

MEASURE

THE RESEARCH PUBLICATION OF ARKANSAS STATE UNIVERSITY

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FALL 2013

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RESEARCH & TECHNOLOGY

DISCOVERIES TO CHANGE OUR WORLD

WHAT IS MEASURE[®]?

How do we measure our commitment to research?

How do we judge successful scholarship?

How do we place value on creative expression?

How do we appraise the impact of service?

- Student engagement?
- Productivity?
- Awards and expenditures?
- Comparison with our peers?
- National and international recognition?
- Influence in the field?
- Solutions to real world issues?
- Economic impact?
- Community enrichment?

The answer is: all of these, and more.

At ASU, we value each discipline and their measures of success.
MEASURE[®] is a showcase of ASU success in a variety of disciplines.

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Arkansas State University educates leaders, enhances intellectual growth and enriches lives.

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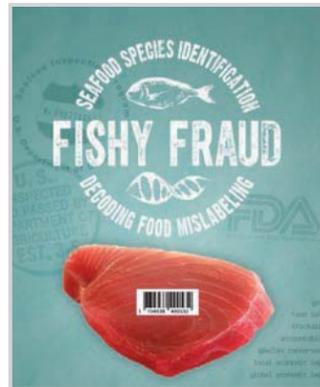


DISCOVERIES TO CHANGE OUR WORLD

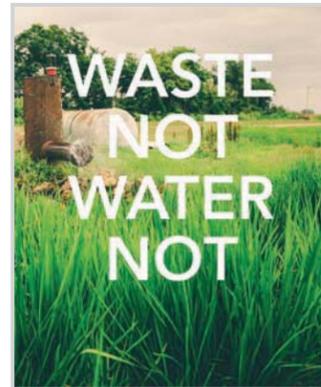
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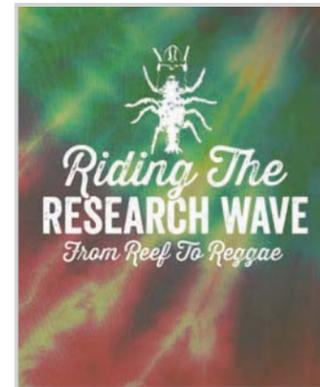
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Dr. Tim Hudson

Ladies and Gentlemen:

I am delighted to present the third edition of **MEASURE : THE RESEARCH PUBLICATION OF ARKANSAS STATE UNIVERSITY**®. This annual magazine showcases the many scholarly activities at A-State. This publication stems from the growing importance of research on our campus, and the desire to highlight the impact of our activities to the ASU community as well as our friends all over the globe.

In this issue, we focus on the broad and multidisciplinary field of agricultural research. Originally established as an agricultural public school in 1909, Arkansas State maintains and celebrates its agricultural roots as it continues to educate students and embrace its emergence as a research-intensive institution. Sustainable agricultural systems and food safety are central themes in the articles profiling Drs. Steve Green, Michele Reba and Maureen Dolan. And we could not resist featuring Dr. Paul Sikkel's *Gnathia marleyi* parasite, named for the Caribbean popular culture icon Bob Marley.

Arkansas State's Institute for Research Development, an intensive program for faculty learning the intricacies of grant proposal preparation, is included along with an introduction of our recently appointed Vice Provost for Research and Graduate Studies, Dr. Andrew Sustich. The final article focuses on the outstanding student research on our campus and reviews **Create @ STATE: A Symposium of Research, Scholarship & Creativity**.

We hope you enjoy this edition of **MEASURE**® and welcome your comments and suggestions.

Sincerely,

A handwritten signature in red ink that reads "Tim Hudson".

Tim Hudson, Ph.D.
Chancellor



Andrew Sustich

Meet the New Vice Provost for Research & Graduate Studies

Dr. Andrew Sustich is the recently appointed vice provost for Research and Graduate Studies. Andy, as he prefers to be called, joined the faculty at Arkansas State University as an assistant professor of physics in 1991.

He was promoted to full professor in 1999 and by 2001 began his administrative career as associate dean of what once was the College of Arts and Sciences. His calm demeanor and collaborative nature made him the perfect go-to person when the university called on him for administrative duty. Thus, he began a succession of administrative roles, including interim dean of the College of Arts and Sciences, interim dean of the College of Humanities and Social Sciences, interim associate vice chancellor for Research and Technology Transfer, before being appointed dean of the Graduate School and dean of the Honors College. He also served as interim dean of the College of Sciences and Mathematics for nine months concurrent with that appointment. "I have really benefited from the opportunity to experience university administration from many different perspectives over the past dozen years," Sustich said.

To say Andy is a busy man is an understatement. As vice provost for Research and Graduate Studies he is responsible for the Office of Research and Technology Transfer (ORTT), the Graduate School and the Arkansas Biosciences Institute. A recent move to the sixth floor of the Dean B. Ellis Library eased some of the challenges posed by maintaining multiple offices, as he now has ORTT and the Graduate School located together in the library. Those who know him can attest to his characteristically physicist-like personality traits: focused, careful, observant and fact-finding. It may not be a surprise that his favorite television show is "The Big Bang Theory," a comedy centered on the happenings of academics (mostly physicists) at a research institution. Though he probably understands the highbrow jokes and can solve the equations written on the whiteboards of the set backgrounds, it's the personal interactions among academics that evoke reminiscences of past real experiences in his career.

Andy has seen a lot of change at Arkansas State over the past 22 years. "While the physical landscape of campus has changed considerably during this time, the changes in how we educate our students and our ability to provide learning experiences beyond the standard classroom are even greater," he said. "Our students are immersed in working side-by-side with faculty to tackle real-world issues that impact our lives. This is at the heart of what a research university is all about, looking for solutions for today's problems while training the problem solvers for the future."



Dr. Sustich engages faculty and students at Arkansas State's annual research symposium.



From theoretical physicist to chief research officer, ASU welcomes Dr. Sustich to his new role.

