

EDUCATION

Workforce Development	Biotechnology & Biofuels	Power Grid	Solar Energy	Education Outreach & Diversity
\$100		\$100	\$100	\$100
\$200	\$200		\$200	\$200
\$300	\$300	\$300		\$300
	\$400	\$400	\$400	

What is ASSET Initiative?

The Arkansas ASSET Initiative is a multi-institutional, interdisciplinary, state-wide program. Our current project, ASSET II, is designed to strengthen Arkansas research areas with potential for national significance and with major economic development potential. Our three specialty areas include: plant-based production, solar cell technology, and new power electronics.

The Arkansas ASSET Initiative is part of the National Science Foundation's EPSCoR Program. An integral component of the program is entrepreneurial training, support for commercialization of new technologies, and an educational outreach program that targets the STEM pipeline needed to support the advanced technologies workforce.



ASSETs of Arkansas

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Director's Welcome

As our ASSET II program enters its fourth year, the evidence of our hard work now stands apparent for all to see. Our research progress is strong, our outreach and workforce development programs are strong and our collaborations prove that Arkansans are made of some pretty tough stuff. In this Fall 2013 edition we present to you an update on the ASSET Initiative project with particular emphasis on the EDUCATION aspects of our great endeavor. Advancing and Supporting Science, Engineering and Technology is a big job and it takes a team of highly talented individuals to make STEM work in Arkansas. On Pages 6, 7 & 27 you will see many of the ways our K-12 students are progressing through the STEM pipeline and attracting statewide, national and international recognition.



ASSET's educational programs focus on enhancing our existing STEM pipeline programs by developing strategic partnerships, creating targeted programs to address gaps in the pipeline and building bridges for students to overcome obstacles in their pursuit of a STEM career path. Our programs span from early elementary through workforce/professional development for practitioners. VICTER Power Box, SOLAR Box (Page 20) and BioTech-iN-a-Box Educational Resource Kits provide hands on learning experiences to K-12 students while Train-the-Trainer workshops provide STEM teachers with the confidence to bring biotechnology and engineering into the classroom. We work hard to integrate the research of our project (Pages 8-13 & 21) into practical applications for the 21st century workforce of Arkansas. We have completed the initial pilot of the ASSET Summer Research Internship Exchange Program (Page 28).

Our impact on the education equation does not end with research and training. Arkansas hosted a national NSF EPSCoR Bioinformatics Conference this past spring through the efforts of P3 and Principal Investigator, Dr. Xuizhen Huang of Arkansas State University. Arkansas GREEN Solar Cells Center researcher, Dr. Fisher Yu served as Principal Investigator on the NSF-funded 4th International Workshop on Bismuth-Containing Semiconductors held July 13-17, 2013 at the University of Arkansas, Fayetteville. Finally, VICTER Center Director, Dr. Alan Mantooth of the University of Arkansas, led the IEEE Power Electronics for Distributed Generation Systems national conference in Rogers, Arkansas, July 8-11, 2013, for electrical engineers from around the world.

We wish to congratulate three ASSET researchers on their NSF Career awards, Dr. Fischer Yu (GREEN Center) and Dr. Burt Bluhm (P3 Center), both of University of Arkansas, Fayetteville and Dr. Brandon Kemp (VICTER) of Arkansas State University. We also celebrate the accomplishments of Kristin Kovach, 1 of 4 Arkansans awarded the NSF 2013 Graduate Research Fellows and a past ASSET Summer Research Intern.

Following the retirement of Dr. Vasundara Varadan (Page 8) we wish to credit the hard work of our GREEN TEAM in completing the leadership transition, which occurred with minimum interruption to GREEN research and student engagement. The management structure that allowed for this transition and the continued research of GREEN was favorably noted at our recent Reverse Site Visit evaluation on September 17, 2013.

~ Dr. Gail McClure, Vice President for Sponsored Projects, Arkansas Science & Technology Authority

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A kindergartener builds her first circuit via the VICTER POWER BOX at the 2012 Black Family Technology Awareness Tech Expo in Kansas City, MO. <http://www.bftaa.org>



Equipping Arkansans with 21st century STEM-enabled skills necessary for Arkansas to prosper.



EDUCATION ASSET STYLE

\$75,000.00 Winner!

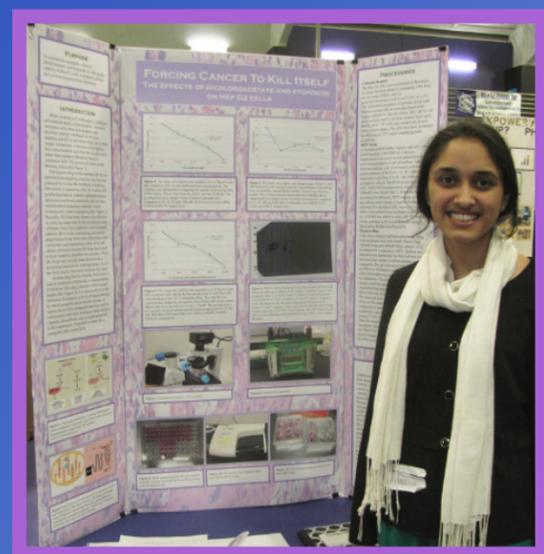


See Post-Game Interview

Leonard Cooper
Little Rock, AR

[WATCH VIDEO ▶](#)

ESTEM STUDENT WINS JEOPARDY TEEN TOURNAMENT: The answer is: He won \$75,000. The question is: Who is Leonard Cooper? A senior at the eStem Public Charter High School School, won the Jeopardy Teen Tournament, filmed in November 2012. Gavin Lesnick of the Arkansas Democrat-Gazette joined Cooper and fellow students to watch a taped version of the show today. Jeopardy has posted an interview with him on-line. I'll break another small piece of news about the Jeopardy winner. He was chosen in judging last weekend as one of this year's Arkansas Times Academic All-Stars. The annual team will be revealed April 25, but letters went out to our winners yesterday. The school will re-air the show at a chili supper/student-faculty trivia match at 5:30 p.m. Tuesday, Feb. 19 to raise money for the school activity fund.



