A nationwide optometry dean search led UAB to Rod Nowakowski, O.D., Ph.D., who had been interim dean of the school since December 2009. “We are fortunate to have a candidate in Rod Nowakowski, who throughout his 36 years on the UAB faculty, has proven himself as a tremendousclinician, researcher, educator and administrator,” says Provost Eli Capilouto. “He has the passion, wisdom, commitment and courage to be an outstanding leader for the School of Optometry in the years to come.”

Nowakowski earned his doctoral degree in 1975 as a member of one of the first classes of the newly established UAB School of Optometry. He joined the faculty as chief of the Low Vision Rehabilitation Service and later directed the Ocular Disease and Low Vision Service within the school. In 2000, he became chief of staff for UAB Eye Care, responsible for all clinical activities of the school.

“My vision is that the School of Optometry becomes the preferred choice of faculty, staff and students for the 21st century due to our outstanding people, programs and accomplishments in research, education and patient care,” says Nowakowski.

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Scientists leverage pilot funds into Gulf oil spill grants

A rich history of research in the Gulf of Mexico will enable UAB marine scientists to support the environmental recovery following the 2010 oil spill. Thane Wibbels’ conservation and recovery efforts to save the Diamondback Terrapin and Douglas Watson’s work with molting blue crabs are among UAB’s numerous scientific contributions to the coastal environment. Because of this, they and others here now will play key roles in new areas of research.

Nine UAB researchers have been awarded grants from Alabama’s Marine Environmental Science Consortium (MESC) for immediate study of the impact of the BP Deepwater Horizon Oil Spill in the Gulf of Mexico.

BP has committed up to $500 million to the Gulf Research Initiative Open Research Program to study its response to the oil spill and the effect on the environment and public health. Of that, $5 million was designated Rapid Response Funds for the MESC, which awards grants to 22 Alabama four-year colleges and universities that comprise its consortium.

UAB researchers have received five MESC grants totaling $217,721, aided by targeted pilot projects funded by the university this past fall. UAB funded 16 research projects to enable investigators to obtain data and prove feasibility for projects in anticipation that new extramural funding opportunities would become available. Investigators from the College of Arts & Sciences and schools of Business, Medicine and Public Health received $300,344 from the Office of Vice President for Research and Economic Development and the deans of the schools that funded the projects.

“Because UAB saw this as a matter of grave concern to the state, we made the decision to invest resources to allow for rapid response,” said Richard B. Marchase, Ph.D., the university’s vice president for Research and Economic Development. “In addition, because of our different areas of expertise we are uniquely positioned to study the long-term consequences of this disaster.

“We are pleased with our initial grants, and anticipate significant additional external funding going forward because of our research capabilities,” Marchase said.

An explosion on the BP Deepwater Horizon mobile offshore-drilling unit April 20, 2010, led to the largest oil spill ever to originate in U.S.-controlled waters. The Flow Rate Technical Group, a group of scientists and engineers from the federal government, universities and research institutions, estimated the amount of oil spilled into the ocean at 4.9 million barrels — or 205.8 million gallons.

How much damage did the oil spill do to the Gulf of Mexico and its ecosystems? No one knows.

Biotech program trains future workforce

As a student, Derek Moates had an extensive background in business and science, but he didn’t know how the two concepts worked together to produce products and profits. He found his answer when he entered a biotechnology graduate certificate program in the UAB Department of Clinical and Diagnostic Sciences. Today he works

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Meditation, Tai Chi and yoga classes to begin April 5

Feeling stressed and tense? Learn new skills for relaxing and managing stress with The Resource Center’s popular Meditation, Tai Chi and Yoga classes.

Meditation classes, led by Resource Center Counselor John Quintelle, will begin on Tuesday, April 5 and continue each Tuesday for eight sessions from 12:10 to 12:50 p.m. This simple, ancient practice has been shown to alleviate the effects of stress, help with pain management and generally improve quality of life.

Tai Chi classes, taught by Resource Center Counselor Alesia Adams, will begin on Thursday, April 7 and continue each Thursday for eight sessions from 12:10 to 12:50 p.m. Tai Chi is a series of slow movements that have been shown to gently improve mental and physical strength and flexibility, improve balance and aid relaxation.