Institute for Research Development

This May, the Office of Research & Technology Transfer (ORTT) launched their third annual Institute for Research Development. Full-time faculty and postdoctoral fellows were invited to apply for the competitive fellowship, and top candidates were recommended by college deans. Seventeen fellows, representing seven of ASU's 11 colleges, were accepted to the rigorous three-week institute.

The institute aimed to assist selected faculty to craft and submit grant proposals while learning the intricacies of the grant-making process. Program components included research and evaluation design, grant writing, budgeting and planning, compliance responsibilities, and other "tools of the trade." By the institute's end, nearly half of the fellows had submitted proposals or pre-proposals.

Fellows reported they left the institute armed with the knowledge needed to submit a successful grant proposal and believed the institute will have a tremendous impact on their future grant writing. Many expressed appreciation that the institute facilitated increased interactions and collaboration with other faculty and helped the fellows develop a comprehensive understanding of the grant process.

One fellow was eager to recommend the institute to other faculty because it both "demystified the grant process for inexperienced faculty and focused on how to be successful for more-practiced faculty." Others said, "It helped me see potential collaboration points with faculty outside my college and department," and "The institute is an excellent opportunity to educate faculty, not only in the process of grant writing, but also the resources available here at ASU to aid faculty." Another fellow recommended faculty take advantage of the opportunity early in their tenure at ASU: "The sooner the better. I would have done better [in grantsmanship] if I had this training right at the beginning."



Faculty gain the knowledge, tools and collaboration needed to develop successful research programs.

Congratulations to each of our 2013 Institute for Research Development Fellows!



PICTURED, FROM LEFT (DEPARTMENT):
Back Row: Dixie Keyes (Teacher Education), Phillip Tew (Economics & Finance), David Gilmore (Biological Sciences), Temma Balducci (Art), Jonathan Merten (Chemistry & Physics), Virginie Rolland (Biological Sciences), Kat Carrick (Social Work), Michael Bowman (Radio-TV), Chris Harper (Communication Studies), Susan Whiteland (Art)

Front Row: Kat Lecky (English & Philosophy), Jie Miao (Mathematics & Statistics), Daniel Milton (Political Science), Holly Hall (Journalism), Frances Hunter (English & Philosophy), Joy Good (Communication Disorders), Koushik Biswas (Chemistry & Physics)



SEED SOIL & OIL

It has often been said history repeats itself. That may be true of resurging interest in an ancient Bronze Age oilseed crop, Camelina sativa, which is being cultivated for modern uses by faculty in the ASU College of Agriculture & Technology.



Steve Green

SEED, SOIL & OIL...

From ancient times until the early 1900s, camelina was commonly used to produce lamp and cooking oil, animal feed, and to supplement food grains. Dr. Steve Green, associate professor of Soil and Water Conservation, is reviving production of camelina, experimenting to determine which varieties are best adapted to Arkansas.



Camelina seed ready for processing into meal and oil (top). Livestock consume the camelina meal, passing on its rich protein and omega-3-fatty acid content to consumers (bottom).

Green's main research interests are in bioenergy cropping systems and soil sustainability. With funding from the U.S. Department of Energy, Green launched a bioenergy cropping systems farm where he is testing several types of plants with bioenergy potential, including 16 – 20 varieties of camelina. The research team is also exploring the effects of different inputs (i.e. chicken litter, municipal biosolids) on soil quality and the dynamics of plant nutrient use. Green explains the questions driving his research, "Can we take a waste product from another sector of society, use it as a resource, and get better or same yields as chemical fertilizer? Or in doing so, can we at least enhance the structure of the soil, reduce erosion and get environmental benefits that are useful to society? How will these modifications affect bioenergy crop yield and soil quality, and how can we best balance these needs?"

All plants grown on the bioenergy farm could potentially be used for biofuel production. When

produced responsibly and developed as part of an integrated approach to sustainable, renewable, efficient energy, biofuels have important economic, environmental and national security potential. Biofuels can be sourced and consumed locally, creating jobs, boosting rural economies and reducing the need for fuel transport. In addition to decreasing carbon and greenhouse gas emissions, growth of winter crops for biofuel production can enhance soil health and sustainability, improving year-round crop yield and reducing pesticide and herbicide use. Incorporating biofuels into our transportation fuel supply will reduce our nation's dependence on imported, non-renewable fossil fuels and help moderate fluctuating oil prices that are vulnerable to a myriad of global political crises and natural disasters.

Arkansas farmers want to grow their own fuel so they can better predict their fuel costs.

Through interaction with local farmers, Green has learned "Arkansas farmers want to grow their own fuel so they can better predict their fuel costs. If they plant a winter bioenergy crop and locally refine it into biofuel, farmers can predict

and plan for fuel costs with much greater accuracy than when using diesel alone." Arkansas rice production in 2012, for example, consumed an estimated 28 – 41 million gallons of diesel fuel. At that level, a spike in the price of a barrel of oil can have tremendous economic impact – an impact that can be cushioned by incorporation of locally produced and refined biofuels.

A priority, then, is finding bioenergy crops that can be grown reliably in Arkansas. Historically, camelina hasn't been cultivated in North America, but biofuels research has led to a recent surge of interest in the plant. "As a cold-hardy winter crop," Green explains, "I see possibilities for a soybean – camelina rotation. When rotating with winter wheat, soybean yield is often lower because by the time wheat is harvested, the soybeans get a late start. But camelina has a very short maturity cycle, which allows soybeans to be planted on time for optimal yield." Of the plants grown on Green's bioenergy cropping systems farm, camelina holds great promise for improving energy efficiency. And it could potentially serve as the energy source for its own production by replacing up to 100 percent of the fuel in existing diesel equipment. As such, this plant that powered ancient Greece and Rome may be a solution for our 21st century energy needs.

Camelina has broad commercial potential. The seed can be processed into oil and meal. The

almond-flavored camelina oil contains an exceptionally high level of omega-3-fatty acids and is rich in vitamin E and natural antioxidants. To utilize the oil, Green says, "The easiest thing to do is make biodiesel fuel. It has been tested and can run farm tractors. The conversion process is feasible and cost-efficient ... and the oil can also be used to make camelina-derived jet fuel." The U.S. Air Force and Navy have already tested 50/50 blends of camelina biofuel and jet propellant in flight demonstrations. Camelina meal, used as livestock feed, also has a high protein and omega-3-fatty acid content, which naturally enriches the resulting animal products. Animal waste may then be cycled back as a resource in camelina production.

