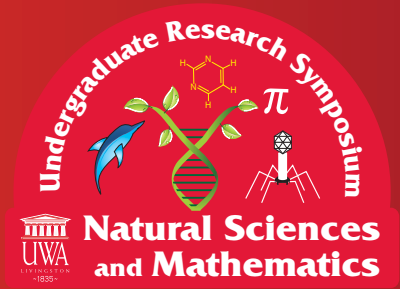


2nd
Annual



UNDERGRADUATE RESEARCH SYMPOSIUM

OF

College of Natural Sciences
and Mathematics (URS @ NSM)



March 12, 2013
Bibb Graves Building
UWA Campus
Livingston, Alabama



THE UNIVERSITY OF WEST ALABAMA
IS AN INSTITUTIONAL MEMBER OF THE
COUNCIL ON UNDERGRADUATE RESEARCH

Learning Through Research



2nd Annual
Undergraduate Research Symposium (URS) of the
College of Natural Sciences and Mathematics

March 12, 2013

Bibb Graves Building, UWA campus

Livingston, AL

Schedule of Events

- | | |
|-------------------|----------------------------------|
| 8:00 - 9:00 a.m. | Poster setup |
| 9:00 - 11:00 a.m. | Student presentations for judges |
| 11:00 - 1:00 p.m. | Public viewing |
| 1:00 - 1:30 p.m. | Award ceremony |

Organizing Committee

Dr. Mustafa R. Morsy, Chair

Dean Sammy Culpepper

Dr. Maydison Ginting

Dr. John N. McCall

Dr. Ketia Shumaker

Dr. Yun Ho Kim

Message from the Dean

Undergraduate research in the College of Natural Sciences and Mathematics (NSM) is an integral part of student learning. Independent research under the direction of faculty mentors represents a unique learning opportunity for many students. Immersion into the techniques of academic research provides undergraduate students with a deeper understanding of their academic fields and prepares them for further success in their academic pursuits and future careers. The NSM faculty pays special attention to a student's individual interests and identity, and takes pride in helping research participants concentrate his/her field of focus and refine the skills of scientific research.



The College sponsors the Undergraduate Research Symposium (URS@NSM, usually held on Spring Assessment Day), a celebration of the year's efforts in which the students present the results of their research activities to the broader university community. Undergraduates from all STEM (Science, Technology, Engineering and Mathematics) disciplines present their current and recent academic projects, showcasing the diversity of topics, approaches, and interests. The Symposium also serves as a resource for other undergraduates. Those who are not yet engaged in such pursuits can learn how fellow students developed their intellectual interests, approached their current projects, and forged the faculty or community connections needed to achieve their success. Finally, URS@NSM is an occasion for students, faculty, staff, prospective students, and alumni to witness how student projects enhance learning, support faculty members' own work, and serves the greater community.

A handwritten signature in black ink that reads "S. Culpepper". The signature is written in a cursive style.

Dean Sammy Culpepper

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I. Plant Physiology and Molecular Biology

1) Responses to Ozone Stress in Green Ash

Natalia Cardenas, Dominique Hill, and Ketia Shumaker

Abstract:

Green ash (*Fraxinus pennsylvanica*) is native to the United States. Its sturdy hardwood is used to produce paper, guitars, tool handles, and baseball bats. Green ash is also important in urban settings as an ornamental and shade tree. The increasing incidence of introducing exotic pests, diseases and invasive plants, combined with climate change may threaten the sustainability and growth of green ash. Ground-level ozone damages vegetation and ecosystems. In the United States alone, ozone is responsible for an estimated \$500 million in reduced crop production each year (US, EPA). Ozone pollution places environmental stress on native vegetation that results in early leaf senescence, loss of photosynthetic capacity, posing a major challenge for productivity and quality. The main goal of this project, while providing training of undergraduate students as part of the “Comparative Genomics of Environmental Stress Responses in North American Hardwoods” project, is to study the molecular response of green ash seedlings to various levels of ozone concentrations. In this experiment, we used 80, 125 and 225 ppb ozone concentrations for 30 days. Generally, increased antioxidant activity or elevated defense enzyme activities are common in plants undergoing ozone exposure. We expect to report increased activity of genes known to be associated with oxidative stress (catalases, peroxidases, etc.) and decreased activity of genes involved in Photosynthesis and ATP-synthesis. This project is supported by a grant from the NSF Plant Genome Research Program (IOS-1025974).

