

ANNUAL REPORT

2016

College of Sciences and Mathematics Outreach

The College of Sciences and Mathematics Outreach Office at Auburn University strives to promote scientific literacy and interest among K-12 students, teachers, and communities in our region, our state, and our nation.



24

on-site programs



177

contact days



10,014

students, parents, and teacher participants

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About COSAM Outreach

To promote careers in sciences and mathematics among K-12 students, the College of Sciences and Mathematics (COSAM) at Auburn University has designed an innovative outreach division offering special events, competitions, workshops, and programs throughout the year for the general public and K-12 students and teachers. These activities are designed to provide a continuum of programs for students in various stages of their educational development.

In 2016, COSAM Outreach hosted over 10,000 students, parents, and teachers at events on the AU campus. A total of 24 on-site programs, with 177 contact days, were hosted/sponsored by COSAM's Outreach Office. Additionally, over 70,000 students and teachers in our 8-county region were impacted through Alabama Science in Motion and the Alabama Math, Science, and Technology Initiative (AMSTI).

In Outreach, we continuously evaluate and assess our existing programs while also creating new programs for specific target audiences. In 2016, we became the Alabama state affiliate site for the Project Lead The Way (PLTW) Engineering and Biomedical Sciences programs (high school), the Gateway middle school program, and the Launch elementary program. This year we provided six weeks of professional development for 170 PLTW teachers from 20 states and hosted a statewide PLTW conference for over 220 teachers, administrators and school counselors.

Another very exciting new endeavor in 2016 was the launch of the innovative **Southeastern Center of Robotics Education**, or SCORE for short. SCORE was developed in response to the many calls and emails from teachers and school administrators we received over recent years requesting advice on how to implement robotics in their

curricular offerings and provide the necessary professional development for teachers. SCORE centralizes the robotics education activities already underway in Auburn's College of Sciences and Mathematics, College of Engineering and Auburn University Aviation Center, and provides a mechanism for growth in the area of robotics education outreach. The SCORE initiative is the only center of its kind in the country.

By centralizing robotics programming, faculty and staff at Auburn are better able to serve K-12 teachers and students with a diverse and targeted approach. The programs offered through SCORE aim to provide education on the use of robots on the land, in the air, and in the water, thus reflecting Auburn University's commitment to research, outreach and instruction as a land, sea and space grant institution. The center already incorporates land-based robots through our BEST Robotics program. The focus in our first year will be expanding our land-based robotics offerings, and developing air-based robotics programs, camps, clubs, workshops and competitions centered around drones, or UAV's (Unmanned Aerial Vehicles). By 2018, SCORE will expand to include aquatic robots.

Robotics is still quite new to the K-12 education arena, and many teachers were not trained in robotics

curriculum prior to entering the classroom. Teachers are forced to learn robotics on the spot alongside their students, which can be overwhelming given their many additional responsibilities. Partnering with outstanding existing programs at Auburn University like BEST Robotics and Project Lead The Way gives SCORE educators instant access to a large number of teachers who want to be more prepared to lead their students into project-based robotics pursuits, but need the extra professional development to build their knowledge and confidence. There is nothing like SCORE in the country right now, and we are thrilled that Auburn University is taking the lead to develop a resource that will be a game-changer for preparing our students for tomorrow's challenges. For more information on SCORE, visit www.scoreau.org.

As our program offerings continue to grow, I am pleased to report that an increasing number of COSAM faculty are enthusiastically connecting with the public through our programs and sharing their passion for science and mathematics. Their involvement adds breadth and depth to our program offerings and provides more opportunity for the public to be true shareholders in the resource that IS Auburn University. We invite you to take a moment to review our 2016 annual report for more information on this past year's successes.

Outreach Staff

Mary Lou Ewald

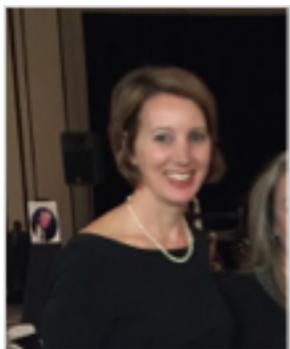
Director of Outreach



As the Director of Outreach for the College of Sciences and Mathematics, Mary Lou's primary responsibilities include: oversight and management of the outreach programs, the Director of AU Science in Motion, SCORE, Co-PI, AU-AMSTI, and the campus-wide outreach representative for COSAM (WISE Institute, Outreach Faculty Engagement Council). In addition, she is responsible for oversight of all grant-related activities for the unit and serves as the State Affiliate Director of the Project Lead The Way program.