Green and his colleagues are raising awareness of camelina and reaching out to Arkansas farmers through a capacity-building project funded by the U.S. Department of Agriculture. It features field days and demonstrations for farmers and other potential end users, with the expectation of establishing a camelina farmer network and oilseed cooperative. In addition to biodiesel, oil and meal production, Green sees other niche market opportunities for camelina, including extraction of specialty chemicals for use in cosmetics and hair care products. "But right now," Green explains, "we're not at the commercialization stage – now we're trying to grow the right variety of camelina for Arkansas."



Camelina sativa in bloom (top) and mature for harvest (middle). The initial harvest product must be processed to separate the tiny oilseeds from hulls (bottom).

GROWING NEW FARMERS

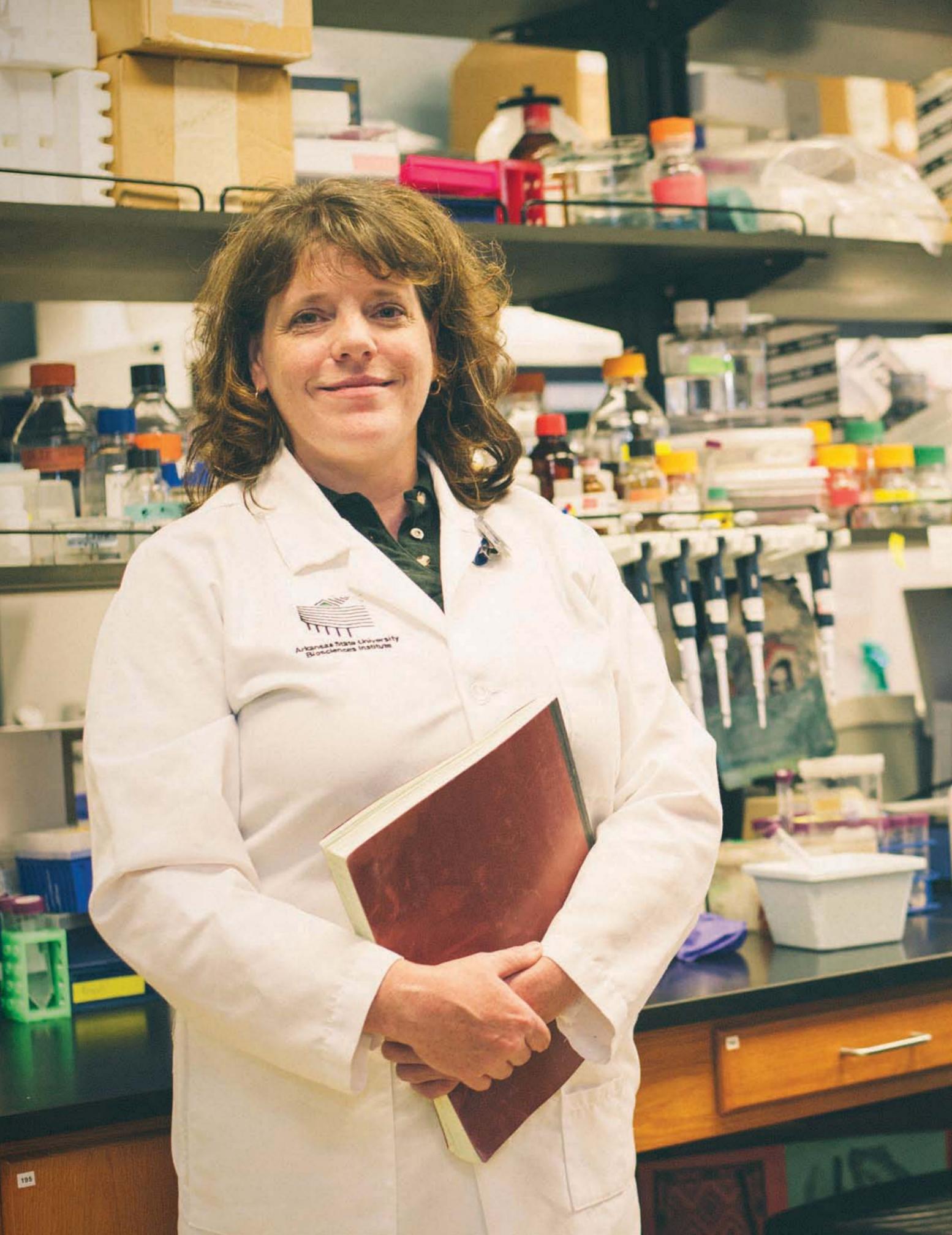
Green's multidisciplinary research team is comprised of researchers from five different fields. Collaborators include Drs. Paul Armah (Agricultural Economics), Greg Phillips (Plant Biotechnology), Kevin Humphrey (Agricultural Education) and Elizabeth Hood (Cell Biology and Plant Biotechnology). The team not only engages farmers throughout the state, but by integrating undergraduate and graduate students in research, they are also "growing new farmers."

One technician working with Green is starting a cover crop demonstration field. She will examine winter and summer cover crops and optimal termination times for potential cover crops to provide farmers with more crop rotation choices. "A critical principle of sustainability is rotation, rotation, rotation," Green explains. "This provides some winter alternatives to break up disease cycles, weed cycles and pest cycles. It gives the soil a rest and a chance to activate different microbial activity."

→ An ASU graduate student with a grant from the Arkansas Soybean Promotion Board, is growing "energy beets" – not to be used for table sugar, but for bioenergy. The project will determine the harvest timing and yield impact of a soybean – energy beet crop rotation.



For more information about this researcher, scan this QR code with your smart phone.