2) Responses to Ozone Stress in Black Walnut

Shelby Watwood, Tamara Smoot, and Ketia Shumaker

Abstract:

Black walnut (*Juglans nigra*) is an economically and ecologically sufficient hardwood tree grown throughout Eastern North America. The hardwood is used to produce flooring, furniture, and rifle stock. The nuts of the tree are used for food and oil, while the shell of the nut is commercially used for water filtration, abrasive cleaning, and cosmetics. The increasing incidence of introducing exotic pests, diseases and invasive plants, combined with climate change threaten the sustainability and regeneration of black walnut in the forest. Ground-level ozone damages vegetation and ecosystems. In the United States alone, ozone is responsible for an estimated \$500 million in reduced crop production each year (US, EPA). Ozone pollution places environmental stress on forest trees that results in early leaf senescence, loss of photosynthetic capacity, posing a major challenge for high productivity and quality. The main goal of this project, while providing training of undergraduate students as part of the “Comparative Genomics of Environmental Stress Responses in North American Hardwoods” project, is to study the molecular response of walnut seedlings to various levels of ozone concentrations. In this project, stress responses of black walnut trees were investigated under 80, 125, and 225 ppb of ozone in closed greenhouse chambers. Generally, increased antioxidant activity or elevated defense enzyme activities are common in plants undergoing ozone exposure. We expect to report increased activity of genes known to be associated with oxidative stress (Catalasses, Peroxidases, etc.) and decreased activity of genes involved in photosynthesis and ATP-synthesis.

3) Usage of Viral and Fungal Symbionts to Improve Crop Production

Caitlyn E. Bonham, Hayden Armuelles, and Mustafa R. Morsy

Abstract:

Environmental changes significantly affect agricultural production every year. In 2007, the US agricultural industry lost more than \$8 billion dollars in crop damages due to drought alone. Global climatic changes will increase the crop loss and will not be sustained with the increasing world population. Most naturally growing plants develop symbiotic relationships with fungal endophytes to provide them with improved environmental stress tolerance. For example, the fungal endophyte *Curvularia protuberate* carrying a double stranded RNA virus (CThTV), enables the native host *Dicanthelium lanuginosum* to survive soil temperatures up to 65°C at Yellowstone National Park. The fungus provides a tolerance to native plant and crop plants such as tomato, corn, rice, wheat, and watermelon. In a field trial, we compared plant survival, vegetation's, and fruit production of tomato plants infected with *C. protuberate* to the non-infected plants. Three rows of tomatoes were planted containing the virus and fungus (AN), the fungus only (VF), and neither the virus or the fungus (NS). Plants were irrigated by a drip system for a week after plantation to allow recovery. Thereafter, plants were grown solely on the natural rainfall. During this time period, Sumter County Alabama received less than average rainfall. The tomato plants infected with the *C. protuberate* had better vegetative growth compared to the non-infected tomatoes. Variation in fruit production and mass was also observed. We expect that the fungal endophyte *C. protuberate* may contribute to the improvement of crops environmental stress tolerance.

