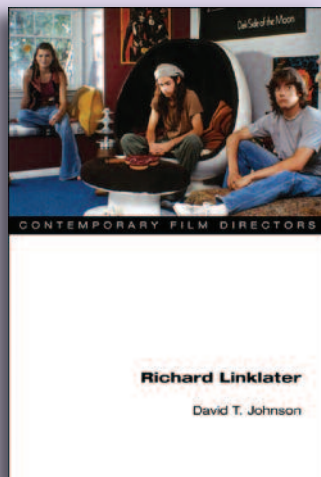
**Richard Linklater**

By *David T. Johnson*,  
Associate Professor of English

Richard Linklater's filmmaking choices seem to defy basic patterns of authorship. Yet throughout his varied career spanning two decades, Linklater has maintained a sense of integrity while working within a broad range of budgets, genres and subject matters.

Identifying a critical commonality among so much variation, Johnson analyzes Linklater's preoccupation with the concept of time, focusing on its many forms and aspects: the subjective experience of time and the often explicit, self-aware ways that characters discuss that experience; time and memory, and the ways that characters negotiate memory in the present; the moments of adolescence and early adulthood as crucial moments in time; the relationship between time and narrative in film; and how cinema, itself, may be becoming antiquated. While Linklater's focus on temporality often involves a celebration of the present that is not divorced from the past and future, Johnson argues that this attendance to the present also includes an ongoing critique of modern American culture. Crucially filling a gap in critical studies of this American director, the volume concludes with an interview with Linklater discussing his career.

*University of Illinois Press, 2012*



**Bell's Theorem and Quantum Realism: Reassessment in Light of the Schrödinger Paradox**

Co-authored by *Asif M. Shakur*,  
Professor of Physics

Quantum theory presents a strange picture of the world, offering no real account of physical properties apart from observation. Niels Bohr felt that this reflected a core truth of nature: "There is no quantum world. There is only an abstract mathematical description."

Among the most significant developments since Bohr's day has been the theorem of John S. Bell. It is important to consider whether Bell's analysis supports such a denial of microrealism. In this book, the authors evaluate the situation in terms of an early work of Erwin Schrödinger. Doing so, they see how Bell's theorem is conceptually related to the Conway and Kochen Free Will theorem and also to all the major anti-realism efforts. It is easy to show that none of these analyses imply the impossibility of objective realism. The authors find that Schrödinger's work leads to the derivation of a new series of theoretical proofs and potential experiments, each involving "entanglement," the link between particles in some quantum systems.

*Ruka Press, 2011*

# LET'S "RAP"

## SU Rolls Out Graduate Research and Presentation (RAP) Grant Program to Enhance Graduate Student Research

*In its ongoing effort to support student research initiatives, the Office of Graduate Studies and Research launched a new graduate student grant program. Research grants, up to \$500, help support graduate students develop research and scholarly projects with a faculty supervisor and present their projects at various conferences and meetings. The program enables students to receive recognition for their work and provides networking opportunities and professional development in their field of study. This year, SU awarded \$3,500 in RAP grants across a variety of academic disciplines.*

### Assessing the Environmental Impact of Dietary Protein Choices Through Ecological Footprint Accounting

Stephen Giarratano, Applied Biology

The global population is projected to reach 10 billion by the middle of the 21st century. Along with this population growth, per capita consumption of resources is expected to increase as well. Currently, a typical resident living in an industrialized country uses 15-35 tons of raw materials annually, compared with those living in agrarian societies, which accounts for only about 4 tons of raw materials.

As agrarian societies march toward industrialization, their consumption of natural resources will increase, resulting in a decline in the planet's ability to sustain human life. At our current population of 7 billion, we are already outstripping the earth's bio-capacity, the amount of productive area needed to generate resources and absorb waste. If everyone on earth lived like the average American, it would take five years to generate what is used and disposed of in a year.

To address this issue, Giarratano is assessing the overall environmental impact of different lifestyles and products using Ecological Footprint methodology, which measures the quantity of biologically productive land and water required to produce the resources used and absorb the waste generated by a population, individual or product. Giarratano's research may lead to a better understanding of the demands of different lifestyle choices, specifically dietary choices, place on the planet.