This year's Science Fair highlighted Arkansas students and their impressively high caliber of experimental design and execution. Mehr Shah, whose research focused on forcing cancer cells to become self-destructive, won Third Place at The Regional Competition. Shah's project will go on to compete at the International Science Fair with other students from all over the globe.

◀ Mehr Shah presents the experimental findings from her senior research project. Shah is a senior at Arkansas School for Mathematics, Sciences and the Arts and will attend the University of Arkansas at Little Rock as a Donaghey Scholar

Imprinting STEM on the Next Gen

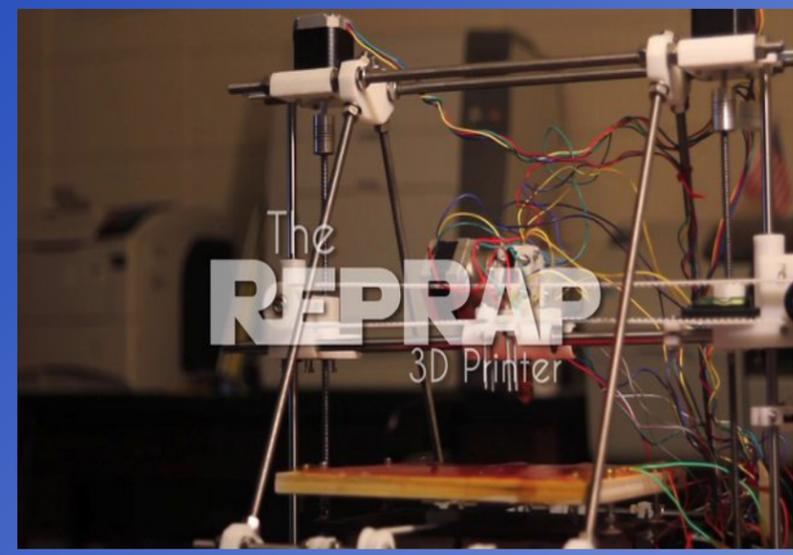
At Hot Springs High School, innovation starts in the classroom. The Reprap 3D Printer Project was created to get kids to take an active role in their education "We wanted students to get into engineering and have the create something," said Michael Vincent, EAST facilitator for Hot Springs High School. "One of my students came to me with the idea and we were able to fund the project through a combination of prior year grant savings.

When building the Reprap students worked with software developers in Denmark when they had problems. They were encouraged by the developers of the technology.

During the construction phase a parent suggested we apply for the Samsung Solve for Tomorrow competition. We did and we were selected as 1 of 15 finalists. This committed us to making a video about how our reprap can solve tomorrow's problems today.

For our project we teamed up with a local business, American Lidar, and the City of Hot Springs to go cave diving into the tunnels under the city. Specifically, the one under central avenue in historical down town. In this project we set out use high tech lidar scanning equipment to gather data needed to create a model of the underground tunnel.

We were awarded 7-55inch led tvs, 3-65inch led tvs, 5 samsung ultrabooks, 4 samsung 10.1 note tablets, and 2 coppies of Adobe CS6 as awards.



We are continuing to use our Reprap to engage in fabrication projects and are planning even larger projects for the future. Pending funding we will be building an arducopter (Unmaned flying drone) in the next school year. Many of the parts will be printed by the Reprap.



Thirty-eight teams of high school students from Arkansas and seven surrounding states gathered at Barnhill Arena April 4-6, 2013 to participate in the Razorback Regional FIRST Robotics Competition. The event will showcase original student work: 150-pound robots, designed and built in just six weeks, that can climb and play a wicked game of Frisbee. The competition is hosted by the University of Arkansas College of Engineering.



FIRST ROBOTICS: FIRST EVER REGIONAL COMPETITION



Silver and Gold



Images courtesy of PeriodicTable.com



(Top to bottom) Dr. Vinay Budhraj and Dr. Vasundara Varadan



Researchers with the GREEN Research Center have established that gold (Au) is an inefficient material as it is currently used in solar cell manufacturing. Based on their findings, this precious metal actually shortens the life of a solar cell. Through similar testing, EPSCoR Scientists now show silver (Ag) to be much more productive and conducive to improved efficiency and longevity in the cell.

Additionally, fishnet overlays are incorporated onto the thin film solar cells, which increases light dispersion across the patterns on glass substrate - 100nm-150nm thick lines.

ASSET initiative would like to thank Dr. Vasundara Varadan for her dedication and commitment to support research innovations in Arkansas. As the founding director of the GREEN Center, Dr. Varadan served as the team leader of researchers from two sites and worked to expand STEM outreach opportunities at three additional colleges and universities in Arkansas. Dr. Varadan's commitment to research and education helped to raise the bar for advancing and supporting science, engineering and technology for Arkansas.

Jingbiao Cui Named Center Director

Dr. Jingbiao Cui was appointed Director of the GREEN Center by the ASSET II Management Team after the resignation of Dr. Vasudara Varadan.