Kristen Bond

Assistant Director of Outreach



Kristen's responsibilities during the 2016 year included: coordination of elementary and middle school Science Olympiads, Science Matters Summer Academy, Middle School AMP'd, as well as school coordination and logistics at both the War Eagle BEST and South's BEST competitions.

Teddy Dubose

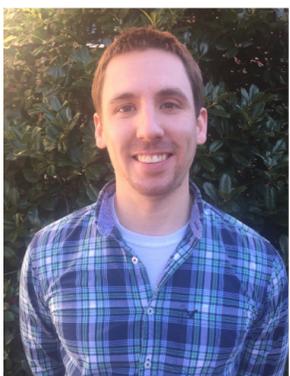
Account II



Teddy's primary responsibility included managing program budgets, office management, and oversight of all financial matters of the unit.

Josh King

Outreach Administrator



Josh's responsibilities during the 2016 year included: coordination of GUTS, coordination of the PLTW State Conference, High School AMP'd Challenge, GEARSEF, Science Café, hospitality for BEST Robotics, and serving as the affiliate assistant director for the Project Lead The Way Biomedical Sciences program.

Outreach Staff (cont.)



Tj Nguyen

Assistant Director of SCORE Robotics

Tj Nguyen is the Assistant Director of SCORE Robotics. He has degrees in mechanical engineering and secondary science education. He has 12 years of experience in BEST Robotics serving in various roles. As a graduate student, he served as the Director of Online Support for Catapult Engineering Academy, an online distance-learning high school engineering program that teaches students Matlab, LabVIEW, and other engineering skills and programs to prepare them for future careers in STEM fields. He has also developed and taught several robotics camps and professional development training workshops.



Frank Ware

Robotics Education Specialist

Frank Ware is a robotics education instructor at SCORE. He is a retired middle school science teacher and army retiree. He has taught Lego Robotics and VEX IQ Robotics. He has instructed several workshops for teachers on using robotics in the classroom and in after-school programs.



Dr. Charles Eick

Affiliate Assistant Director of PLTW Launch and Gateway

Dr. Eick's responsibilities during the 2016 year included: coordination of the PLTW state conference, coordination of Summer and Winter Launch and Gateway PLTW core trainings, teacher visitations and school support, and coordination of other PLTW supplemental professional development offerings.



Janie Marino

STEM-IQ Project Assistant

Janie's responsibilities during the 2016 year included: coordination of STEM-IQ professional development, logistics, mentoring, and program evaluation, as well as the coordination of STEM Discovery Day and assisting with the GEARSEF program.

Student Employees



Emily Hardy

STEM-IQ Graduate Student Assistant

Emily's responsibilities during the 2016 year included: coordination of STEM-IQ professional development, logistics, mentoring, and program evaluation, as well as the coordination of STEM Discovery Day and assisting with the GEARSEF program.



Chloe Chaudhury

Student Program Assistant

Biochemistry and Dance

Senior

Third year in COSAM Outreach



Khori Dunn

Student Program Assistant

Interdisciplinary Studies

Senior

Fourth year in COSAM Outreach



Jacob Varner

Student Program Assistant

Software Engineering

Junior

Fourth year in COSAM Outreach

Student Employees (Cont.)



Erika Dunavant
Student Program Assistant
Building Science
Junior
Second year in COSAM Outreach



Hunter Whitten
Student Program Assistant
Building Science
Junior
Fourth year in COSAM Outreach



Hunter Terry
Student Program Assistant
Aerospace Engineering
Freshman
First year in COSAM Outreach



Hannah James
Student Program Assistant
Biomedical Sciences
Freshman
First year in COSAM Outreach