4) Alabama Endophyte and Environmental Stress Tolerance of Crop Plants

Hayden Armuelles, Caitlyn E. Bonham, and Mustafa R. Morsy

Abstract:

Most plants serve as unique ecological hosts for diverse communities of cryptic symbiotic fungi and bacteria that exist within plant tissues without causing any apparent harm to their host. The association of plants and endophytic symbionts is ancient and is thought to be a critical step in the movement of plants onto land. These symbionts often contribute multiple benefits, such as enhancing the efficiency of photosynthesis, nutrient, and water use, and improving tolerance to abiotic and biotic stress. The long-term objective of our lab is to discover mechanisms to improve crop production and abiotic stress tolerance via discovery of beneficial microorganisms associated with wild plants. Our central hypothesis is that association of wild plants with endophytic symbionts plays a key role in their survival and increased adaptation to unfavorable conditions. Discovery and application of local symbionts to crops can be an effective and safe method for sustainable improvement of crop yield and stress tolerance. The specific objectives of this proposal are to: 1) To discover fungal symbionts associated with wild plants in diverse environments in Alabama. Our survey of plants from diverse habitats and soils in Alabama yielded 30 fungal isolates belonging to genera identified as endophytic fungi. These fungal endophytes included *Colletotrichum* and *Curvularia spp.* that are implicated in heat, salt, and pathogen tolerance. 2) To determine the role of candidate endophytes in enhancing crop productivity. We have optimized a method for tomato infection with different identified fungal species to test their role in improving growth.

5) A virus-containing Fungi Could Be the Answer to Farmers' Woes

Joshua D. Millwood, Caitlyn E. Bonham, and Mustafa R. Morsy

Abstract:

Every year farmers lose a significant part of their crops due to drought and excessive heat. This problem affects all Americans because the shortage of produce leads to increased food prices which are devastating in our weak economy. Previous research has proven that wild plants survive excessive heat and drought via association with symbiotic fungal endophytes. In the geothermal soil of Yellowstone National Park, panic grass (*Dichanthelium lanuginosum*) can survive soil temperatures of up to 65 °C via symbiotic association with the fungus *Curvularia protuberate* bearing a mycovirus named *Curvularia* thermotolerance virus (CThTV). Our laboratory has confirmed that the CThTV not only provides heat tolerance, but also drought tolerance and improves growth of tomato plants grown in Sumter County. Our laboratory's goal is to discover local fungal-viral symbionts that can be used to improve plant stress tolerance and production. To achieve our goal, wild plants were collected from several Alabama locations characterized by high soil salinity or drought conditions. Of the total 94 fungal isolates, 30 isolates are endophytic fungi with potential agricultural use. My project focuses on the isolation and identification of viral symbionts within these endophytes. Using a double stranded RNA isolation method, preliminary results show that potential viral symbionts are present in some of these endophytes. The data may suggest the possible involvement of one or more isolated viruses in the survival mechanisms of local wild plants. This is a step toward the identification of local useful symbionts leading to environmentally friendly and sustainable agricultural systems.

II. Animal Biology and Microbiology

6) A Pilot Study of the Effects of Environmental and Physiological Stress on the Conjunctival Bacteria of College Student Contact Wearers

Tara K. Grayson and Brian Burnes

Abstract:

The influence of environmental and physiological stress on conjunctival bacteria of the eye during soft contact lens wear is incompletely understood. A five week case control study was conducted during the second half of the Fall 2011 semester on the campus of the University of West Alabama to assess the impact of environmental and physiological stress on the conjunctival bacteria of contact wearers. Weekly stress survey scores and bacterial colonies from conjunctival swab samples were recovered from eight undergraduate students representing males, females, contact wearers, and non-contact wearers. The most common bacteria recovered were *Ornithinibacillus bavariensis*, *Staphylococcus equorum*, and *Micrococcus luteus*. No positive correlations were observed between stress scores and bacterial counts in the subjects. Changes in bacterial counts correlated with seasonal changes in air temperature and precipitation, suggesting that conjunctival bacteria respond strongly to environmental changes.