Students Apply Research & Win Big

Picasolar, a new hi-tech business launching out of the University of Arkansas, Fayetteville, won the first place graduate division overall prize of \$25,000.00 during the Arkansas Governor's Cup Business Plan Competition held at the Statehouse Convention Center in Little Rock on Wednesday, April 10, 2013. Arkansas GREEN Solar Cell's Center doctoral candidate, Matthew Young, presented the winning elevator pitch during the competition highlighting Picasolar's "game-changing technology (patent-pending) that will increase the efficiency

of solar cells by up to 15%, while reducing silver costs by \$20 million annually for an average manufacturer." Fellow Picasolar teammate, Seth Shumate, is also a GREEN Center graduate researcher working under the mentorship of Dr. Hameed Naseem, Professor of Electrical Engineering at the University of Arkansas, Fayetteville. Trish Flanagan and Michael Miller complete the Picasolar team which was advised in the competition by Dr. Carol Reeves, Associate Vice Provost for Entrepreneurship at the University of Arkansas, Fayetteville.



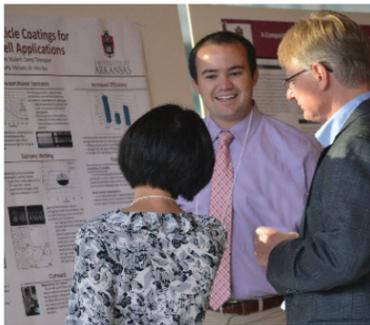
(Top to bottom) Seth Shumate, Matthew Young, Carol Reeves, and Hameed Naseem.



Picasolar is congratulated by Arkansas Governor Mike Beebe and state business leaders for winning the graduate division at the Donald W. Reynolds Governor's Cup. Matthew Young (from left to right), Picasolar; Seth Shumate, Picasolar; Rush Deacon, chairman, Arkansas Capital Corp.; Trish Flanagan, Picasolar; Governor Beebe; Carol Reeves, faculty mentor, Picasolar; and John Rutledge, CEO, First Security Bank.

GREEN RESEARCH UPDATES

VICTER Student Bridges Research to Entrepreneurship



Graduate student, Corey Thompson won two awards at this year's 2013 Governor's Cup for his business models and research innovations. Corey and his team took home the Graduate Delta Plastics Innovation Award and a prize of \$5,000.00. Additionally, the business plan they submitted to the Graduate Business Plan Competition garnered them 3rd Place with an accompanying prize of \$10,000.00.

EverClean Coating Solutions

(ECS) LLC took third place overall in the competition showcasing their low-cost, easy to apply, self-cleaning and anti-reflective coating that increases solar cell efficiency by 4%. ECS hopes to prevent the efficiency losses of up to 30% that currently result from the accumulation of dirt and dust on commercially-available solar cells as well as other manufacturing applications. Corey Thompson, a graduate student researcher with the Vertically-Integrated Center for Transformative Energy Research (VICTER), is a member of ECS's technical team. Dr. Carol Reeves also served as advisor for ECS.



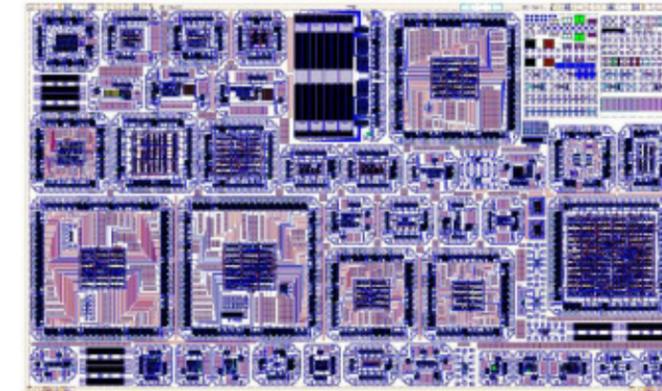
VICTER RESEARCH UPDATES

SiC Integrated Gate Drivers

Alan Mantooth's work seeks to improve the performance and reliability of solar microinverters by:

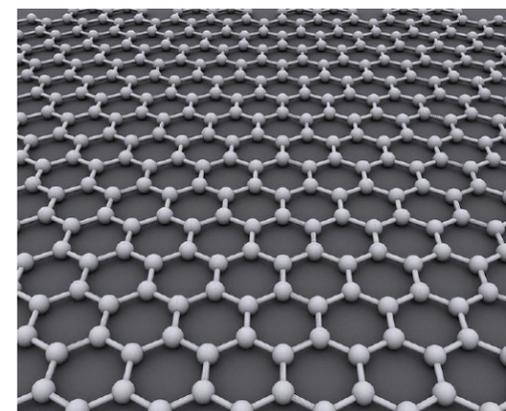
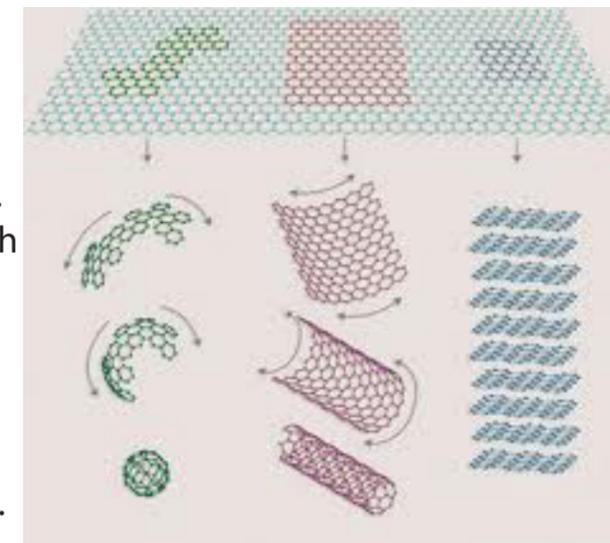


- Reducing part count through integration in solar microinverters to improve reliability.
- Integrating gate drive and control circuitry closer to the power switching devices to improve electrical performance of the microinverters.
- Using SiC integrated gate drive and control circuitry to be able to withstand the thermal in such close proximity to the power devices.