2016 Outreach Calendar

High School AMP'd	January 23 (Initial Date) & May 7 (Makeup Date)
Elementary Science Olympiad	February 20
MS Science Olympiad	February 27
GEARSEF	March 3 and 10
Spring GUTS	March 29 and April 11
AU Explore	April 29
SWSM	May 5
STEM IQ	June 1 – 2 (Cohort 1), and June 27 – July 1 (Cohort 2)
FLIP	June 6 – 9
Science Matters	June 6 – 10, 13 – 17, and 20 – 24; June 27 – July 1; July 18 – 22, and 25 – 29
PLTW Core Training	June 6 – July 22
Science in Motion	Physics (June 8-17), Chemistry (June 16-25), Biology (June 29 – July 10)
AP Summer Institute	June 27 – July 1 and July 11 - 22
Summer Science Institute	June 12 – 18 and July 24 – 30
Science Café	June 28, July 26, August 23, September 27, October 25, and November 15
Pave The Way	July 12 – 14 and 19 – 21
TASSAL	July 12 – 14 and 19 – 21
Drone Camp	July 25 – July 29
War Eagle BEST	October 8
Fall GUTS	October 27
Middle School AMP'd	October 29
Robotics Merit Badge Day	October 29
PLTW State Conference	November 9 – 10
STEM Discovery Day	November 8
South's BEST	December 2 – 4

Program Descriptions



Alabama STEM Studio for Afterschool Learning

Funding Source: Truman Pierce Institute Grant

TASSAL (The Alabama STEM Studio for Afterschool Learning) is a statewide afterschool STEM professional development program hosted by COSAM Outreach, in partnership with the College of Education's Department of Curriculum and Teaching and the Truman Pierce Institute. The initiative utilizes a series of hands-on, inquiry based activities that integrate science, technology, engineering and mathematics principles in a fun, non-threatening learning environment. The target audience is afterschool educators located at 21st Century Community Learning Centers (CCLC) in Alabama.



AP Summer Institute (COSAM Facilitated)

Funding Source: Participant fees

The AP[®] Summer Institute (APSI) Workshop is endorsed by College Board and designed to aid the professional development of teachers, counselors, and administrators who are involved with Advanced Placement (AP[®]) courses. Workshops are designed for teachers who are teaching an Advanced Placement course for the first time and for experienced teachers desiring refresher training. Topics include subject matter content, test construction, pupil and teacher selection, College Board policies and procedures, and preparation and grading of AP tests. APSI is hosted each summer in partnership with the Office of Professional and Continuing Education at Auburn University. COSAM facilitates course offerings in Biology, Chemistry, Calculus, and History.



Auburn Mathematical Puzzle Challenge

Funding Source: COSAM, participant fees

The Auburn Mathematical Puzzle Challenge, or AMP'd Challenge for short, is a problem solving challenge offered two times each year. In the fall, AU hosts a middle school event in which teams of 6 –8 students work together to 'solve a crime' by solving thematic mathematical puzzles. In the spring, a high school event is hosted in which students are challenged to solve 10 - 12 puzzles in a five hour period.



AU Explore

Funding Source: COSAM

AU Explore is COSAM's annual Open House Day for 5th - 8th graders. Students have the opportunity to experience live animals up close, as well as interact with University faculty and students at the Science and Math EXPOs, Make-n-Take Science Fun Shops and Demo Shows presented by Auburn's finest.

Program Descriptions



Drone Camp

Funding Source: Participant Fees, COSAM

Drone Camp is a week-long camp for rising 7th-9th grade students interested in learning about the world of quadcopters, drones, and UAVs. Participants learned about the basics of flight, the anatomy of a drone, different uses of drones in research and industry, as well as how to program and pilot their drone to fly through an obstacle course designed by the participants.



FLIP Teacher Training

Funding Source: AL Math Science Partnership Grant

The FLIP (Flipped Learning and Instruction in Physics) project aims to support teachers in developing the necessary skills, knowledge and beliefs to effectively implement research based inquiry instruction using flipped/inverted approaches in high school physics courses. The 2-year professional development program, funded by a Math Science Partnership grant from the AL State Department of Education, emphasizes content mastery, pedagogical knowledge and the use of professional learning communities (PLC).



Getting Under The Surface (GUTS)

Funding Source: Participant fees

GUTS is a program for kids in grades 1-6 and their parents or grandparents as lab partners. Each evening session includes dessert followed by a 90-minute science activity featuring a “Getting Under The Surface” theme that focuses on a scientific topic or technique.