7) Epidemiology of *Aeromonas hydrophila* on Alabama Catfish Farms

Jon Tyler Newburn and Brian Burnes

Abstract:

Since 2009 *Aeromonas hydrophila* has caused devastating mortality among market-sized catfish located on catfish farms throughout the Southeast. *Aeromonas hydrophila* is a bacterium that was known to science, but until it mutated recently it had only infected catfish through open sores or wounds. This new strain is infecting healthy fish and causes hemorrhagic destruction on the internal organs of the fish causing internal bleeding and eventual death. A survey was conducted among Alabama catfish farmers to collect data on characteristics of the attacks. With 80 of the surveys returned and the data collected and ran through Discriminate Function Analysis, indicators point to a correlation between higher numbers of stocking times per year and the number of farms being infected.

8) Different Faces, Different DNA Sequences

Sherilyn Garner and Mustafa R. Morsy

Abstract:

An individual's facial appearance is the most well noted phenotype in humans. Until publication of a recent study, there was no genetic information available that linked any genetic variable to facial appearances. Liu F *et. al.* (2012) proposed a study that identified five different genetic loci in people of European descent that are associated with different facial phenotypes. The loci identified were PRDM16, PAX3, TP63, C5orf50, and COL17A1. Respectively, these genes are linked to nose width, eye distance, orofacial defects, forebrain and midface development, and patterning facial tissues. For this particular study, only two of the five genes were chosen. The genes, PRDM16 and PAX3 were isolated from Caucasian, African American, and Asian participants. We will present data on the detected differences between PRDM16 and PAX3 genes among people from the aforementioned ethnic groups.

III. Ecology and Environmental Sciences

9) Water Quality Assessment of Factory Creek Sumter County, Alabama

Richard J. Alsabrook and Brian Burnes

Abstract:

Factory Creek is listed under Section 303 (d) of the Clean Water Act as being polluted with nutrients (organic matter, nitrogen, and phosphorus; data from ADEM, 2001). In accordance with the Clean Water Act of 1972, the Alabama Department of Environmental Management (ADEM) designated Factory Creek with the "Fish and Wildlife" use category, indicating that the water should be of sufficient quality to support fish and wildlife and incidental human contact. Data collected by ADEM in 2001 indicated that the lowest 1.86 miles of Factory Creek are exceeding the allowances for Organic Enrichment and Nutrients. ADEM tested for dissolved oxygen, nitrogen, phosphorus, and chlorophyll a. A year-long monitoring project conducted by UWA included monthly baseflow/highflow sample collection from each of the four existing monitoring sites. The data falls within ADEM regulations except during a period of rain around October 3 for turbidity, fecal counts, chlorophyll a, ammonia, Kjeldahl nitrogen, electrical conductance, phosphorus, and mineral levels where all the reading were higher than ADEM regulations. This water quality data will be used to develop a watershed plan and, appropriate, apply for Section 319 funding.

10) Impacts Of BP Oil Spill on Meiofaunal Communities in an Alabama Salt Marsh

Cory Chance and John N. McCall

Abstract:

The Deepwater Horizon oil spill of 2010 has greatly impacted salt marsh ecosystems in the northern Gulf of Mexico ranging from Louisiana to Florida. These salt marsh communities act as nursery grounds and are beneficial to many species of fish and invertebrates. The oil spill provides an opportunity to study how these salt marsh ecosystems respond to stressors in their environment. Over an eleven month period, we measured meiofaunal densities in two separate locations at Point aux Pins, Alabama, in Mississippi Sound. According to the National Oceanic and Atmospheric Administration, the eastern shoreline of Point aux Pins was impacted by oil, while the western shore was not affected. We sampled meiofaunal communities at sites on the eastern and western shorelines over an eleven month period in 2011, and detected a direct correlation between nematode and harpacticoid copepod densities at each site. Densities of both nematodes and copepods were higher at the western site in January and February, but by March, when densities had increased greatly, the two sites did not differ significantly. Both nematodes and copepods rose to their greatest peaks in the late spring, but then crashed in the late summer and early fall. It remains unclear whether the observed patterns result from oiling impact. It is hoped that further research at the site will shed light on the factors affecting meiofaunal densities in this system. Support for this work was provided by the BP Sponsored Gulf of Mexico Research Initiative.