Researcher Ryan Tian is working with graphene to find uses for its growing number of applications. Tian's chemical methodology is both cheap and simple and has already produced a patentable technology.

To see similar research in graphene, check out this [video](#).



Graphene is a one-atom thick form, or allotrope, of carbon - other allotropes include diamond and graphite. It is often described as an atomic-scale chicken wire constructed of carbon atoms and their bonds. When graphene sheets are stacked, three million sheets would be needed to create a 1mm thickness. It's been claimed that graphene is the strongest material known to man and that a clingfilm-thick layer could support an elephant! Despite its strength it can be stretched by 20% without being damaged. It is also an excellent conductor of electricity and the best conductor of heat that has been discovered.

-Ashley Spurr

P3 RESEARCH UPDATES

STUDENTS



Ashley Spurr, University of Central Arkansas P3 Student Researcher

Spurr works at the Plants Genetics Biology Lab with Dr. Arijit Mukherjee. Spurr's research focuses on symbiotic relationships between plants, fungi and bacteria. Their goal is to improve nitrogen fixation process in cereals such as rice, corn, and wheat. Improving nitrogen fixation could bring positive results such as:

- Reducing the need for fertilizers.
- Studies that could be instrumental towards improving our agricultural sustainability.
- A decrease in soil contamination caused by harmful fertilizer runoffs.

Price Hardin, Arkansas State University Biosciences Institute P3 Student Researcher

Price Hardin works developing computational and mathematical models for real-life mathematical problems in collaboration with Dr. Xiuzhen Huang and other biologist to conduct biological data analysis. Price is very passionate about finding better ways to improve the environment. His bioinformatics interest include:

- Next generation sequences
- Gene networking
- Gene profiling
- Gene-ontology



FACULTY

Plant-Microbe Interactions- P3 Impacts on Success

Dr. Burt Bluhm (University of Arkansas, Fayetteville)

Dr. Bluhm's research centers on complex, molecular-level interactions between plants and pathogens that ultimately determine the extent to which disease develops.

- Awarded 2013 NSF Career award: "Dissecting the role of a putative blue-light photoreceptor in stomatal sensing and infection during fungal pathogenesis."



Dr. Lirong Zeng (University of Arkansas at Little Rock; ASSET I hire)

Research in the Zeng laboratory focuses on the identification and characterization of genes and signal transduction pathways involved plant immunity against microbial pathogens, particularly the roles and molecular mechanism by which the ubiquitination system regulates host defense responses in plants.

- Ubiquitin in plant defense & defense signaling
- Awarded NSF and USDA grants in 2013 NSF OIS grant: Role of a Lys63-specific E2 ubiquitin-conjugating enzyme/variant in plant innate immunity.



**Dr. Argelia Lorence
Arkansas Biosciences Institute at Arkansas State University**

Under Argelia Lorence's leadership

- First grant (NSF Plant Genome grant on drought tolerance in rice; collaboration with Univ. of Nebraska).
- First paper using Scanalyzer data [Avila CA, Arévalo-Solíz ML, Lorence A, Goggin FL (2013) Expression of α -DIOXYGENASE 1 in tomato and Arabidopsis contributes to plant defenses against aphids. Molec. Plant-Microbe Interact. 26:977-986.
- First non-P3 collaborators: Browning, Univ. Texas; Gaxiola, AZ State U.
- New international interest : Robert Hancock (U.K.) and Ben Vosman (Netherlands) will visit following P3-sponsored symposium at Entomology Society of America annual meeting (TX in Nov. 2013).



◀ Graduate Student, Kalavathy Rajan won 2nd place in the "Abstract to Contract" University of Arkansas competition. Kala was in the Biological Engineering Division.

<http://www.youtube.com/user/arp3center>
www.plantpoweredproduction.org

Discovering Arkansas' Museums



High School student takes advantage of SolarTech Academy at Henderson State University.



Since its inception, the Network has served more than 2 million Arkansans. Each of the partners, together, is dedicated to providing the highest quality educational experience to the children, families and teachers of Arkansas. This is accomplished through a mobile museum vehicle, interactive exhibits, professional development for partner museums' educators, ongoing contact with advisory groups, teacher workshops, and the newly installed Tinkering Studios.

The Arkansas Discovery Network was initiated in 2006 with funding from the Donald W. Reynolds Foundation. A total of \$10.3 million has been awarded from the Reynolds Foundation and other donors over the years to support the mission of making hands-on, interactive museum experiences more accessible to the state's 498,000 school-children and their families.



▲ A Tesla coil sends excitement through a crowd of patrons visiting the Mid-America Science Museum in Hot Springs.



◀ Map of The Arkansas Discovery Networks' participating museums.

The Network's seven member organizations are located strategically throughout Arkansas to extend outreach to all areas. The museums support each other by sharing operational strategies, collaborating with teachers and expanding educational programs. Network members include the Museum of Discovery in Little Rock, Mid-America Science Museum in Hot Springs, Arts and Science Center for Southeast Arkansas in Pine Bluff, Texarkana Museums System in Texarkana, Arkansas Museum of Natural Resources in Smackover, Arkansas State University Museum in Jonesboro and the Northwest Arkansas Children's Museum which will break ground soon.

For more information, please visit www.arkansasdiscoverynetwork.org.