Yoga classes, taught by Diane Reid, Resource Center counselor and Yoga Fit instructor, will begin Thursday, April 7 and continue each Thursday for eight sessions from 4:45 to 6 p.m. Participants will combine mind, body and spirit to develop strength, balance and flexibility. All classes will last eight sessions.

Classes will meet in the Resource Center Classroom, Suite 330, 2112 11th Ave. South. Participants are not required to attend all sessions of a class and may join at anytime during the month. Space is limited, so please call 934-2281 to register. Visit www.uab.edu/sap for more info.

Library wants input for improvements

Help Sterne Library plan improvements by completing the LibQUAL+ user-experience survey online at www.mhsl.uab.edu/qual by April 16. Responses may be anonymous, but those who provide a UAB e-mail address will be entered in a drawing for one of three e-book readers to be given away.

National Public Health Week events celebrated this week

The UAB School of Public Health and the UAB Public Health Student Association will host several events during National Public Health Week, April 4-9. This year’s theme is “Safety is No Accident: Live Injury-Free.”

Public Health Research Day will be held in the Campus Recreation Center from 9 a.m. to 11:30 a.m. Tuesday, April 5 to showcase academic advancements. For a full listing of each day’s events, visit www.soph.uab.edu/phsa/NPHW.

Researchers needed to beta test new portal feature

UAB faculty and departmental personnel are encouraged to assist with beta testing of the new Integrated Research Administration Portal (IRAP). The focus will be on testing the SMARTS feature, which will send automated email notification of funding opportunities based on criteria set by the user. Access IRAP on the Administrative Systems page at www.uab.edu/adminsystems. Individuals or groups wishing to know more about IRAP or SMARTS should contact IRAPprofile@uab.edu.

Chekhov’s “The Three Sisters” is Theatre UAB’s season finale

Theatre UAB’s performance season culminates with Anton Chekhov’s “The Three Sisters,” a story of three passionate, restless sisters who dream of escaping the isolation of their small town, April 13-17.

“The Three Sisters” will show at 7:30 p.m. April 13-16 and at 2 p.m. Sunday, April 17, in UAB’s Alys Stephens Center Sirote Theatre. Tickets are $15 and $18; $7 for students and $12 for UAB employees and senior citizens. Call 975-2787 for tickets.

UAB Choir, singers to perform April 10

The UAB Concert Choir and Chamber Singers will perform a free concert at UAB’s Alys Stephens Center at 3 p.m. April 10, following concert engagements in Mobile and New Orleans.

Led by Brian Kittredge, D.M.A., assistant professor in the UAB Department of Music, the students will perform “Sing to the Lord a New Song,” a collage of choral works old and new, including selections from Schutz, Bennett, Chesnok, Clausen and Hogan.

For details, call 934-7376 or visit www.music.uab.edu.

Area filmmakers invited to scramble

Think you have what it takes to create an award-winning film in just days? The third annual Film Scramble challenges filmmakers to create a three- to five-minute film in less than five days. Team registration will be held from 1 to 3 p.m. April 14 in the Hill University Center Room 116; a majority of members must be UAB students. Guidelines will be provided at registration.

The completed work must be submitted by on 3 p.m. April 18. Cash prizes include: $700, first place; $300, second place; and $100, third place. Public screenings will be held at 7 p.m. April 25. For more information, call 975-9509.

UAB Police preparing for re-accreditation

Assessors from the Commission on Accreditation for Law Enforcement Agencies (CALEA) will be on campus April 16 to examine UAB Police Department (UABPD) policy and procedures, administration, operations and support services. Chief of Police Anthony Purcell says CALEA accreditation helps ensure the highest quality law-enforcement services are provided to the university community.

As part of the on-site assessment, employees and community members are invited to offer comments at a public information session from 5 to 6 p.m. Monday, April 18 in the UAB Police Department Headquarters at 1117 14th St. Comments are limited to 10 minutes and must address the UABPD’s ability to comply with CALEA standards. For a copy of those, contact Sgt. Zandral Washington at 996-2247. Written comments may be sent directly to CALEA, 13575 Heathcote Boulevard, Suite 320 Guinevere, VA 22553.