SEAFOOD SPECIES IDENTIFICATION



FISHY FRAUD



DECODING FOOD MISLABELING



U.S. INSPECTED AND PASSED BY DEPARTMENT OF AGRICULTURE EST. 3, 1889

Seafood Inspection Program No. 098274652

U.S. Food and Drug Administration



- goals:
- food safety
 - trackability
 - accountability
 - species conservation
 - local economic impact
 - global economic impact

Mislabeling of food fish is a complex problem impacting public health, conservation efforts, economics, politics and industry. Importation taxes are just one reason a seller might fraudulently substitute a cheaper fish species. But economics aside, substitution raises important concerns about allergens, toxins and environmental contaminants in our food supply.



Maureen Dolan

FISHY FRAUD & FOOD MISLABELING

Recently a large nationwide study reported more than one-third of seafood samples they tested were mislabeled. White tuna, for example, frequently used in the sushi market, has a close relative, escolar, which contains toxins and can cause serious illness when ingested. Mislabeled escolar as white tuna was reported in 84 percent of the retail outlets tested.

companies. Among these is Applied Food Technologies, Inc. (Alachua, FL; AFT) where she is a co-founder and chief scientific officer. AFT is a molecular diagnostics company that specializes in developing DNA-based tests and services for seafood species identification and verification.

With the passion and energy of an entrepreneur, Dolan explains the mission of her research, “The species of fish actually can make a difference, but once you pull skin off a fish it is very hard to identify.” AFT and Dolan have been integrally involved in the development of the DNA-based testing methods that are currently used in the seafood industry. Still, there is room for improvement. “Seafood distributors and importers are often required to hold fish in cold storage until the current testing confirms the species identity,” says Dolan. “Thousands and thousands of dollars can be at stake with each day of storage, so there is interest in coming up with faster, more streamlined testing methods and better screening tools.”

The research team is currently developing a more rapid molecular identification system to authenticate the species of seafood. When they started out about 12 years ago, there was no prior industry-recognized database for combining molecular and morphological traits to identify fish species. Dolan and her collaborators worked to build a fish DNA

database that both industry and science would recognize. Using this validated database (made up of close to 2,000 reference food fish), they are then able to establish a DNA barcode for each fish sample tested to confirm it is indeed the species it has been labeled to be. AFT, which began as a basement experiment, has been awarded over \$2 million in federal Small Business Innovation Research grants in support of developing fish species ID diagnostics. Other funding from the U.S. Department of Agriculture, U.S. Department of Commerce, and National Oceanic and Atmospheric Administration also supported this technology.



Roughly two percent of imported seafood receives a quality inspection before sale, compared with nearly 97 percent of beef steaks. Dolan's team is developing a rapid molecular species identification tool that may allow a sizeable increase in quality assured seafood.

In addition to her work with AFT, Dolan and fellow ABI scientist Dr. Fabricio Medina-Bolivar founded Nature West, Inc., a biotech company in Jonesboro. Of their experience in commercializing technology developed at ASU, Dolan says, “We have an incredible breadth of scientific expertise here on this campus. With the merging of the technological know-how at the ABI and ASU faculty who are world-experts in classic disciplines, the opportunities for innovation are vast. The incubator [Catalyst Innovation Accelerator] has an interesting mission that I didn't fully appreciate until we started to interact with them. They offer a dynamic model and paradigm for commercializing basic research discoveries that is very different, but needed, in industry.”

Utilizing the best available science in regulatory decision-making is considered mission critical by the FDA. But Dolan and her partners aren't stopping at the best available. They are continually improving this methodology and developing new platforms to make the tests faster and more accurate, and expand its utility to the seafood industry. “We are really interested in blazing new trails,” says Dolan. “Developing science that has valuable applications has always been a driving force for me. Pure science is great, but it's pretty cool to be able to repackage it to solve real world problems.”



Sitting at a dimly lit sushi bar, could you recognize which of the above sashimi photos is white (albacore) tuna and which one is an escolar substitute?

Pure science is great, but it's pretty cool to be able to repackage it to solve real world problems.



The DNA sequence of each fish species can be more easily visualized and compared by using a different fluorescent color for each nucleotide.

For nearly a decade, Maureen Dolan has been at the Arkansas Biosciences Institute (ABI) designing solutions to complex problems such as seafood species identification. Early in her career, Dolan realized she could take emerging technology and apply it to medical and biological problems. It is important “to find a niche that works for you,” she says. Dolan, now associate professor of Molecular and Cell Biology, has found her niche in the merger of plant science, molecular biology and innovative technology.

ASU and ABI seek to foster translation of basic research into commercial applications and technology. In that environment, where science and entrepreneurship come together, Dolan and her collaborators founded several biotechnology

“REEL” RESEARCH

Dolan is devoted to developing the future STEM workforce by providing undergraduate and graduate students with authentic research experiences. Contracts to ASU from AFT have allowed Dolan to train student interns like Jenna Warsham and employ ASU alum Garreth Clines, '11. This spring, instead of having Cell Biology lab students replicate lab exercises designed solely to learn techniques, Dolan took them into ABI labs where they conducted “real” experiments for which even she didn't know

the answer in advance. Her students responded with genuine enthusiasm, saying:

Dolan broke new ground by involving an entire class of students at ABI, but she was building on a strong tradition at ASU. Of her tenure at ASU she notes, “I see more undergraduates in research labs here than I've seen at any other institution I've been.”

“I feel like I now understand more about how a lab works and how experiments are really set up.”

“Working on a real scenario that's applicable and tangible was very nice.”

“The opportunity to work in the ABI lab really opened my eyes and made me realize I would really love to work in research.”



For more information about this researcher, scan this QR code with your smart phone.



WASTE NOT WATER NOT

Beneath the lush Delta farmlands of Eastern Arkansas lies an alluvial aquifer stretching 32,000 square miles, from southern Missouri to northern Louisiana. Water pumped from the shallow aquifer has nourished Arkansas' crops since the early 1900s, but because of unsustainable use, the water level has declined one foot per year over the past 40 years.