WeSTEM

Women in Economics, Science, Technology, Engineering & Math

Resources

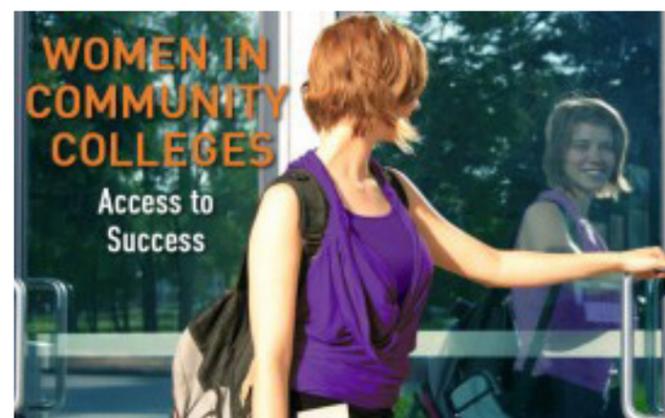


Engineer Adrienne Stropes explains what motivated her pursuit of a STEM career. ▶

Photo by Laney Butler



Adrienne Stropes



When did you know engineering was for you? Around my junior year in high school, I started to be intrigued by engineering. I had previously been interested in the medical field, but I started to feel like my personality was better suited to engineering, while still utilizing my love of math/science. It was not until my sophomore year of college that I was 100% sure I wanted to do computer science. I went into school interested in CS, but I had not been able to take any CS in HS (due to scheduling conflicts with band). **What sparked your interest & made you want to go into that field?** Math was always my favorite subject. I liked that computer science was an in demand career field that used problem solving, and it challenged me intellectually. **What degrees do you hold?** M.S. Engineering Management from The University of Texas, and B.A. Computer Science, Minors in Music & Environmental Studies from Southwestern University. **Once you graduated, did you have difficulty finding a job? Was it in Engineering?** I received my offer to work at IBM a month or two before (undergrad.) graduation. The CS market was still strong but much slower than the previous year, since 9/11 was my senior year of college. Many companies were slowing down hiring. I originally wanted to be a software engineer, perhaps in an environmental field. I was very excited by my position doing middleware at IBM, and I was trained initially in WebsphereMQ in the IBM Global Services division. **When you were hired, what about the job surprised you?** When I first started my job, I was surprised how quickly I was put on call (pager) and was representing the team on conference calls. I learned how to handle uncertainty until I was trained in the product I was to support. **Of the projects you worked on, which was your favorite & why?** It is hard to pick just one! I am most proud of pushing through a customer request that initially seemed like it was not feasible. After approved, this project opened an estimated \$20MM USD pipeline for sales on some higher end servers. It was a great example of putting the customer first, thinking outside of the box, and teamwork. **What has been your greatest challenge as an engineer?** My greatest challenge in engineering is work-life balance. I hold myself to high standards and sometimes agree to more projects than I should. In engineering, you have to learn when to go the extra mile & when to stop to sharpen your sword. There is always more to do; tech can be very fast paced. Now that I have a 2 year-old, I find myself wanting to work only part-time but not finding many positions that would challenge me and use my experience. Before that, I was on the executive track trying to climb the ladder quickly. You can switch back and forth and should be true to yourself. **What advice would you give to other young women considering a career in engineering?** Engineering is hard work, but it will give you many great opportunities, too. I have been able to meet people from around the world & learn a lot about their cultures. Many people tell you to focus on math & the natural sciences, but I also think it is important to be well rounded. Yes, engineering classes will teach you what to do but not always how to do it. You need to navigate business and team cultures, too, so I am glad I went to schools with an emphasis on organizational issues and ethics training for engineers, plus it is always good to know more about other cultures. I worked with Brazil, Canada, China, England, France, India, Ireland, Japan & many other countries, so it is always good to understand more about your colleagues' cultures.



WeSTEM Presents: [Lisa Twillie-Woodruff](#)

Women in Economics, Science, Technology, Engineering & Math

Doctoral Candidate in Higher Education, University of Arkansas at Little Rock

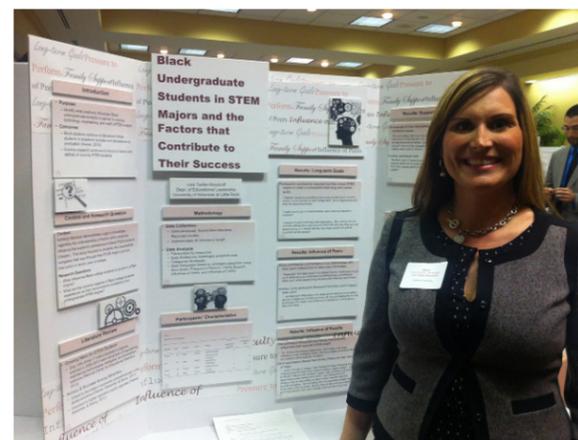


Photo by Marta Collier-Youngblood

The purpose of this qualitative study was to identify factors that positively influenced Black students to persist in their STEM majors at the University of Arkansas at Little Rock. Four Black undergraduate STEM students who persisted to their junior or senior year in their programs were interviewed. Based on the data collected from the interviews, five categories were developed: Long-term aspirations, Pressure to perform, Support of family, Support of peers, and Support of Faculty. (IRB: 13-076)

Energy Labs Generate **Buzz** As Well As Electrons

Sustainable Conservation & Generating Clean Electrons

Sustainable Conservation has 8 students enrolled, 5 Bachelor of Arts in Science and 3 Associate of Arts in Science. The BAS students had an extra assignment to accompany Oklahoma Gas & Electric on an Energy Audit at a local home. Students made a presentation on their findings at this year's Undergraduate Research Symposium on Friday afternoon April 19, 2013, on University of Arkansas at Fort Smith campus.