11) Biomonitoring Used to Assess Water Quality of Alamuchee Creek in Alabama

Sarah Jessica McDill and John N. McCall

Abstract:

Alamuchee Creek flows through Lauderdale County, Mississippi, and Sumter County, Alabama, and drains approximately 146 km² of land in the two counties. As of 2010, no previous water quality investigation had been conducted on the stream. Beginning in October 2010, data collection was initiated to determine the relative quality of the stream. Topographic maps and aerial photographs were used to map the perimeter of the drainage basin. Aquatic insects were used in a multi-metric approach to water quality assessment including Ephemeroptera/Plecoptera/Trichoptera (EPT) richness, species richness, EPT:chironomid ratio, species diversity, percent EPT, and family biotic-index metrics. Four sampling areas were selected along a section of the stream between Kewanee, Mississippi and Livingston, Alabama. Specimens were collected via D-frame net from different microhabitats throughout each sample site. A representative subsample of 100 organisms was collected from each site. In addition to insect collections, environmental parameters including water temperature, conductivity, and dissolved oxygen content were recorded. Insects were identified to genus level in most cases. The results showed high amounts of species richness and diversity among the sample sites, and a “good” family biotic-index rating (as defined by the North Carolina family biotic index) indicating some impairment, but an overall healthy stream.

IV. Other Disciplines

12) The Role of the High School Biology Laboratory Experience on Science Performance and Attitudes

Andrea Clanahan and John McCall

Abstract:

Laboratories have played a central role in science education since the 1880s, and have been heavily investigated. John Dewey believed students should understand “science content and lab activities and also the connectedness of the two”. By 1975, the work of Jean Piaget influenced the role of science laboratories. The learning cycle was created and used to introduce information and use laboratory activities to explore and apply concepts. Currently, the National Science Foundation reports a decline in U.S. citizens training in science fields, which may be related to a change in the nature of science laboratory education. The goal of this research project is to identify the factors of laboratory experiences that most significantly impact the performance and attitudes of students. Survey Monkey was utilized to administer a ten question survey to freshman biology students at the University of West Alabama with the goal of investigating the nature of the high school biology laboratory experience for beginning college students. Laboratory elements evaluated included the frequency of lab experiences, type of lab experience, resources and guidance provided, and the manner in which laboratory activities contributed to the biology course. Data was analyzed to investigate how these factors differ among area schools.

13) An Investigation of Language Accent as a Symbolic Intergroup Threat

Alexis Hewitt and Mark Davis

Abstract:

Two studies investigated the role of language accents in perceptions of symbolic intergroup threat, and the effect of accents on facial EMG. Study one examined if and to what extent realistic threats, symbolic threats, intergroup anxiety, negative stereotypes, and language accents were used to predict prejudice toward immigrants. Symbolic threat, intergroup anxiety, and negative stereotypes were predictors of attitudes toward immigrants, and language accents predicted symbolic threat. Study two tested the effects of accents on facial EMG. Using the corrugator supercilii as an indicator of negative/positive affect, participants listened a speech delivered by one of six accents (male and female British, Spanish, and Southern US accent), or read the speech in the control condition. Facial EMG data showed an increase in corrugator supercilii activity from baseline when participants listened to the Spanish accent, indicating negative affect. In conjunction with self-reported data, participants who perceived the accent as a threat produced a greater corrugator supercilii response.