Greater East Alabama Regional Science & Eng. Fair

Funding Source: COSAM, Samuel Ginn College of Engineering, & fees

GEARSEF is a regional affiliate fair of the Intel International Science and Engineering Fair (Intel ISEF), the world’s largest international pre-college science competition. ISEF, the premiere science competition in the world, annually provides a forum for millions of students from over 50 countries, regions, and territories to showcase their independent research. GEARSEF hosts 6th– 12th grade projects from 19 Southeast Alabama counties. Two exceptional high school students from GEARSEF advance to the Intel ISEF each May to compete against the top 1,500 students in the world for nearly \$4 million dollars in prizes and scholarships.

Program Descriptions



Pave The Way

Funding Source: AL Math Science Partnership Grant

In order for teachers to teach the new AL content standards successfully with the needed increase in rigor, to incorporate the mathematics practice standards, and to affect student achievement, quality professional development experiences are needed to both deepen content and pedagogical knowledge at all levels of the K-12 spectrum. The Pave The Way teacher training furthers teachers' skills in STEM content and pedagogy at grades 3, 4, and 5 by applying research-based practices and emphasizing project-based learning as an outcome.



Project Lead The Way

Funding Source: Participant fees

Auburn University serves as the Project Lead The Way (PLTW)'s engineering and biomedical sciences affiliate university for the state of Alabama. In this role, Auburn University facilitates the delivery of the PLTW Pathway to Engineering, Biomedical Sciences, Launch, and Gateway to Technology programs by providing professional development through its core training and counselor conferences, as well as college-level recognition, program initiatives, and statewide/regional support and communication. Project Lead The Way at Auburn University is a collaboration between the WISE Institute and the College of Sciences and Mathematics. As COSAM Outreach takes a direct role in the planning and facilitation of the program, a more detailed program description can be found in the following pages.



Science Cafe

Funding Source: COSAM

Science Café is a monthly recurring community outreach night of science, good drinks, tasty sweets, and great conversations. At the AU Science Cafe, participants have the opportunity to sit down and talk about new and exciting science and technology with scientists in our community, all the while relaxing in a great local food and drink venue. The event is free and open to all of the public.



Science Matters

Funding Source: Participant fees

Science Matters is a summer enrichment program for elementary students offering youngsters a supercharged science experience. The program allows participants to explore the world of science through authentic experiments, local field trips, constructive play, technology, art projects, and hands-on, make-n-take activities. Each summer, up to eighteen different one-week courses are designed and taught by master educators in the region.

Program Descriptions



Science Olympiad

Funding Source: COSAM, AU Bookstore

Science Olympiad is a national science competition that is organized as a one-day academic track meet, consisting of up to 23 different competitive events. Each spring, Auburn University hosts two separate Science Olympiad competitions- one for 500+ elementary students and one for 200+ middle school students. Winners from the middle school competition advance to the state competition each April.

Science in Motion

Funding Source: State Department of Education



Alabama Science in Motion (ASIM) is the high school science component of the Alabama Math, Science and Technology Initiative. ASIM is a partnership between universities and high schools in Alabama. The goals of Science in Motion are to provide high-tech laboratory experiences for students and effective professional development for teachers. In many instances the cost of the equipment involved would be prohibitive for individual schools or even systems to acquire. Sharing this equipment through Science in Motion offers equally enriching opportunities to students from different backgrounds and schools.



STEM Discovery Day

Funding Source: STEM-IQ Grant

The objective of STEM Discovery Day was to expose 60 middle and 30 high school students from Lowndes County to STEM and a college campus. This day included two activity sessions followed by a networking luncheon. Our goal was to broaden the students' perspective of what they think is represented by the term "science" and meet college students and role models who are in these disciplines.

SWSM

Funding Source: Sponsorships and Participant Fees

The annual Society of Women in Sciences and Mathematics (SWSM) Symposium and Luncheon offers women at all stages of their careers in science and mathematics the opportunity to network with one another through panel discussions, break-out sessions, career corner, and a luncheon with Keynote address from the Marie W. Wooten Distinguished Speaker.