Michele Reba

MEASUREMENTS + MODELING = SMART MANAGEMENT

In Eastern Arkansas, where 80 percent of land use is for agriculture, groundwater conservation is critical. Michele Reba, a research hydrologist with the USDA Agricultural Research Service stationed at Arkansas State University, is working to preserve water quantity and quality in the Lower Mississippi River Basin. Since her arrival at ASU in 2011, Reba has been instrumental in collaborating with farmers, conservationists and researchers to monitor and improve management of agricultural water supplies.

Reba's research group aims to incorporate technology into conservation science. Their focus is to develop best practices for agricultural water management that will lead to producing crops using the least amount of water possible, while maintaining high water quality in the region and retaining or improving crop yields. Thus, Reba's program targets the questions of forward-thinking producers such as, "How can I use technology to better manage my crop?" and "Can I put a sensor in the field to tell me how much and when to irrigate?"

In a highly collaborative multi-disciplinary approach, Reba, together with ASU students and faculty in agriculture, biological sciences and engineering, is partnering with producers at approximately 30 field monitoring sites that span 11 farms. The field measurements provide data to understand water use, water quality,

groundwater-surface water interaction and on-farm reservoir management at the plot, field and farm scale. For example, ASU graduate students are pioneering state-of-the-art sensors to detect water levels and allow producers, whose farms may span thousands of acres, to remotely manage irrigation pumps. Improved irrigation management could save millions of gallons of groundwater per field with each irrigation cycle. "Incorporation of technology is a large part of our program," says Reba. "I've been so fortunate to work with producers who are willing to try something different."

Several of the project sites employ "edge of field" monitoring techniques that allow Reba's research team to assess the impact of conservation practices on the region's water resources. The Mississippi River Basin Healthy Watersheds Initiative (MRBI), a USDA-Natural Resources Conservation Service (NRCS) program, supports this effort. Data collected will be used to compare the economic, agronomic and environmental outcomes and determine best practices for water conservation. Additionally, field-specific data will be used to improve existing modeling efforts through collaboration with the National Sedimentation Laboratory and ASU computer science programmers. Reba notes, "Water quantity is highly variable, with flooding some years and drought in others. We must be smart about water management."



In large-scale farming operations spread across several thousand acres, the logistics of irrigation management is a common obstacle to water conservation.



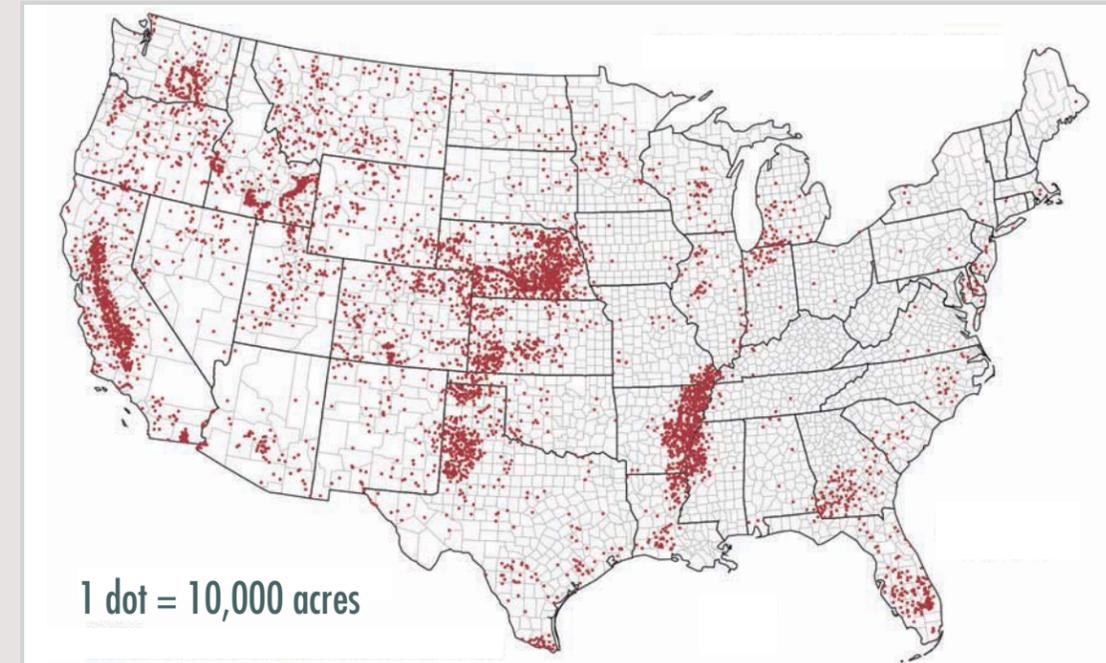
For more information about this researcher, scan this QR code with your smart phone.

INTERSECTING DISCIPLINES

Reba didn't always envision developing models and technologies for water conservation as her future. While volunteering as an undergraduate summer intern with the U.S. Forest Service, Reba was exposed to the idea of a career in hydrology. Though pursuing a bachelor's degree in civil engineering, she was assigned to work for one week with a hydrogeologist in Washington's Olympic

National Park. "We walked up and down streams all week taking water measurements and I thought 'This is awesome! People actually do this for a living!'" The experience led her into a career that spans three academic disciplines and allows her to spend most of her time in the field working hard to ensure there is plenty of water available to keep Arkansas' commodity futures strong.

Producers are asking, "How can I use technology to better manage my crop? Can I put a sensor in the field to tell me how much and when to irrigate?"



Arkansas trails only California in quantity of water used for irrigation and ranks 4th in the number of acres irrigated. From 1992 to 2007, the number of acres irrigated in Arkansas increased by 65 percent. "Although Arkansas has annual rainfall of about 50 inches, in 2008 Arkansas producers irrigated 4.5 billion acres," Reba explains. "If you compare the alluvial aquifer map and the map of irrigated acres, the two overlap. Irrigation is occurring where there is presumed to be an abundance of groundwater. But this has caused a documented water-level decline of approximately one foot per year in the alluvial aquifer," says Reba.