Generating Clean Electrons has 13 students enrolled, 5 BAS and 8 AAS. The BAS students had an extra assignment to work with Arkansas Oil & Gas on a special project researching a hybrid wind/solar system to help power their remote radio link monitoring stations. They also presented their findings at the Undergraduate Research Symposium on April 19th.



Will Lange gave a presentation on Geo-thermal heating, cooling and hot water generation for residential and commercial use. Michele Halsell's presentation was on Energy Jobs for Arkansas. Both classes in Sustainable Conservation and Generating Clean Electrons attended Halsell's presentation and the students in Sustainable Conservation attended Will's presentation. Sustainable Conservation class also attended the Fort Smith Home Show and Doug Rye's presentation on energy saving tips and resource conservation in the home. As part of the home show we also visited many of the display booths.



GREEN OUTREACH UPDATES



Summer Workshop: Alternative Energy

Dr. Nastassia Jones facilitated an Alternative Energy Workshop on June 17-19, 2013 on the campus of Philander Smith College. This workshop was open to faculty as well as high school and undergraduate students from the Little Rock Metro area. Participants learned about the practical uses of alternative energy, such as solar and wind energy, through several hands on activities. For more information on this project please contact njones@philander.edu.



Industrial Technology Management and Applied Engineering

The course is a combination of a series of lectures and indoor and outdoor experiments that engage students in understanding the concept of converting sunlight to electricity with photovoltaic cells (PV). The current-voltage characteristics curve of PV measured was plotted at differing light intensities, distances and angles between the light source and solar cell.



- 15 undergraduate students are enrolled from Industrial Technology Management and Applied Engineering.
- Students are required to prepare a project.
- Students are being exposed to the many challenges in the integration of solar energy or in general alternative energy.



REPLICATING Success

Program expanding to University of Arkansas at Little Rock, adopted their own Power Box which is now being used with their nanotechnology outreach programming.



INSTITUTIONALIZING Success



For information on how to access the train the trainer videos please contact Marta. Collier@arkansas.gov

Train the Trainer seminars were conducted for four expansion sites including the University of Arkansas at Monticello, Southern Arkansas University, Henderson State University, and Harding University.

Jasmon Montgomery



Jasmon Montgomery, a student from the University of Arkansas at PineBluff, participated in the VICTER Summer internship program 2013, under Dr. Brian Berry's supervision at the University of Arkansas at Little Rock. Her research was to synthesize novel materials and characterize their self-assembly. Montgomery's main goal was to create layers of nano tubes without destroying the bottom layer by adjusting different variables. Although she was unable to reproduce her successful experimental result, she learned what it takes to be a good researcher. "I did learn that research demands a lot of time and ideas to come up with a successful product," said Montgomery.

During her internship she had the opportunity to use advanced technology and methods to conduct part of the research. Montgomery was exposed to methods such as resistivity testing with the 4point probe, flow coater using polymers, glove box, Ultraviolet-Visible spectroscopy, and used the electron microscope to look at the nanotubes.

Bonafride Tuyishimire



Increased adoption of solar photovoltaic (PV) generation has motivated the investigation of improved forecasting techniques. This is due to the disruptive nature of variable energy sources on the existing electric utility infrastructure. This research develops a multiple-rate Kalman predictor that provides real-time forecasting of solar PV generation. The proposed method is evaluated on an operational 13kW PV array installation at fifteen minute intervals using one-minute measurement data. Forecast values are posted once per-hour for a fifteen minute-ahead market scenario. Two designs are compared that contrast the trade-offs of steady-state variance versus transient following capability. Overall experimental results indicate a multiple-rate Kalman predictor is a promising technique for improved solar PV forecasting.

Bonafride, a VICTER Intern, worked with Dr. Roy McCann at the University of Arkansas, Fayetteville. His project was "Evaluation of a Kalman Predictor Approach in Forecasting PV Solar Power Generation".

Brandon Kemp - Early Career Award

The National Science Foundation recognized Dr. Brandon Kemp, assistant professor of electrical engineering at Arkansas State University, with a \$400,000 Faculty Early Career Award for his project, "Interpretation of Electrodynamics for Modern Applications." This has been a great accomplishment for this individual as well as for the university because it is the most prestigious award given by the NSF.

Dr. Kemp's research interests include electromagnetics and optics, solar energy materials, printing technology, and analytical modeling. Prior to becoming an educator, he spent several years in laser printer product and technology development at Lexmark International, Inc.

Dr. Kemp obtained his B.S Engineering degree from Arkansas State University. He graduated from University of Missouri-Rolla with a M.S in Electrical Engineering. He earned his Ph.D in Electrical Engineering from the Massachusetts Institute of Technology.



P3 OUTREACH UPDATES

NSF EPSCoR Workshop Brings Scientists Together for Bioinformatics Forum
<http://bioinformatics.astate.edu/nsfworkshop.php>

NSF EPSCoR Workshop in Bioinformatics to Foster Collaborative Research

- Home
- Organization
- Committees
- Session Chairs
- Pre-Arrival
- Registration
- Accommodations
- Conference
- Program
- Speakers
- Venue

March 3 - 5, 2013
 Peabody Hotel and Clinton Presidential Library
 Little Rock, AR

The National Science Foundation EPSCoR Workshop in Bioinformatics to Foster Collaborative Research took place in Little Rock, Arkansas, March 3-5, 2013, with sessions at the Peabody Hotel and the Clinton Presidential Library. This event brought computational scientists and life scientists from across the country to Little Rock to stimulate novel solutions, suggestions and strategies to solve real-world bioinformatics problems. Over 124 faculty, post-docs, students and others attended the three day workshop with 93% of these coming from EPSCoR-eligible jurisdictions. Two-thirds (68%) of the 115 participants from EPSCoR jurisdictions are faculty/post-docs and over one-fourth (28%) are graduate students. The workshop provided opportunities for critical networking and discussions for advancing the state of bioinformatics collaborative research.