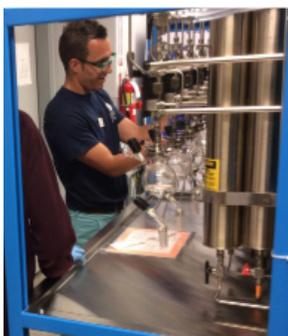
Program Descriptions



STEM-IQ

Funding Source: National Science Foundation Grant

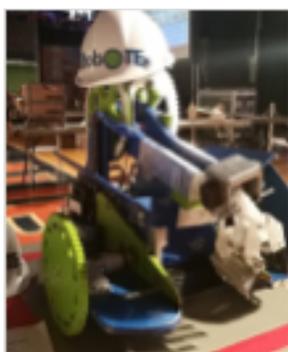
STEM-IQ is a program for middle and high school teachers that focuses on aiding students through the science and engineering fair design process. The program is funded through a National Science Foundation, EPSCoR grant. Participation in this program is by invitation and is limited to school systems interested in participating in AU's regional Science and Engineering Fair.



Summer Science Institute

Funding Source: NSF, SWSM, Physics Department, & COSAM Outreach

The Summer Science Institute at Auburn University is a summer science program for rising 11th-12th grade students with a high aptitude and interest in the fields of science and math. The program partners students with experienced AU Science and Math research faculty to explore topics more advanced than what is typically taught in a public or private high school environment. Students are chosen based upon their academic merit through a rigorous application process.



War Eagle BEST

Funding Source: Sponsorships, COSAM and Samuel Ginn College of Engineering

War Eagle BEST is the local BEST Robotics hub for schools located in East Central Alabama and West Georgia. The program is co-hosted by the College of Sciences and Mathematics and the Samuel Ginn College of Engineering at Auburn University. Each fall ~25 local schools design, build, and program a robot from a kit of raw materials through implementation of the Engineering Design Process. The six-week-long program culminates in a one-day, sports-like competition.



South's BEST

Funding Source: Sponsorships, COSAM and Samuel Ginn College of Engineering

Each December, a crowd of over 3,500 students, teachers, parents, and industry mentors assemble at Auburn University for the Annual South's BEST Regional Robotics Championship. Winners from 16 Southeastern BEST hubs advance to South's BEST, where the "Best of the BEST" compete in two intense days of competition.

Program: High School Auburn Mathematical Puzzle Challenge (AMP'd)

Date: Saturday, January 23 and Saturday, May 7, 2016

Description: Math Puzzle Challenge event for high school students

Facilities: Sciences Center Auditorium, Parker Hall

Personnel:

AU: Josh King, Mary Lou Ewald, Kristen Bond, Teddy Dubose, Khorizon Dunn, Jacob Varner, Hunter Whitten, Erika Dunavant, Dr. Chris Rodger

Non-AU: Eric Harshberger

Student Impact:

Number of Students: 185

Grade Range: 8th-12th

Schools Impacted:

- Baker High School
- Beauregard High School
- Beulah High School
- Brewbaker Technology Magnet School
- Central Educational Center
- East Coweta High School
- Lakeview Christian School
- Lanett High School
- Newnan High School
- Northgate High School
- Opelika High School
- Saint James School
- Smiths Station High School
- Springwood High School
- W. P. Davidson High School



Program: Science Olympiad- Elementary School (Division A2)

Date: Saturday, February 20, 2016

Description: Regional Elementary School Olympiad

Personnel:

AU: Mary Lou Ewald, Kristen Bond, Teddy Dubose, Josh King, Hunter Whitten, Chloe Chaudhury, Jacob Varner, Erika Dunavant, Khorizon Dunn. Students from Tau Beta Pi, AED, NSBE, Honors Serves, CEGS, AOE, SWE, and IEEE.

Non-AU: Science teachers from participating schools

Schools Impacted: Beulah Elementary, Highlands Elementary, W.O. Lance Elementary, Mt. Gap Elementary, Ogletree Elementary, Pick Elementary, Oakgrove Elementary, St. Luke's Episcopal, Auburn Classical Academy, Wrights Mill Rd. Elementary, Yarbrough Elementary, Springwood School, LaFayette Eastside Elementary, Hillcrest Elementary, Montana Street Magnet School, Fairhope Intermediate School, Bagley Elementary School, North Highlands Elementary, Bethel Baptist School, Prattville Christian Academy, and Thompson Intermediate