FUNDS FOR FARMING

Transforming agricultural practices in the Delta is no small task. The USDA provided four-year support of nearly \$82 million for Arkansas' five project areas that will impact 3.4 million acres. Arkansas' general collaboration includes: Arkansas State University, the University of Arkansas, the University of Arkansas at Pine Bluff, the Arkansas Natural Resources Commission, the Arkansas Association of Conservation Districts, the White River Irrigation District and major agricultural commodity producers.

IT DOESN'T ADD UP

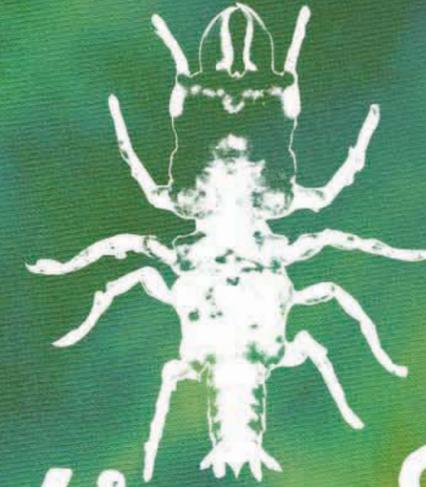
Arkansas, the nation's leading producer of rice, third-largest cotton producer, and 10th largest soybean producer, irrigates the fourth largest number of acres in the U.S., making sustainable agricultural water practices a critical concern. Agricultural irrigation pumps nearly 5,700 Mgal/day of groundwater from the alluvial aquifer. The sustainable water yield is less than 3,000 Mgal/day. The result is an unmet demand on water resources of 2,700 Mgal/day, for every day that fields are irrigated.



Edge-of-field monitoring utilizes high-tech sensors to assist producers in water conservation by providing practical tools such as remote pump management.

Irrigation is occurring where there is presumed to be an abundance of groundwater. But this has caused a documented water-level decline of approximately one foot per year in the alluvial aquifer.





Riding The **RESEARCH WAVE** *From Reef To Reggae*

*What do mosquitoes, malaria and Bob Marley have in common? A tiny fish parasite recently discovered by ASU marine biologist Paul Sikkel. The new species, *Gnathia marleyi*, is a small crustacean blood feeder he observed in shallow coral reefs of the Caribbean. The species is the first to be discovered in the Caribbean in more than two decades.*



Paul Sikkel

RIDING THE RESEARCH WAVE

Sikkel named the species after Jamaican reggae artist Bob Marley because of his respect and admiration for Marley's music and "because this species is as uniquely Caribbean as was Marley," he quipped.

The marleyi are as common in the ocean as mosquitoes are in Arkansas.

Sikkel noticed the parasite while studying damselfish spawning activity in the U.S. Virgin Islands and Barbados. Damselfish spawn at dawn, leading to many sleepless nights for Sikkel and his accompanying student researchers. But the long hours are worth it, says Sikkel. "Dawn is a transition period in the ocean. Nocturnal species are going down to sleep and day species are coming up. There is a changeover like clockwork."

Dawn is also the period when *Gnathia marleyi* are most active. Each morning, and after spawning, damselfish pay a visit to cleaner fishes and shrimps that remove the parasite which infests damselfish skin and scales. In the past, the fish would likely carry only a few parasites, but now it can be hundreds per fish. Reef destruction and overfishing have reduced the number of host fishes for *G. marleyi*, possibly leading to a greater number of parasites per fish. Such conditions are potentially harmful to the

valuable fishes, which through their feeding habits help balance diversity of algae, supporting coral reef preservation.

Sikkel believes understanding the role of *Gnathia marleyi* and other gnathiid species will help explain the impact of haemogregarines, malaria-like blood parasites that may weaken the immune systems of marine fishes. Gnathiid isopods, like *G. marleyi*, are thought to transmit the parasites through their blood-sucking bite, much in the way mosquitoes and ticks are vectors for malaria, West Nile virus or Lyme disease.

Sikkel's research team spans three continents and includes faculty in South Africa and the U.K., who study gnathiids and blood parasite transmission. The team also collaborates with Dr. Maureen Dolan (at ASU) to identify blood parasites in coral reef fishes. "Though *G. marleyi* are only in the Caribbean, gnathiid isopods are as common in the ocean as mosquitoes are in Arkansas," says Sikkel. "They are in all the waters from the Arctic to the Atlantic."

The work of Sikkel's research team, most recently funded by grants from the National Science Foundation and the Arkansas Department of Higher Education, is making waves in the field of aquatic biology. Their findings broadly affect how aquatic food webs are viewed. "We know very little about parasites in aquatic ecosystems. They

This research will totally change our view of the ecosystem for freshwater and marine life.

have historically been completely left out of aquatic foodweb models. This research will totally change our view of the ecosystem for freshwater and marine life."

But this illustrates a fundamental change in biology, Sikkel explains. "The new frontier in biology now is the small things (what some have referred to as "the smaller majority"). We know a lot about the big things and now have the technology to study the small things."

SIKKEL'S REVITALIZING RESOURCE

Sikkel finds that as a researcher, he can be more productive by living in Arkansas rather than the Caribbean, collecting data during summer trips to the Caribbean and returning to Jonesboro to teach, analyze data and publish findings. Though he lives in a land-locked state, he would never consider giving up marine research, "Research fuels my passion for teaching. I can't teach well without research."

So what does he do when he isn't refueling through research? He invests in his other passions: basketball (still an LA Lakers fan – true to his California roots), surfing, music and sipping strong coffee. Sikkel's love for music led him to the name for *Gnathia marleyi* and he says, "The arts do a much better job of presenting

science to the world. In the U.S. Virgin Islands, particularly St. John, there is an art-science-conservation synergy that fuels and enhances each discipline." Local artists in St. John are now featuring *G. marleyi* on hand-painted shirts and other objects. Sikkel is even working on a collaborative music venture with Amlak Tafari of the reggae band Steel Pulse.