### Creating Exigency in Students Toward Writing: How Workplace Writing Can Benefit WAC

Alexandra Guerrierio, English

Writing Across the Curriculum (WAC) is an educational reform movement that promotes writing as a mode of learning and communicating, as well as an activity central to critical thinking. WAC pedagogy focuses on the integration of writing into courses across the curriculum to enhance learning and foster development of student writing throughout their academic careers.



Kyle Ward, Dr. Eugene Williams and Amy Reese at the ASIP Conference in San Diego.

WAC programs are generally designed according to trends in composition studies and serve to encourage faculty to express the value of writing across all academic and professional disciplines. Guerrierio's research is unique in that it addresses the pedagogical and theoretical benefits of incorporating professional or workplace writing into the discipline-specific curriculum. Current research does not examine the possibilities that professional writing can bring to disciplines such as engineering, for example, which traditionally have not placed a great emphasis on writing. Through writing assignments that resemble workplace writing in their field of study, students will see the professional value of writing and will become more motivated to sharpen their own writing skills to meet changing workplace demands.

Guerrierio's work also explores common misconceptions students have about workplace writing and provides university professors with specific examples and applications they can use in their own classrooms. She presented her research at the 2012 International Writing Across the Curriculum Conference in Savannah, GA.

### Service Learning in the Composition Class: Creating Courses That Shape Our Students and Our Communities

Melissa Perry, English

Perry's interest in service learning began during her undergraduate studies when she took several courses that used different methods of integrating service learning into the classroom. Service learning is defined as a method of

teaching that combines formal classroom instruction with related community service activities. Perry has expanded on her undergraduate experiences by examining the theory and pedagogy in order to propose methods of integrating service learning that are more beneficial to the students and to the community.

Perry's research examines current trends in service learning and analyzes their strengths and weaknesses. Her findings suggest that an effective service learning course must produce writing that represents diverse rhetorical purposes, enable students to develop the critical consciousness to understand the underlying social issues affecting our society, rely on the principles of scholarly research and encourage student to explore diverse community issues through their writing. Perry presented her research at the College English Association's 43rd Annual Conference in Richmond, VA.

### Temperature as a Cellular Stress of Chinook Salmon Embryo Cells

Amy Reese, Applied Biology

Chinook salmon are indigenous to the east and west coasts of the Pacific Ocean. They are cold-water fish that migrate from their hatcheries in rivers to the ocean, where they live and feed for several years before returning to spawn in the rivers where they were hatched. According to the International Panel on Climate Change, sea-run salmon stocks are declining due to an increase in water temperatures thought to be a consequence of global climate change.

When exposed to elevated water temperatures, fish cells produce heat shock proteins (HSPs) and other enzymes that increase the cell's heat shock resistance. However, when the cell can no longer withstand the stress caused by heat, the cell membrane disintegrates, ultimately resulting in cellular death.

The goal of Reese's research is to determine the temperature at which Chinook salmon cells begin producing heat-resistant enzymes and how this timing correlates with cellular death. The results of the study will be used to make predictions about the effect of climate change on salmon. Reese presented her research at the Biochemistry and Molecular Biology in San Diego, CA.

**Species Diversity and the Succession of Dung Beetles to Horse Dung on Assateague Island**

*Elizabeth Rentz, Applied Biology*

Dung beetles play a critical role in the environment by recycling nutrients back into the soil and are of great importance to ecosystems as well as the agricultural industry. The *Scarabaeinae* dung beetle is particularly useful for understanding broad biodiversity trends.

Some 180 feral horses (*Equus caballus*) graze on Assateague Island. Since the population is so large, a significant amount of waste is produced daily. Their diet is comprised mainly of salt marsh grass, which differs from that of mainland horses, particularly in salt content, suggesting differences in diversity and abundance among dung beetles attracted to island horse deposits.

Rentz is conducting a series of succession studies to determine species diversity and abundance of dung beetles on Assateague Island, in comparison with species diversity and abundance on the mainland. A total of eight species of dung beetle have been sampled from horse deposits on the mainland, compared with only three species sampled from the deposits on Assateague Island. These results suggest that most species prefer the mainland horse deposits, which presents a problem with horse dung build-up on the island. Rentz presented her findings at the Mid-Atlantic Ecological Society of America Conference in Blacksburg, VA.