CALEA assessors will provide a written report of the assessment to the commission to use during the re-accreditation review. CALEA accreditation is for a three-year period.
Energy-use policy must balance benefits, risks of sources

Climate change has been a topic of discussion at the highest levels of world governments for years. Julia Gohlke, Ph.D., assistant professor of Environmental Health Sciences, was involved in those discussions during her fellowship with the U.S. Department of State in 2009-10.

Gohlke was one of several scientists advising professional negotiators in the climate change office. She was immersed in the topic, and there was one consistent oversight in the discussions that perplexed her.

“Health was not a primary concern,” Gohlke says. “It should be. The primary reason we developed electricity is it’s useful and it improves our lives. If we’re going to change our energy infrastructure, we need to evaluate the health benefits and risks associated with it.”

Gohlke, who joined UAB in August 2010, recently published findings on the relationship between coal consumption, electricity use and health in the Feb. 21 edition of the journal Environmental Health Perspectives.

The findings show that electricity use has health benefits in diverse populations worldwide, but the relationship is not linear and increasing use past a certain threshold may not add benefits. Additionally, those benefits may be offset by negative health effects of the fuel used to generate electricity.

Environmental hazards, including reduced access to clean water, tend to be mitigated by access to a reliable electricity source, according to her findings. Access to electricity also reduces in-home burning of inefficient and polluting fuels such as coal, wood and animal dung. However, depending on the way electricity is generated, new health hazards may be introduced, including exposure to particulate matter, sulfur oxides, nitrogen oxides, volatile organic compounds, carbon monoxide, mercury and ozone emitted during power generation.

In 2008, Gohlke interned at the World Health Organization office that develops the Environmental Burden of Disease reports that estimate the attributable fraction of diseases to environmental causes, including clean water, and air pollution.

“What interested me is that many of those environmental causes can be attributed to electricity use,” Gohlke says. “For instance, electricity creates a mechanism to get clean water. Once you have electricity, you more than likely have reliable access to clean water. But it also creates health detriments if you’re using a polluting source of fuel — for instance, coal-fired power plants release several pollutants that cause both short- and long-term health effects.”

Gohlke says an effort has to be made to weigh the benefits and risk to assess the implications for climate and energy policy.

“We know electricity is good for our health,” she says. “But at what point does increased consumption of electricity no longer increase the health of a population? That is what initiated the study.”

Gohlke studied 41 countries from 1965 to 2005 to determine if electricity and coal consumption contributed to the relationship between infant mortality or life expectancy. The model suggested that electricity use was associated with improved infant mortality rates, but only in countries where rates were relatively high in 1965.

“Change in life expectancy did not appear to be associated with electricity use,” Gohlke says, “but increased coal consumption was associated with reduced life expectancy and increased infant mortality. Essentially, those countries that use coal as their main source of electricity have a reduced rate of decrease in infant mortality and increase in life expectancy.”

So what are the answers? Several life-cycle studies have suggested alternative energies that are more health-promoting, like solar and wind. But Gohlke acknowledges harnessing those resources would require the investment in technology and infrastructure.

“From a health standpoint, they’re great,” she says, “but you can’t ignore the economics of the evaluation.”

In the meantime, Gohlke says identifying the health risks and benefits inherent to meeting the demand for energy will be critical to international policy development, particularly given current and possibly increasing reliance on coal for electricity, especially in middle-income countries such as China and India. The way those countries interpret their electricity needs will likely be different from industrialized nations.

“Tearing apart the complex relationships between energy consumption and health will help us to identify those policies that may be particularly health-promoting as we negotiate energy and climate policy,” Gohlke says. “This study is a starting point, but more are needed to examine the social and economic drivers of the relationship between energy consumption and health.”

UAB medical school graduates match national priorities

The 168 members of the 2011 graduating class of the School of Medicine exceeded the national average for matching to one of their top choices for residency training in the most competitive Match Day ever.