And perhaps you're as curious as we were to inquire about his favorite pirate movie. Not surprisingly, Sikkel enjoys any of the "Pirates of the Caribbean" films. "I love Johnny Depp in that role, especially because he modeled his character after Keith Richards," a founding member of the Rolling Stones. "But, I can think of no better pirate than Geoffrey Rush's character – he just oozes pirateness," says Sikkel. "In a sense, our team is like a band of pirates driven by the thrill of discovery. Sometimes we hit the motherload of data treasure, and there is no greater thrill!"



The new frontier in biology now is the small things what some have referred to as, "the smaller majority."



Sikkel's discovery of *Gnathia marleyi* is the first new species identified in the Caribbean in 20 years.



Field work for those researching coral reef preservation means a dawn dive to study Damselfish.



To watch a video about Paul Sikkel's research, scan this QR code with your smart phone.

STUDENT SUBMERSION

Students are an integral part of Sikkel's work. One factor in his decision to come to ASU was the opportunity to teach and mentor graduate and undergraduate students in the Department of Biological Sciences, and to contribute to the development of a marine science program. Since coming to A-State, Sikkel has maintained a productive research program by

integrating students at each step, from field data collection through dissemination of results. Sikkel's students primarily travel with him to a marine field station in the U.S. Virgin Islands. There they are able to learn not only about marine ecology, but also gain cross-cultural experience without the cost and other concerns of international travel.

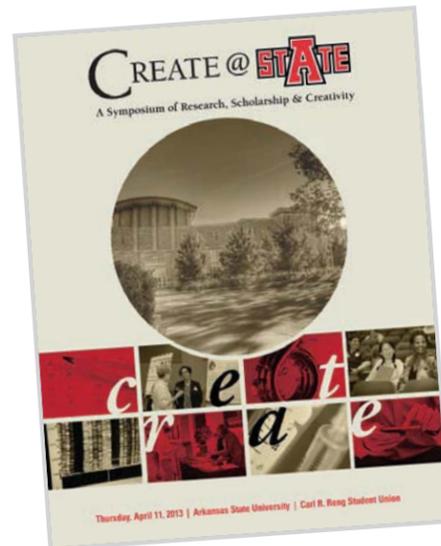


"Research fuels my passion for teaching. I can't teach well without research."

2013
3rd Annual!

CREATE @ STATE

A Symposium of Research, Scholarship & Creativity



Create @ STATE: A Symposium of Research, Scholarship & Creativity is an annual event dedicated to the celebration of research, scholarship and creativity by students at Arkansas State University. Create @ STATE is an opportunity for undergraduate and graduate students in all disciplines to showcase their accomplishments through the traditional academic mechanisms of poster presentations, oral presentations and creative performance. Faculty members across the ASU campus serve on the Advisory Board, as mentors to student presenters and as judges, room hosts and enthusiastic audience members.

Program and abstract booklet for the third annual Create @ STATE: A Symposium of Research, Scholarship & Creativity

The third annual **Create @ STATE** took place on April 11, 2013, with a record number of participants. More than 300 undergraduate and graduate students presented their scholarly work during the day-long symposium and the ASU Trumpet Ensemble performed original works for the attendees. The newest additions to the symposium included a "Video Pitch" competition and "Three Minute Thesis" competition. During her

welcoming address, Dr. Lynita Cooksey, vice chancellor and provost, said, "This symposium is a great representation of the university as it continues to grow into a research institution."

Awards of gift cards to ASU's IT Store totaling \$3,675 were presented to 45 students. Grand prizes were awarded to the overall best poster presentation and oral presentation for undergraduate and graduate students. In

addition, winners of the "Three Minute Thesis," received \$500 for first place, \$250 for second place, \$150 for third place and \$100 for People's Choice Award.

A new addition to **Create @ STATE** was the 3MT[®] competition. Sponsored by the Graduate School, the competition was open to ASU students preparing master's theses or doctoral dissertations. The goal for the competitors was to explain their thesis to a panel of non-specialist judges in three minutes using only one static PowerPoint slide. The first place winner of this competition was Rachel Welicky for her work titled, "Direct and Indirect Effects of the Caribbean Cymothoid Parasite Anilocra Haemuli on Host Energetics, Behavior and Trophic Interactions." Rachel also won the People's Choice Award.

Another new addition to **Create @ STATE** was the "Video Pitch" competition. Championed by the College of Business, 40 student entrepreneurs competed by

preparing a 60-second video pitch of their business idea and plan. The first place winner was Dylan Gamble for his business idea, "Rigs-On-A-Roll: Pre-Tied Fishing Rigs." Both of these events were met with great enthusiasm; it is expected **Create @ STATE** will include these two competitions as part of the annual symposium.

Create @ STATE continues to add new and innovative ways to engage students in the educational research experience. Deep commitments and support from faculty continue to add to this event and provide an expressive outlet for students and faculty. The fourth **Create @ STATE** is scheduled for Thursday, April 10, 2014, in the A-State's Carl R. Reng Student Union.



ASU students from all disciplines participate in the day's events.

2013 Create @ STATE Three Minute Thesis Competition



Rachel Welicky, Environmental Sciences, received first place and the People's Choice Award for her presentation titled, "Direct and Indirect Effects of the Caribbean Cymothoid Parasite Anilocra Haemuli on Host Energetics, Behavior and Trophic Interactions." **Mike Gray, Communication Studies**, received second place for his presentation titled, "The Relationship Between Gender Identity and Flirting Style." **Swapnali Halder, Molecular Biosciences and Lana Elkins, Molecular Biosciences**, tied for third place. Ms. Halder presented, "Could oral nicotine be a safer choice for smoking cessation? Let's ask the rat." Ms. Elkins presented, "'Plant-Powered' Fish Food: An Environmentally Sustainable Immune Stimulant for Improved Aquaculture Practices."

2013 Create @ STATE Video Pitch Competition



Dylan Gamble, Business Administration, received first place for his video pitch titled, "Rigs-On-A-Roll: Pre-Tied Fishing Rigs." **Kirsten Druckenmiller, Business Management**, received second place for her video pitch titled, "Breathalyzer & iPhone App Pair to Prevent Drunk Phone Use." **Bridgette Riley, Business Management**, received third place for her video pitch titled, "Vending Machine Offering Travel Size/One Time Use Products."