**Temporal Hierarchy of Membrane Restructuring During Cold Acclimation in Fish**

*Kyle J. Ward, Applied Biology*

Climate change may have dramatic effects on the diversity and abundance of fish. Fish can acclimatize by restructuring cellular membranes in response to a change in water temperature. Biochemical evidence suggests variances in the rate of cellular change. Some reactions occur rapidly, while others are delayed. Generally, there are two methods by which cells alter their membrane composition in response to climate change. The cell can restructure lipids already present in the membrane, or it can synthesize entirely new molecules from smaller macromolecules.

Ward is studying molecular change in response to temperature change in Chinook salmon. Chinook are capable of surviving in a wide range of temperatures and they modify the structure of their cell membranes in order to withstand the temperature changes. However, the mechanism by which the cell membrane is modified remains unknown. By understanding how fish adapt to climate change, we can gain a better understanding of the impacts of global climate change on the worldwide fishing economy. Ward presented his research at the annual meeting of the American Society of Biochemistry and Molecular Biology in San Diego, CA.



**Sexual Selection in the Spring Peeper: Female Mate Choice in Response to Variation in Male Cell Properties and Mixed Signals**

*Kyle Wilhite, Applied Biology*

Anuran amphibians (frogs) are commonly used to study acoustic communication and sexual selection. When a male produces vocalizations to a female, she evaluates these signals to select a potential mate. Many female frogs are known to exhibit preferences for specific call properties in male vocalization.

Male spring peepers, a North American tree frog found from northern Maryland to Louisiana, gather at ponds and call from open to semi-protected areas and usher loud peeps. These peeps range in properties such as frequency, length, amplitude and rate (calls per minute). Even with the knowledge of other anuran mating systems, female choices in this species are still poorly understood. Wilhite is using recording analysis, synthesis of the male's call and phonotaxis experiments, which examine ability to approach sound sources, to gain new insights about the mating habits and preferences of the spring peeper.

**Secondary Metabolite Comparison in the Polyploids of a Dominant Desert Shrub (*Larrea tridentata*): Known Use in Cancer Treatment, Unknown Function in the Native Plant**

*Kristin Zuravnsky, Applied Biology*

North American *Larrea tridentata* (creosote bush) is a long-lived desert shrub that exists in three ploidy levels and can be found in three distinct regions: Chihuahuan Desert — diploid; Sonoran Desert — tetraploid; Mojave Desert — hexaploid. Nordihydroguaiaretic acid (NDGA) is a secondary metabolite found in high concentration in the leaves. It is a powerful antioxidant that inhibits cancer, microbes, fungi and viruses; however, NDGA's function in the creosote bush is unknown.

Zuravnsky examined the varying ploidy levels of the plant to determine a relationship between ploidy level and NDGA concentration. She compared field-collected *Larrea* to polyploids grown in the Salisbury University greenhouse. Field samples were collected from 20 locations across the range of the plant, simultaneously each month for one full year. Thirty greenhouse grown polyploid plants were sampled using the same methodology. NDGA was extracted using methanol and quantified using reverse-phase HPLC.

Analysis of 3,080 samples showed that while NDGA concentrations are variable in the 20 field sites, average concentrations are significantly correlated with ploidy level. The positive correlation with increased ploidy suggests that NDGA is likely a protective molecule important for conferring an advantage in survivorship in the extreme desert environments. Zuravnsky attended the inaugural Joint Congress on Evolutionary Biology in Ontario, Canada.

# RAP in Focus:

## Understanding the Function of BK Channels in Tobacco Hornworm Larvae

By Chad Wiley, Applied Biology

Each and every day we interact with our environment, perceiving tastes, smells, sounds, sight and touch. We convert thoughts and experiences to memory to aid in our day-to-day planning and survival. Even mundane actions such as getting out of bed or driving to work require a balanced symphony of physiological processes. Although vital to our survival and quality of life, it is not until these processes are disrupted that we begin to pay attention to them. A multitude of human diseases emerge when one or more of these pathways are obstructed. This imbalance can potentially result in debilitating and life-threatening conditions, such as Alzheimer's, Parkinson's, schizophrenia, epilepsy and cystic fibrosis. The broken piece to this puzzle was unknown for some time, until recent research has uncovered a common link among many of these conditions: ion channel malfunction. Although many different channels exist with distinct variations in configuration, purpose and overall physiology, their basic functions are similar.