Total Number of Students: approx. 628

Age Range: 3rd – 6th grade

Facilities: AU Student Center, Parker Hall, Science Center Labs, Science Center Classroom Building, Science Center Auditorium, Student Activities Center



Program: Science Olympiad- Middle School (Division B)

Date: Saturday, February 27, 2016

Description: Regional Middle School Olympiad

Personnel:

- AU: Mary Lou Ewald, Kristen Bond, Erika Dunavant, Jacob Varner, Hunter Whitten, Khorizon Dunn, Chloe Chaudhury, Josh King, Teddy Dubose
- Non-AU: Science teachers from participating schools



Schools Impacted: Admiral Moorer Middle School, Auburn Jr. High School, Baldwin Arts and Academics Magnet School, Brighton Middle School, Beulah High School, JF Drake Middle School, Lee-Scott Academy, Marion Academy, Montgomery Catholic Preparatory School, Saint James School, and Russell County Middle School

Total Number of Students: approx. 245

- Age Range: 6th – 9th grade

Facilities: AU Student Center, Parker Hall, Science Center Labs, Science Center Auditorium, Science Center Classrooms, Petrie Hal

Program: Greater East Alabama Regional Science and Engineering Fair (GEARSEF)**Date:** Thursdays March 3rd (Junior Division) & March 10th (Senior Division), 2016**Description:** Students presented projects from a variety of Science and Engineering fields.**Personnel:**

AU: Mary Lou Ewald, Josh King, Janie Marino, Kristen Bond, Teddy Dubose, Jessica Taylor, Chloe Chaudhury, Jacob Varner, Khorizon Dunn, Hunter Whitten, Erika Dunavant

Judges:**Junior Division**

College of Sciences and Mathematics: Teri Briggs, Antonio Currie, Nicole Garrison, Jessica Gilpin, Curtis Hansen, Rylleigh Harstad, Min Khanal, Lydia Moore, Erin O'Reilly, Furuzan Ozbek, Ph.D., Kay Stone, Michael Tassia, Charmaine Tutson, Matthew Warren, Maya West, Nathan Whelan, Ph.D.

Samuel Ginn College of Engineering: Cindy Anderson, Garon Griffiths, Will Hand, Kelli McCullough, Jeremiah Mitchell, Elise Munz, Matthew Noor

College of Education: Alexis Davis, Ph.D.

Society of Women in Sciences and Mathematics: Stephanie Renuart

WISE Institute: Bonnie Wilson

**Senior Division**

College of Sciences and Mathematics: Shaliah Armstrong, Adriana Avila Flores, Ph.D., Roger Birkhead, Nicole Garrison, Gregory Hartwell, Ph.D., Shawn Jacobsen, Rebecca Koch, Marcelo Kuroda, Ph.D., Allen Landers, Ph.D., Guillaume Laurent, Ph.D., Richard Mariita, Tim Mitchell, Ph.D., Lydia Moore, Cody Rasmussen-Ivey, Elizabeth Schwartz, Ph.D., Christine Sundermann, Ph.D., Haruka Wada, Ph.D., Kat West, Kosala Yapabandara

Samuel Ginn College of Engineering: Majid Beidaghi, Ph.D., Cibele Falkenberg, Ph.D., Garon Griffiths, Will Hand, Jeremiah Mitchell, Matthew Noor, James Radich, Ph.D.

College of Education: Joni Lakin, Ph.D, Bavani Paneerselvam

College of Agriculture: Molli Newman, Ph.D., Sang Wook park, Ph.D.

100 Women Strong: Brittany Wilson

Industry: Clint Baxter, Dana Hickey (Northrop Grumman)

U.S. Air Force: Capt. Michael Brueder

Sponsoring Auburn University Organizations:

Junior Division

College of Sciences and Mathematics Office of the Dean, Mathematics & Statistics Department, Department of Biological Sciences, Geosciences Department, Physics Department, Chemistry & Biochemistry Department, Samuel Ginn College of Engineering Office of the Dean, 100 Women Strong, Society of Hispanic Professional Engineers

Senior Division

College of Sciences and Mathematics Office of the Dean, Samuel Ginn College of Engineering Office of the Dean, Biophysical Society, Dr. Christine Sundermann, Mathematics & Statistics Department, Department of Biological Sciences, Geosciences Department, Physics Department, Chemistry & Biochemistry Department, 100 Women Strong, Society of Hispanic Professional Engineers, Society of Women in Sciences and Mathematics, U.S. Air Force, U.S. Navy, Project Lead the Way