14) Math Computer Lab Work Scheduling Optimization Using Linear Programming

Jonathan Woodruff and Maydison Ginting

Abstract:

The Optimization Models are usually made to achieve a particular objective, and the role of the model is to specify the way in which the decision variables will affect the objective that satisfies the given constraints. A constraint is a limitation on the range of allowable decisions. So, there are three components of an Optimization Model, which are

- Objective function(s)
- Decision variables
- Constraints

One of the most common tools used in Optimization Models is a Linear Programming (LP). Every Linear Programming (LP) problem has two important features, an objective function to be maximized or minimized and constraints. The constraints in an LP model can be equalities as well as inequalities. In general, the model of the LP is represented as:

$$\begin{array}{ll} \text{objective function} & \max \text{ (or min) } z = cx \\ \text{subject to (s.t.)} & \mathbf{Ax} \leq \mathbf{b} \text{ (constraints)} \\ & \mathbf{x} \geq 0 \text{ (sign restrictions)} \end{array}$$

The feasible region is the set of all points that satisfies all LP's constraints and sign restrictions and the objective function is to be maximized or minimized only over the set of feasible regions.

We will be using the LP modeling technique to find the optimal solution of the number of tutors working in the Math Computer Lab room BG 210 on certain times and days.

15) Implementation of Intelligent and Autonomous Hover Craft Robotic Model with Variable Counter Balancing Speeds

Jacob Wilson, Balakrishna Gokaraju, and Don Yessick

Abstract:

Artificial Intelligence (AI) as it has become known confuses many people, but it could not be any simpler. Take a simple problem and solve it with a simple solution. Make this solution repeatable and you get an algorithm. The problem no longer has to be figured out every time it comes up. Take an algorithm that can change with the problem and you have the building blocks of AI. We intend to build a small-scale intelligent hover craft robotic model using the popular Hummingbird controller kit.

The Hummingbird Robotics kits are used to create simple machines that are fairly one-dimensional. However, with a little thinking outside the box one is able to build a complex robot. The base Hummingbird kit consists of controller, two vibration motors, four servos, LEDs and light, temperature, distance and sound sensors. But, with a quick trip to the hobby shop a light weight variable speed motor can easily be brought into play. This motor gives us the ability to create a rotation that speeds up or slows down on the fly. This intelligent robotic model will be able to hover and even move about in the air by counter balancing the speed of horizontal propeller motor against the varying motor speed of the vertical lift autonomously. With this we are able to create a counter spin which acts as a stabilizer. We will run two rotors moving in opposite directions one in the front and one in the back of the craft.

Other activities and outreach offered by NSM

Tri-Beta Biological Honor Society

The Beta Phi Chapter of Beta Beta Beta is the sole biological honor society at The University of West Alabama. Beta Beta Beta is a society for students, particularly undergraduates, dedicated to improving the understanding and appreciation of biological studies and extending boundaries of human knowledge through scientific research. As such, Tri-Beta is one of the nation's most respected biological honor societies. The Beta Phi Chapter of Beta Beta Beta National Biological Honor Society was chartered at The University of West Alabama in 1999. Since that time, Beta Phi has installed over 150 regular members of Beta Beta Beta. The members of Tri-Beta at UWA are active in undergraduate research, as well as service to the university community. The organization introduces and orients students to the numerous biological disciplines through guest speakers, shadowing opportunities, volunteer activities, and working on undergraduate research projects.

Alpha Epsilon Delta

Alpha Epsilon Delta (AED) is a national health pre-professional honor society dedicated to the encouragement of scholarship and recognition of excellence. Pre-professional areas of interest include medicine, dentistry, veterinary and other similar health fields. The AED chapter at The University of West Alabama was chartered in 2010. Some of the benefits are public recognition of outstanding scholarship, activities which promote interests in professional health, and establishment of contacts with health professionals. Requirements for membership are overall and science GPA's of 3.2 or higher. The science GPA includes biology, chemistry, physics and mathematics.