Essentially, ion channels are classified as pore-forming proteins, which aid in establishing and controlling the voltage gradient across the plasma membrane of cells by way of ion flow down their electrochemical gradient. The ultimate goal of ion channel research is to gain insight into the properties and behaviors of these highly dynamic proteins, the functions they perform and ultimately, how these properties can be restored in the event of disease.

The study of the functions of ion channels, conducted under the guidance of Dr. Stephen Gehrich will attempt to broaden knowledge of ion channel physiology — more specifically, how these channels are utilized in nature when stress is induced upon an organism. This project focuses on *Manduca sexta*, also known as the tobacco hornworm. A highly specialized herbivore, this animal feeds predominantly on plant material containing compounds too toxic for many organisms to safely consume.

Two species of interest; *Larrea tridentata* and *Nicotiana tabacum* possess two such toxic compounds, nordihydroguaiaretic acid (NDGA) and nicotine, respectively. The pesticidal properties of NDGA protect the plant from a variety of insects and mammals. Nicotine also provides a defense against potential herbivores and has been used as early as the 17th century by farmers as an active ingredient in pesticides until more effective analogues were developed. Despite its toxic chemical properties, *Nicotiana tabacum* is still the primary energy source for the tobacco hornworm.

We believe the hornworm's ability to metabolize such toxic compounds without compromise to its health can be attributed to a specialized adaptation. However, the



mechanism for this adaptation remains unknown. To gain insight into the physiology responsible for the tobacco hornworm's behavior, ion channels present in the gastrointestinal epithelia have become the primary subject of this investigation, specifically, large-conductance calcium activated potassium (BK) channels. These channels are expressed ubiquitously and behave in a tissue-specific manner. The BK channel protein can be found in many distinct forms, with properties reflecting the needs of its functioning cell. Alternative splicing of the *Msslo* gene (the gene from *Manduca sexta* that codes for the BK channel)

generates various isoforms of the protein in response to cellular requirements or stress. The primary objective of this research is to investigate the implication of the *Msslo* protein isoforms as a possible mechanism for the ability of *Manduca sexta* to process or circumvent the secondary metabolites present in its food sources.

The BK channel itself is tetrameric in structure, comprised of two distinct subunits, termed alpha and beta. The alpha subunit is much larger in comparison, with seven membrane spanning segments and a large cytosolic tail. The beta subunit, comprised of two trans-membrane segments has been shown to express a wide array of variation with respect to the tissue in which they are expressed, as well as the physiological state of its functioning cell. While variation exists in both, the beta subunit demonstrates significantly higher sequence variability. Alteration of the *Msslo* transcript would create functioning proteins with differing amino acid sequences, and once the protein composition is changed, the behavior of the protein is then altered, shifting the kinetics of the channel as well as its ability to interact with, or bind to, potentially harmful compounds.

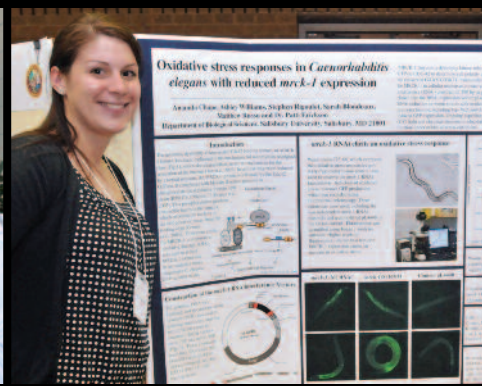
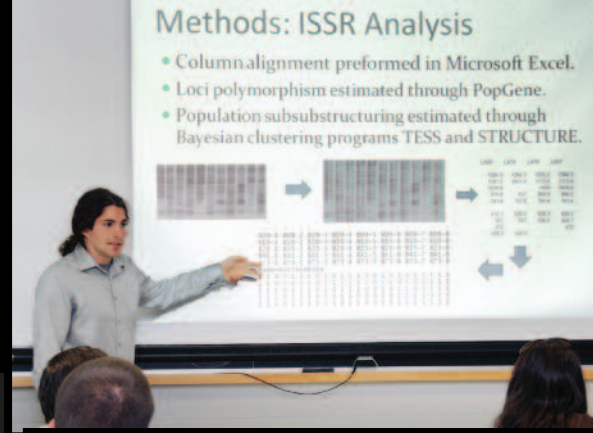
To test this theory, *Manduca sexta* are reared under laboratory conditions with exposure to varying amounts of NDGA in order to illicit a stress response within the organism and ultimately link this response to genetic variation within the *Msslo* gene via expression of different isoforms of the BK channel. The second phase of this research is exposing the relationship between these altered channels and changes in the rate of ion transportation across the gastrointestinal epithelia; these findings will be compared with the varying levels of NDGA consumption. This should provide a physiological correlation to the genetic variation in stress-induced tissue as a result of exposure to NDGA. ❖