The Class of 2011 responded strongly to the need for more physicians in primary care and general surgery, areas in which a shortfall of doctors is predicted.

Of the class, 43 percent will do residency training in one of the primary care fields, and 10 percent will conduct their residencies in general surgery.

Overall, UAB’s graduates will do residencies at 69 hospitals in 29 states. Twenty-two percent will go into a surgical field, 6 percent into emergency medicine and nearly 6 percent into obstetrics-gynecology.

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The UAB Ethics Bowl Team, also has won a debate national championship. The teams prepared 10 to 15 cases to defend, but didn’t know which would be chosen. It was pandemic bird flu.

“I had a gut feeling that my case was going to be called,” Jani said. “My heart started racing.” When she spoke, Pence said he knew the team would win on the strength of Jani’s prepared case and her eloquence, he said. He was right. “The first words out of my mouth were, ‘Oh my goodness,’” Jani said. “I was surprised, but I also felt we really deserved it because we had worked so hard.”

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Callahan Hospital first in nation for eye-trauma care

O ran Almog’s journey to the Callahan Eye Foundation Hospital at UAB began at a restaurant in Haifa, Israel. Ellen Bomer’s started at the U.S. embassy in Tanzania. Baltjit Singh was in India. And Emily Lyons was on Birmingham’s Southside. Each suffered severe eye trauma and sought treatment at UAB, a world leader in eye care.

They certainly are not alone. Each year nearly 2,200 people are treated for eye trauma at the Eye Foundation Hospital, the nation’s first and only Level I ocular trauma center as designated by the American Society of Ocular Trauma.

“We’re writing the book on eye trauma here in Birmingham,” said Brian Spraberry, C.O.O. of the Callahan Eye Foundation Hospital.

Eye trauma has many causes, from violence to accidents. More than 17,000 traumas were reported in the U.S. Eye Injury Registry between 1982 and 2010. More than half of those injuries were in people younger than 30. Sixty-five percent of injuries were unintentional, and 17 percent were caused by violence.

Almog was 10 when a terrorist’s bomb killed several family members and took his left eye and damaged his right. Bomer was the victim of a suicide bomber in the 1998 embassy attack that killed 11 people and injured 85 in Dar es Salaam. Singh was a world-class field hockey player for the National Indian team when his eye was injured during a training exercise. Lyons was a victim of domestic terrorism, blinded when Eric Rudolph’s bomb blew up a Birmingham abortion clinic.

“The eye trauma surgeons at the Eye Foundation Hospital have developed unprecedented expertise through the volume of patients treated,” said Doug Witherspoon, M.D., who directs the hospital’s Ocular Trauma Center. “New techniques and specialized tools have been created.

Surgeons here have demonstrated that cases deemed hopeless by others may be at least partially repairable.”

Spraberry says one benefit of the Level I designation is that it will boost awareness among the public, first responders, paramedics and other medical professionals that Alabama has a world-class eye-trauma facility.

The American Society of Ocular Trauma Level I designation has several requirements:

- Ocular trauma hospitals must have emergency services with nursing and physician staff on site 24 hours a day, seven days a week, and the ability to perform emergent surgery within one hour of admission.
- The facility must have all necessary equipment, supplies, instruments and ancillary services to treat all types of eye trauma.
- Additional requirements include participating in research and education activities and serving as a community resource.

“Vision is precious, and eye trauma can be a devastating blow,” said Spraberry. “We want everyone in Alabama to know about the resources, skill and expertise in eye trauma that the Callahan Eye Foundation offers the community, state and region.”