Science Saturdays

The College of Natural Sciences and Mathematics (NSM) at the University of West Alabama initiated the *Science Saturdays* outreach program in 2010. The program aims to acquaint area K-12 students to the exciting field of Science and Mathematics at an early age. The program provides students in elementary, middle, and high schools in and around Sumter County, Alabama, with opportunities to experience hands-on learning activities in science. *Science Saturdays* activities are two-hour events held three times during each Fall and Spring semester. Faculty members from UWA host science exploration projects through a variety of activities such as, "What Went By?" to learn how to trace animal footprints, "Dig Archaeology" to learn how archaeologists study the past, and "Dr. Frankenstein" to learn about human anatomy. *Science Saturdays* activities are free of charge and are open to all children in the appropriate age groups advertised for each event. There is, however, a limit of 20 children per activity. Since the program started, over 350 K-12 students from 6 surrounding counties have participated in the program. Please visit the *Science Saturdays* website for more information and pictures of activities (<http://www.uwa.edu/ScienceSaturdays>).

Science Olympiad

Since 2004, the College of Natural Science and Mathematics has hosted the UWA Elementary Science Olympiad. This is an academic interscholastic competition for Grades 3-6 consisting of a series of individual and team events for which students prepare throughout the year. Participating students interact with one another, learn subject matter, and have fun with science. Participation in Science Olympiads has been directly linked to increased interest and achievement in science and math. Events in the ESO relate directly to National Science Education Content Standards and to Alabama Content Standards for Science.

West Alabama Regional Science Fair

The West Alabama Regional Science Fair is an Intel ISEF-affiliated fair serving the counties of Choctaw, Fayette, Greene, Hale, Lamar, Marengo, Marion, Perry, Pickens, Sumter, and Tuscaloosa. These competitions exist in nearly every state in the United States as well as in 40 foreign countries. All Intel ISEF-affiliated science fairs register with Society for Science and the Public and must consist of five participating high schools and/or 50 students in the ninth - twelfth grades. The 2013 West Alabama Regional Science Fair will sponsor a winning student's travel to the 2013 International Science and Engineering Fair to be held in Phoenix, Arizona from May 12 - 17, 2013. Each year, millions of students worldwide compete in local and school-sponsored science fairs; the winners of these events go on to participate in Intel ISEF-affiliated regional and state fairs from which the best win the opportunity to attend the Intel ISEF. The Intel ISEF unites these top young scientific minds, showcasing their talent on an international stage, enabling them to submit their work to judging by doctoral level scientists—and providing the opportunity to compete for nearly \$4 million in prizes and scholarships.

STEM Freshman Seminar

UWA 101 (Freshman Seminar) is a required course for all entering freshmen. As a biology math, science, or computer science major, students have the opportunity to take a special UWA 101 courses designed specifically for them through the UWA Project Engage Program funded by a Minority Science and Engineering Improvement Program grant from The United States Department of Education. In addition to the regular UWA 101 course content, such as campus resources, personal, social, and academic support skills development, and expanded university orientation, the STEM (Science, Technology, Engineering, and Mathematics) UWA 101 course integrates specific STEM-related content and provide students access to enhanced educational technology resources.

UWA's Project Engage

UWA's Project Engage is a capacity-building program designed to increase the retention rates of students. It is aimed at under represented groups majoring in science, technology, engineering, or mathematics (STEM), and focuses on their freshman and sophomore years through intensive academic and personal mentoring. A second purpose of Project Engage is to increase graduation rates of STEM students through their continued participation in project activities during the second year and beyond.

The Alabama Onsite Wastewater Association Training Center

The Alabama Onsite Wastewater Association Training Center (AOWATC) was established in 1997 because of a growing need for education in the rapidly changing wastewater field. The organization is dedicated to expanding public awareness of water quality issues, with a particular emphasis on wastewater management. The center was established with funding from the United States Environmental Protection Agency through the Alabama Department of Environmental Management, and by donations from the University of West Alabama and other contributors. The center is a member in a partnership that includes many federal, state, and local agencies, including the Alabama Onsite Wastewater Association, the Tombigbee Resource Conservation and Development Council, the Alabama Department of Public Health, the Alabama Onsite Wastewater Board, , the Alabama Soil and Water Conservation Committee, and the Sumter County Soil and Water Conservation District.