The Arkansas Science & Technology Authority's Vice President of Sponsored Projects, Dr. Gail McClure, is a Co-PI with Dr. Xiuzhen Huang of Arkansas State University on the workshop award (National Science Foundation Award No. 1239812).
 Emily Devereux
 AR P3 Center Program Manager
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Communicating BioScience in the 21st Century



P3 has successfully launched their P3 YouTube Thursday series! The AR P3 Center has partnered with the Arkansas State University RTV's Web Communications Class, under the instruction of Collin Pillow, to produce a AR P3 Center Social Media Campaign to communicate their science and research to the general public.

This partnership has been successful in launching a media campaign with YouTube, Facebook, Twitter and P3's blog (on P3's website).



▲ Ken Korth, co-Campus-Lead, and Lacy Nelson, P3 Assistant, of the P3 Center for the University of Arkansas-Fayetteville hold copies of the recently published Water Sustainability in Agriculture, the proceedings of the 24th annual meeting of the National Agricultural Biotechnology Council.

The National Agricultural Biotechnology Council held their annual meeting in Fayetteville, AR in July, 2012, hosted by the University of Arkansas Division of Agriculture. Co-campus-lead for the P3 Center at the University of Arkansas, Ken Korth, served as co-organizer for the meeting. Dr. Korth was also a co-editor of the recently published proceedings of the meeting. Lacy Nelson, Program Manager of the P3 Center for the University of Arkansas, served as workshop facilitator. The meeting and published proceedings focus on issues and solutions of water sustainability in agriculture. Agriculture is by far the largest consumer of fresh water on the planet, and is fully dependent on a sustainable supply of quality water. Therefore, it is critical that agricultural researchers, food and fiber producers, and agriculture-related industries are fully aware of the many facets of their activities that impact water sustainability and climate change. The NABC is a consortium of thirty-one major research and educational institutions in the United States and Canada, which annually provide an open forum for exploring issues in agricultural biotechnology.

Summer of STEM in Arkansas

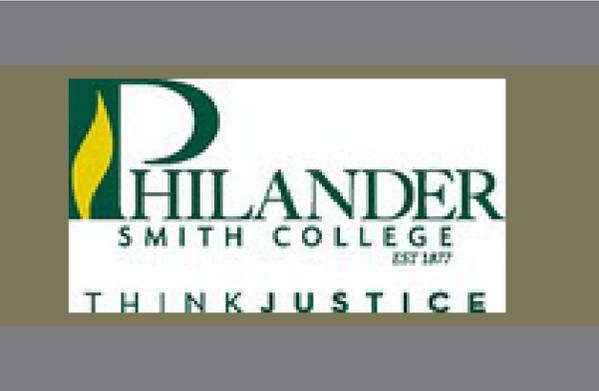
ENGINEERING OUTREACH PROGRAMS
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ACXION/UCA IT Careers Camp
 UNIVERSITY OF CENTRAL ARKANSAS
 Dr. Jim Downey
 jdowney@uca.edu



Alternative Energy Workshop took place on June 17-19, 2013 at Philander Smith College. This workshop was facilitated by Dr. Nastassia Jones njones@philander.edu.



SUMMER STEM PROGRAMS
 ASU DELTA STEM CENTER
 Dr. Cynthia Miller
 (870) 680-8248
 camiller@astate.edu

SUMMER STEM ACADEMY
 UNIVERSITY OF ARKANSAS AT PINE BLUFF
 Dr. Mary Benjamin
 (870) 575-8475
 benjaminm@uapb.edu



STEM Teacher Professional Development Workshops Around the State

University of Arkansas at Monticello
 STEM Teacher Professional Development Workshop
 06/06/2013 - 06/07/2013
 Pam Beard
 beard@uamont.edu

Arkansas School for Mathematics, Sciences and the Arts
 Biotechnology and Solar Power Teacher Professional Development Workshop
 06/23/2013 - 06/28/2013
 Dr. Patrycja Krakowiak
 krakowiakp@asmsa.org

Henderson State University
 Alternative Energy for Middle School Teacher Professional Development Workshop
 06/20/2013
 Betty Ramsey
 ramseyb@hsu.edu

Harding University
 STEM Teacher Professional Development Workshop
 06/25/2013 - 06/26/2013
 Dr. Tony Finley
 tfinley@harding.edu

Henderson State University
 Bio-Tech-in-a-Box Teacher Professional Development Workshop
 06/21/2013
 Betty Ramsey
 ramseyb@hsu.edu

Southern Arkansas University
 STEM Teacher Professional Development Workshop
 06/06/2013
 Dr. Scott White
 srwhite@saumag.edu



ENGINEERING SUMMER ACADEMY
 COLLEGE OF ENGINEERING
 Eric Specking
 (479) 575-7780
 especki@uark.edu

EAST = (ME)²

2013 Conference



The world is full of young minds eager to explore and create a better future. STEM provides the inspiration and avenue to apply creative solutions to real world problems.

Over 150,000 students have experienced EAST. Each year, thousands from across the country attend the National EAST Conference to share their stories, celebrate their work over the past year and experience a formal banquet and a trade show-like environment. The conference is also the EAST Initiative's largest training venue of the year. It is a wonderful opportunity for students to meet other students from around the country and share ideas. Join us in Hot Springs, Arkansas, for the **2014 ASSET SOLAR DESIGN COMPETITION** and experience the excitement of EAST!