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UAB projects funded by the Alabama Marine Environmental Science Consortium are:

- Assessing the impact of oil/dispersant on marine sponges and their symbiotic communities, Robert Thacker, Ph.D. $67,791.
- Chemical dispersants in the marine environment: Harnessing the fish acute phase response for rapid and sensitive evaluation of exposure, Stephen Watts, Ph.D., Alexander Salzali, Ph.D., Vishal Ghanta, Ph.D., Mickie Powell, Ph.D. $25,645.
- Assessing the impact of the Deepwater Horizon oil spill on the diamondback terrapin: A top carnivore and keystone species in the salt marshes of Alabama, Thane Wibbels, Ph.D., Ken Marion, Ph.D. $34,395.
- SEER: Studies of microbial communities affected by the Deepwater Horizon spill, James Coker, Ph.D. $60,000.
- Microbial responses to hydrocarbon and dispersant: Lab and field-based studies, Asim Bej, Ph.D. $25,900.
Oil-spill projects reveal unexpected economic findings

UAB solicited applications this past fall for pilot projects to explore the economic, health and social effects the Deepwater Horizon Gulf Oil Spill exerted on all aspects of life in the Gulf coastal states. The UAB Gulf Oil Response Initiative received numerous applications and funded 16 university projects for a total $308,344.

Eleven departments received internal funding for pilot projects, including chemistry, biology, accounting and finance, pharmacology, justice sciences, government, foreign languages and literatures, health behavior, environmental health sciences, epidemiology and health care organization and policy. Because of the magnitude of the disaster and its impact on the state, the university invested resources to allow for rapid response—and to set the stage for significant future external funding for research on potential long-term consequences.

Mike Perez, program manager in Computer and Information Sciences, worked with David Graves, Ph.D., chair of the Department of Chemistry to initiate the UAB Gulf Oil Spill Summit this past fall. The purpose of the summit was to bring together an interdisciplinary group of UAB faculty to determine the ways their research could address some of the problems caused by the oil spill. The pilot projects and other funded activities were the result of the summit.

“Pilot projects are especially important in the context of a major outlier event such as the Gulf Oil Spill,” Perez says. “They are a cost-effective way to test and refine hypotheses, evaluate data collection and statistical and analytical procedures, eliminate many problems that might otherwise occur under a full study, and it provides a low-cost means to assess whether or not to proceed to a full study.”

The pilot grant projects were funded by the Office of Vice President for Research and Economic Development and the deans of the schools that funded the projects. Projects funded ranged from assessing the social and attitudinal impacts of the spill in coastal Alabama to Gulf oil spill-related exposure assessment among elementary school children in Mobile County to foreclosures.

Accounting & Finance assistant professors Stephanie Rauterkus, Ph.D., Lacy Cowart, Ph.D., and Andreas Rauterkus, Ph.D., spent most of this past fall studying the affect of the spill on foreclosure rates and residential real estate values in Gulf Coast communities. Both of those research proposals have been accepted to the American Real Estate Society Conference in Montgomery earlier this year, and Rauterkus presented early findings at a Federal Reserve conference in late October.

Rauterkus was particularly interested in examining the oil spill’s effect on foreclosures along the coast in the wake of the American housing crisis during the past two years.

Significant regional differences exist in foreclosure rates, and some studies have shown that these differences are due to the degree to which an area experienced housing price run-up and other economic indicators such as unemployment. Anecdotal evidence showed that the Deepwater Horizon spill exacerbated the negative effects of the recent recession for Gulf Coast residents. Rauterkus’ proposed research to determine if foreclosure rates rose in impacted areas more than in other parts of the state, but the results were surprising.

“When you think about people affected by the oil spill, you think about people who have income due to tourism, fishing or any marine-related industry,” Rauterkus says. “But as I talked to people in those counties, many of those folks don’t own homes. They rent. Now you have to figure out from whom are they renting and how they are affected. These are questions and nuances of the housing crisis that we didn’t think about initially. It’s going to be difficult to tie the spill to a housing outcome.”

Rauterkus says the acceptance of both of her research projects for the conference shows the topic is popular in the industry. She still is concerned whether enough time has passed to make a truly accurate assessment, particularly on the foreclosure research.

“For example, we were trying to compare it to other natural disasters that had an impact on housing. In California, you’ve got earthquakes,” Rauterkus says. “They’ve found that it takes 12 to 18 months before you really see an increase in foreclosures and significant economic distress. “We might be a little bit early trying to tie the spill to economic distress, but we’ve got some interesting things happening so far,” she says.

Rauterkus says the important part of Gulf oil spill-related research projects is to gather information to help plan for future disasters.