< Video still capture was taken from "Breathalyzer & iPhone App Pair to Prevent Drunk Phone Use."

2013 Create @ STATE Poster Presentation Winners

<i>Science, Technology, Engineering and Mathematics Undergraduate</i>			
2nd Place	Yachi Wu	A Zone Management Approach to Tarnished Plant Bug (<i>Lygus lineolaris</i>) Control Termination in Cotton	Plant Science Agriculture
1st Place	Jennifer Roberts	Plant-based Fish Protein Production as an Alternative Antimicrobial Therapeutic Strategy for Aquaculture	Biological Sciences
<i>Science, Technology, Engineering and Mathematics - Graduate</i>			
2nd Place	Swapnali Halder	Long Term Oral Nicotine Exposure is Associated with Changes in Sera Cotinine and Uterine Histology but not the Estrous Cycle in Female Rats	Molecular Biosciences
1st Place	Cesar Nopo-Olazabal	Bioproduction of Stilbenoids in Hairy Root Cultures of Muscadine Grape (<i>Vitis rotundifolia</i> Michx.)	Molecular Biosciences
<i>Social Science and Behavioral Sciences Undergraduate</i>			
2nd Place	Meggen Horwatt, David Barrera, Brandin Stehle, Susan Shelley	Handling Techniques on Stress in Female Adolescent Rats	Psychology
1st Place	Amanda Harris, Molly Bryson, Trisha Arnold	Assessment of Writing Across the Curriculum: Is Psychology a Writing Intensive Discipline According to University Trajectory?	Psychology
<i>Social Science and Behavioral Sciences Graduate</i>			
2nd Place	Jonathan Wilson, Keri Holder, Kelly Lansford, Shannon Rogers, Brittany White	Immigration Reform and Higher Education	Psychology
1st Place	Elizabeth Snow	The Impact of Developmental Play on Voluntary Nicotine Intake in Female Rats	Psychology
<i>Nursing and Health Professions Undergraduate</i>			
2nd Place	Paula Weaver, Melissa Lee, Jalessa Cross, Melissa Russell	The Great Escape	Social Work
1st Place	Melissa Bowman, Summer Corker, Kei-Lynn Swindle, Stephanie Gryner	Educating Adolescents About Dating Violence	Social Work
<i>Nursing and Health Professions Graduate</i>			
2nd Place	Eric Haertling	Do Previously Deployed Soldiers in Northeast Arkansas Relate Increased Feelings of Hopelessness After Return From Afghanistan or Iraq?	Family Nurse Practitioner
1st Place	Ashlee Gill	Acute Bronchitis and Treatment Guidelines	Family Nurse Practitioner



ASU students present research findings through poster presentations.

2013 Create @ STATE Oral Presentation Winners

<i>Science, Technology, Engineering and Mathematics - Undergraduate</i>			
2nd Place	Zach Marsh	Secondary Metabolite Enhancement in Hairy Root Cultures of <i>Scutellaria Lateriflora</i> by Treatment with Cyclodextrin and Methyl Jasmonate	Biological Sciences
1st Place	Cheyenne Gerdes	Degradation of Bat Wings by Geomyces Destructans Proteases	Wildlife Ecology and Management
<i>Science, Technology, Engineering and Mathematics - Graduate</i>			
2nd Place	Ningning Zhang	Engineering Hydroxyproline-O-Glycosylated Peptide Motifs In Hairy Roots For An Enhanced Bioproduction Platform	Molecular Biosciences
1st Place	Muhsin Aydin	Rapid Identification of Salmonella Serovars by Flow Cytometry-Based Multiplexing Analysis System	Molecular Biosciences
<i>Social Sciences, Behavioral Sciences and Nursing Undergraduate</i>			
2nd Place	David Beck	The Innocent Eye: Personal and Political Change Through a Child's Lens	English
1st Place	Hunter Sadler	Cross-Cultural Perception of Common Colors	Psychology
<i>Social Sciences, Behavioral Sciences and Nursing Graduate</i>			
2nd Place	Elizabeth Snow	Developmental Play and Sensitivity to Nicotine	Psychology
1st Place	Mark Lovins	The Impact of Honesty in The Tenant of Wildfell Hall	English



Faculty and peer students attended compelling oral presentation sessions.

2013 Create @ STATE Best Overall Presentations

Best Overall Oral Presentation Undergraduate

Aaron Hattle Mary Sues In Literature English

Best Overall Oral Presentation Graduate

Ashton Erwin Bounded Area Tests for Comparing the Dynamics Between ARMA Series Mathematics

Best Overall Poster Presentation Undergraduate

Brett Shirley Assessment Of High DFW Courses: Psychology
Ezra Rodgers General Chemistry I Focus Groups
Devin Harper
Kasha Shannon

Best Overall Poster Presentation Graduate

Taylor Gregory Extending the Medicaid Program to More Social Work
Brandi Koschmann Uninsured Arkansans Will Be Beneficial to
Tracy Mallard the State as a Whole
Melody Mccaig

Thanks to all of the participants!

Congratulations to all of the winners!



Cheryl Dison

Friends:

I hope this edition of **MEASURE**[®] helped you gain a deeper understanding of the many ways Arkansas State's scholarly activities impact the local and broader economy. We are proud of the innovation and drive of our faculty, staff and students, who are leading us into the future. In research administration, we appreciate our unique perspective gained through supporting the variety and magnitude of intellect, discovery and creativity taking shape across campus. We created **MEASURE**[®] to share that perspective with you.

The Office of Research & Technology Transfer is committed to supporting discovery and innovation through additional research initiatives including **Create @ STATE**, our in-depth grant writing program, Institute for Research Development, other ongoing research development sessions and support of new centers of excellence, and more.

On behalf of the Office of Research & Technology Transfer, along with A-State's artists, scholars and researchers, we extend our deepest appreciation to you. Thank you for taking the time to read this issue; we look forward to sharing the next edition with you.

Best regards,

Cheryl Dison, MPA
Director of Research Development

MEASURE

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