Research Day at the Capitol



Throughout the morning, Governor Beebe as well as several Arkansas State Representatives, Arkansas University and College faculty and administrators made their way through the posters, listening to students explain their work and asked questions. A steady stream of high school and middle school students funneled through the rotunda as well, giving them exposure to the variety of research opportunities they have to look forward to if they hop onboard Arkansas' STEM pipeline.

ASSETsinAction

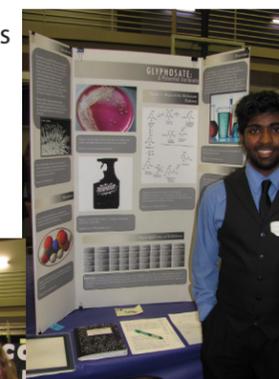
High school students from across the state poured into a brightly lit gymnasium on Friday, March 29th for the 2013 Arkansas State Science Fair. The professionally dressed high schoolers stood by their project boards anxiously awaiting questions from competition judges. The University of Central Arkansas served as host to this year's event which highlighted a myriad of division categories, each with their own group of expert judges.



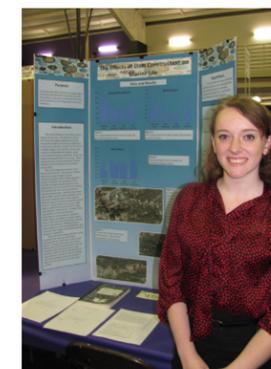
Among the student competitors were several participants of last summer's Central Arkansas Biotechnology Science (CABS) Academy sponsored in part by ASSET Initiative; those students include: Bobby Brown of Parkview High School, Mehr Shah, Lorenzo Sukhdeo, Taylor Flynn, Dave Soni, and BJ Osterberger, all of which currently attend Arkansas School for Math, Science, and the Arts (ASMSA). The 2012 CABS Academy exposed students to a variety of laboratory experiments ranging from biofuel creation and bacteria cultivation to DNA Electrophoresis. Additionally, students were mentored on collegiate preparation, scholarship opportunities, and rewarding careers in science, technology, engineering and mathematics.



This year's Science Fair showcased Arkansas students and their impressive caliber of research design and execution. Impressive entries included Central High School's Erick Jackson (*pictured at left*), whose research explored carbon nanotubes and their applications in polymers (plastics). Jackson's research is similar to the work of Arkansas GREEN Center, The microscopic, carbon nanotube skeletons would act as interior support structures, redefining the strength and durability of any number of plastic forms.



1. **Mehr Shah** (ASMSA)
Forcing Cancer to Kill Itself: Effects of Dichloroacetate and Stoposideon HEP G2 cells
2. **Lorenzo Sukhdeo** (ASMSA)
Glyphosphate: A Potential Antibiotic
3. **Bobby Brown** (Parkview HS)
The Effect of Light on the Taxis and Kenesis of Armadillium Vulgare
4. **Taylor Flynn** (ASMSA)
Effects of Dam Construction on Marine Life
5. **BJ Osterberger** (ASMSA)
Isolation of Probiotic Material Found in Yogurt
6. **Dave Soni** (ASMSA)
Comparison of the Conservation of Flagella & the Type III Seccesion System Proteins
7. **Erick Jackson** (LR Central HS)
Carbon Nanotubes and their Applications in Polymer Applications



(From top to bottom) Bobby Brown, Lorenzo Sukhdeo, and Taylor Flynn eagerly await questions from the judges concerning their research.

Trading STEM Places



The Arkansas ASSET Initiative piloted a new intercollegiate summer research exchange program that allowed a diverse group of students to work as visiting scholars at a number of institutions around the state. Each student intern worked with an aspect of the ASSET project totally 21 research and outreach projects for the summer. This effort also led to the addition of Henderson State University and the University of Arkansas at Monticello as undergraduate student research sites within the ASSET research group. This program will be replicated in 2014 based on the unprecedented success of the 2013 cohort.

Participating colleges and universities included: Arkansas State University, Henderson State University, Pulaski Technical College, University of Arkansas, University of Arkansas at Little Rock, University of Arkansas for Medical Sciences, University of Arkansas at Monticello, University of Arkansas at Pine Bluff, University of Central Arkansas



On Tuesday, April 9, 2013, the final Next Generation Science Standards (NGSS), a new set of voluntary, rigorous, and internationally benchmarked standards for K-12 science education, were released. Twenty six states and their broad-based teams worked together for two years with a 41-member writing team and partners to develop the standards which identify science and engineering practices and content that all K-12 students should master in order to be fully prepared for college, careers and citizenship. The NGSS were built upon a vision for science education established by the Framework for K-12 Science Education, published by the National Academies' National Research Council in 2011.

The lead state partners include Arizona, Arkansas, California, Delaware, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New York, North Carolina, Ohio, Oregon, Rhode Island, South Dakota, Tennessee, Vermont, Washington and West Virginia.

Contacts are Dr. Tracy Tucker and Michele Snyder

2013 ASSET SUMMER RESEARCH INTERNS

- Donald Andrew Bearden
- John Austin Beatty
- Shana Chancellor
- Robert Chaney
- Alyssa Caparas
- Caleb De la Paz
- Lafayette TaShon DeRamus III
- Christopher Gillison
- Christian Jacquez
- Josh Jasper
- Jeffery Jones
- Anthony Keener
- Jasmon Montgomery
- Kiara Newhouse
- Linda Ogutu
- Radiance Peterson
- Rebecca Ring
- Ashley Spurr
- Bonifride Tuyishimire
- Darren White
- Kymerly Wimberly