“The thing we have to capitalize on when we have any kind of disaster is what can we learn from it so when the next bad thing happens we are prepared,” Rauterkus says. “What really stinks is when we’re caught off guard and we don’t know what to do or how to help. We want to think about how this compares to a natural disaster, what other types of man-made disasters can have those same affects and how we mitigate them.”

Oil-spill projects funded by UAB

<table>
<thead>
<tr>
<th>Title of Proposal</th>
<th>Name/Department</th>
<th>Budget</th>
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<tbody>
<tr>
<td>Biodegradable sponge-like polymeric microparticles for effective oil removal</td>
<td>Eugenia Khriampieva, Chemistry</td>
<td>$22,000</td>
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<tr>
<td>Endocrine disruption by crude oil and chemical dispersant: Impacts on basic cellular and physiological processes in a species in the Gulf of Mexico</td>
<td>Douglas Watson, Biology</td>
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<td>Genetic implications of relocating loggerhead sea turtle eggs from the Alabama Coast in response to the deepwater horizon oil spill</td>
<td>Thane Wibbols, Biology</td>
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<td>Foreclosure in the Gulf after the oil spill</td>
<td>Stephanie Rauterkus, Finance</td>
<td>$16,700</td>
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<tr>
<td>Upgrade of GC-MS instrument for the analysis of oil contaminants in biological samples and other materials emanating from Gulf oil research projects</td>
<td>Stephen Barnes, Pharmacology</td>
<td>$19,152</td>
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<td>Study of the response of oil degrading bacteria as a consequence of the Deepwater Horizon oil spill</td>
<td>Elizabeth Gardner, Justice Sciences</td>
<td>$18,500</td>
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<tr>
<td>Assessing the social and attitudinal impacts of the Deepwater Horizon spill in Coastal Alabama</td>
<td>Kent Kerley, Justice Sciences</td>
<td>$12,616</td>
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<td>&amp; Michael Howell-Moroney, Government</td>
<td>Shahid Mukhtar, Biology</td>
<td>$21,950</td>
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<td>Investigation of the detrimental effects of oil spill on phytoplankton using a range of physiological and molecular methods</td>
<td>Karolina Pajerowska-Mukhtar, Biology</td>
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<td>Evaluating the toxic effect of Gulf oil spill on turtle grass</td>
<td>Mickie Powell, Biology</td>
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<tr>
<td>High sensitivity toxicity screening of dispersants and residual oil using molecular biomarkers</td>
<td>Thane Wibbols, Biology</td>
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<tr>
<td>Assessing the impact of the Deepwater Horizon oil spill on the diamondback terrapin A keystone species in the salt marshes of Alabama</td>
<td>Lamia Zayzafoon, Foreign Languages &amp; Literatures</td>
<td>$20,000</td>
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<td>Gated communities inside the global village: Metaphors of pollution in the Gulf of Mexico oil spill crisis</td>
<td>Herman Foushee, Health Behavior</td>
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<tr>
<td>Vulnerability, resiliency, and adaptation in communities impacted by the Gulf oil spill</td>
<td>Claudia Lungu, Environmental Health Sciences</td>
<td>$19,992</td>
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<td>Method development for the use of dispersant as a leading indicator of oil contamination and exposure following the Gulf oil spill</td>
<td>Nalinii Sathikumar, Epidemiology</td>
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<tr>
<td>Gulf oil spill-related exposure assessment among elementary school children in Mobile County, Ala.</td>
<td>Andrew Rucks, Health Care Organization &amp; Policy</td>
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<tr>
<td>Measuring Gulf Coast community resilience: a pilot study</td>
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Research could lead to more efficient electronic components

UAB’s designation by the Carnegie Foundation as an institution with “very high research activity” has accustomed faculty, staff and students to hearing its world-renowned teacher-scholars have received competitive grants and other awards to support their research. Even so, it is still impressive that some of our youngest and brightest scientists have been thrust into the spotlight in the past seven months, with three professors winning National Science Foundation Career Awards — a prize that the foundation describes among its most prestigious.