# SUSARC

SALISBURY UNIVERSITY STUDENT RESEARCH CONFERENCE

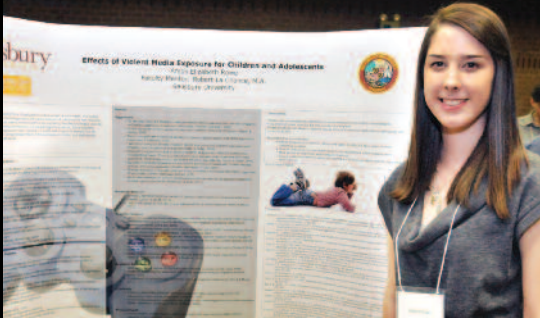
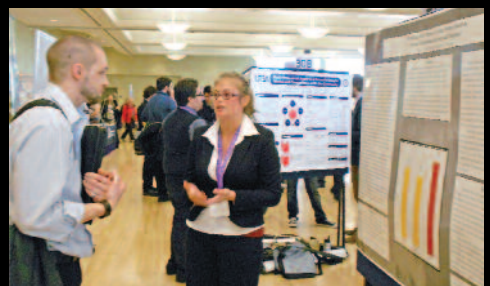
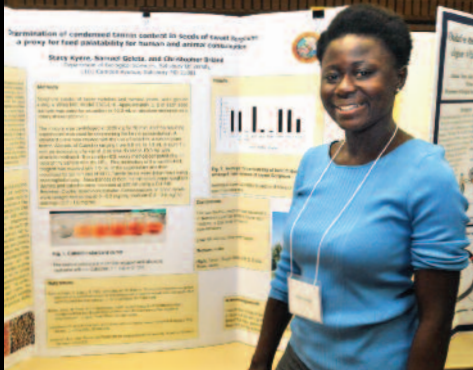
Approximately 150 undergraduate students representing all four of SU's academic schools presented their research at the 11th annual Salisbury University Student Research Conference (SUSRC), on Friday, April 27. This year's plenary speaker was Dr. Roel Lopez, associate director of The Institute of Renewable Resources at Texas A&M University. He presented "Learning by Doing: Transformational Impact of Undergraduate Research and Creative Activity." Lopez provides leadership in the field of wildlife management, military sustainability and natural resource management. He received a bachelor of science in forestry from Stephen F. Austin State University and a Master of Science and doctorate from Texas A&M.





National Conference on Undergraduate Research  
Weber State University • Ogden, Utah

*This March, Salisbury University joined over 275 colleges and universities in attending the National Conference of Undergraduate Research (NCUR) in Ogden, UT. This annual conference is dedicated to promoting undergraduate research in all fields of study. Twenty-five students, representing each SU school, presented their research through posters or oral discussions to faculty and fellow peers from across the United States and world. Along with the experience of presenting, students benefitted from excursions to local attractions such as the Great Salt Lake and attended plenary sessions given by such speakers as Nobel Laureate Mario R. Capecchi, award-winning author Anne Fadiman and Paul Alan Cox, director of the Institute of Ethnomedicine. The students were excellent ambassadors for SU and continue to display the success of undergraduate research at SU.*



## Graduate Studies at Salisbury University



### MASTER'S 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.W.)
- Teaching (M.A.T.)

### CERTIFICATES

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

### DOCTORAL PROGRAM

- Doctor of Nursing Practice (D.N.P.)

[www.salisbury.edu/gsr](http://www.salisbury.edu/gsr)