Sumter County Nature Trust

The Sumter County Nature Trust was established in 1985 through a gift from Doctors Ralph and Margaret Lyon, both UWA Professors Emeriti. The Lyons, who lived in Sumter County for over thirty years, chose this avenue as a means of expressing their love for the county, for nature, and for people.

The Trust is committed to identifying and preserving the natural resources of Sumter County, informing citizens about such matters, sponsoring environmental education activities, and developing sites where citizens can enjoy and appreciate the environmental treasures of the Black Belt Region. Endowment income provides funds for activities initiated by the Trust, as well as matching grants for individuals and organizations interested in fulfilling the goals of the Trust.

Fossils of the Black Belt

A one-day workshop on fossils for high school teachers is held each October, run by the University's paleontologists (Andrew Rindsberg and James Lamb) in partnership with researchers from the Geological Survey of Alabama. Continuing Education credit is offered.

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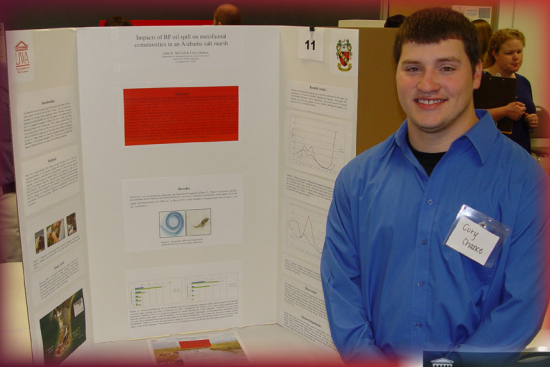
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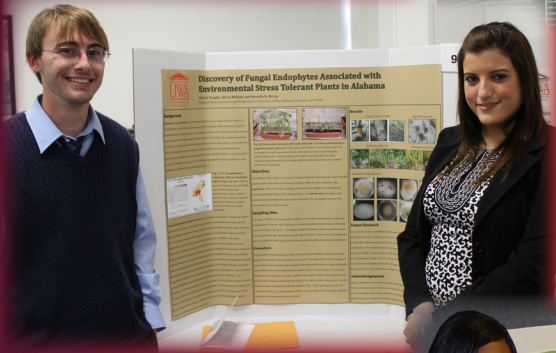
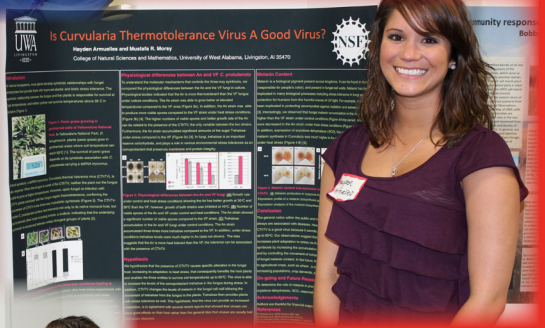
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Past Winners

**President's Award
Cory Chance**

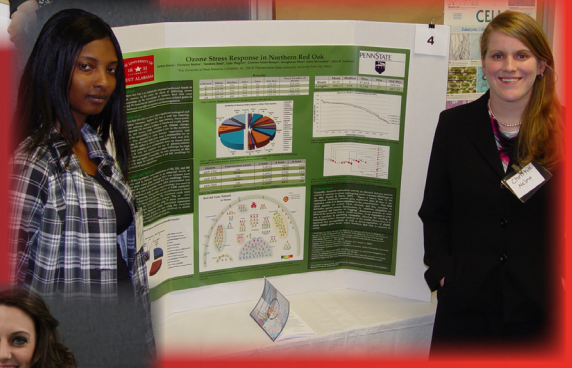


**Provost's Award
Hayden Armuelles**



**Dean's Award
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