David Hilton, Ph.D., assistant professor in physics, Xincheng Yao, Ph.D., assistant professor in the biomedical engineering and Ho-wook Jun, Ph.D., assistant professor in the biomedical engineering, each won the influential award to support the early career-development activities of professors who most effectively integrate research and education within the context of the mission of their organization.

This month UAB Reporter looks at Hilton’s work and its promise. Jun was featured in the March 7 edition.

Hilton received his $600,000 NSF Career Award for research into coherent manipulation in quantum systems. He wants to develop novel applications to facilitate computation on the quantum scale.

Q. What was your reaction to this honor by the NSF?
A. The first email from NSF about this award came Nov. 1, 2010, so I was a bit unprepared for it. I was expecting to hear something, either way, by mid-December, so it was about six weeks ahead of me. I actually waited a day to tell anyone here at UAB, mostly to make sure someone at NSF headquarters hadn’t pushed a button by mistake.

Q. How did you become interested in this type of research?
A. I became interested in optics in my senior year of high school. The University of Rochester, where I was an undergraduate, has an extensive program in Optics and Optical Engineering. The program is one of only a few in the United States that trains optical engineers on the physics of light, building imaging systems and lasers and designing photonics. Basically, we treat photons the same way that electrical engineers treat electrons.

I work with lasers and study how light interacts with electronic materials. Laser spectroscopy is an extremely powerful tool to help us understand why materials are insulators, semiconductors, metals or superconductors, which is the basis of my research here.

Q. What is the significance of the nanoscale?
A. Typically, when electronic device sizes approach nanometers (1 billion nm is a meter) the basic rules of motion change — radically. You can walk into your local electronics store today and buy computer processors that are very different from other early career awards from the National Institutes of Health, the Department of Defense and the Department of Education. His is a very strong program that was a significant resource. I have had enormous support from the physics department and the College of Arts and Sciences to obtain this award, so I feel an obligation to help others so that UAB can build on the success that Jun, Xincheng and I have had.

Q. What is the value in reducing the size of electronic components to the quantum scale?
A. Conventional computers today use transistors as binary switches to represent numbers as a string of 1s (transistor is on) and 0s (transistor is off). The speed at which you can turn on a transistor on and off is one of the limits of the speed that your processor can perform calculations. The main method that people have used since the 1970s to increase computer processor speed from a few megahertz (in 1970s) to gigahertz (now) is to shrink these devices to smaller sizes.

From now on, we are going to have to do more than shrink our electronic components to make them faster, since there is not a whole lot of room left to shrink dimensions below 32 nm (about 60 atoms). This is where our ideas to use quantum coherence in new electronics are truly going to excite people. We are interested in new ways that we might be able to do with these wave-like effects that haven’t been possible in previous generations of electronics. As an example, the late Professor Richard Feynman from Caltech proposed an entirely new version of a quantum computer that would be built on the principles of quantum mechanics. His design would be capable of performing calculations at an astronomical rate that the current transistor-based design probably never will be able to achieve. Feynman’s proposal was made in 1982, and we are just now starting to catch up with his vision.

Q. What is coherence, and how is it role in design in the future of electronic components?
A. Quantum coherence permits wave-like electrons to interfere and turns on these novel effects due to quantum mechanics. Wave-like electrons are absolutely critical for the Feynman quantum computer design. Coherence is how we mathematically describe this interference and if we cannot maintain the interference, of these electrons, then we cannot construct this new kind of computer. Our work at UAB will focus on the properties of these materials that would destroy coherence and what we can do to improve electronic materials to enable these kinds of new applications.

Q. What is the value in reducing
Join the UAB National Alumni Society on Friday, April 29th at Pepper Place (29th Street South & 2nd Avenue South) for the UAB NAS Scholarship 5K/10K Run to raise money for UAB student scholarships!

Registration begins at 4:00 p.m. Race starts at 6:00 p.m.

Registration fees:
- $30 after March 31st
- $35 day of race

To register, visit www.active.com or www.alumni.uab.edu.

For more information, contact the UAB Alumni Affairs Office at 205.934.3555 or uabalumni@uab.edu.