Total Number of Students: 164 students presented 135 projects (top 41 projects advanced to state)

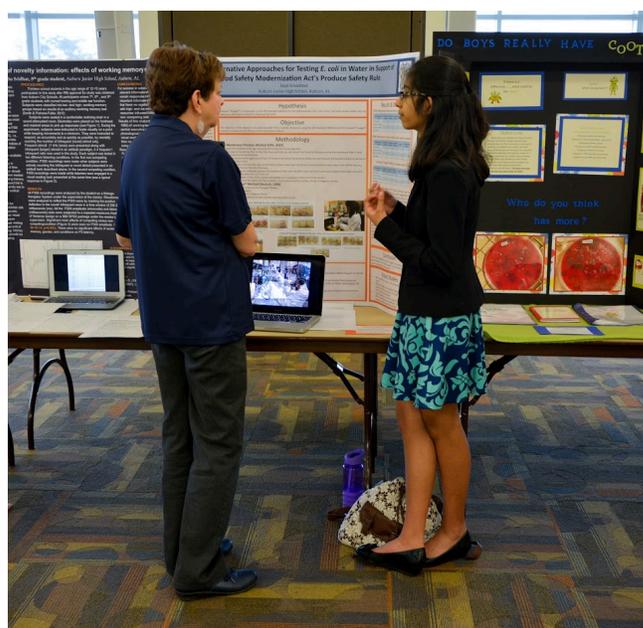
Age Range: 6th-12th grade

Schools Impacted: J.F. Drake Middle School, Auburn Jr. High School, Greenville Middle School, McKenzie High School, Wetumpka Middle School, Eclectic Middle School, Holtville Middle School, Hayneville Middle School, Beverlye Magnet School, Honeysuckle Middle School, Geneva Middle School, Girard Middle School, Carver Magnet School, Opelika Middle School, D.A. Smith Middle School, Phenix City Intermediate School, Auburn High School, Central High School, Evangel Christian Academy, Glenwood School, Lakeview Christian School, Holtville High School, South Montgomery Academy, Stanhope Elmore High School, The Calhoun School, Wetumpka High School

Facilities: AU Student Center

GEARSEF Teacher Training

A one-day training for new teachers to GEARSEF was also provided on September 26, 2016 at the Auburn Chamber of Commerce. Personnel included Mary Lou Ewald, Josh King, Dr. Charles Eick, Janie Marino, and Emily Hardy. 38 teachers from the Greater East Alabama region attended.



Program: Getting Under the Surface (G.U.T.S) – Spring (March)

Date: Tuesday, March 29th, 2016; 6:00 pm - 8:00 pm

Description: Parent/Child teams act as lab partners in a 75-90 minute science activity.

Logistics:

AU Personnel: Josh King, Hunter Whitten, Chloe Josefson, and Wayne Strickland

Non-AU Personnel: Frank Ware and Andrew Click

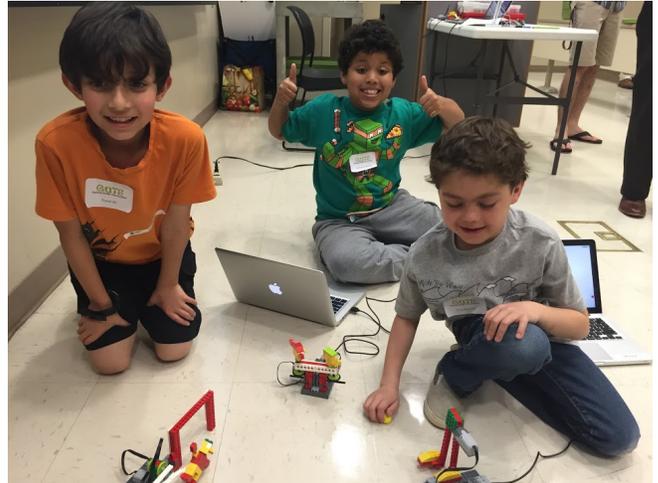
Schools Impacted: N/A

Total Number of Students: 42

Total Number of Parents: 41

Age Range: 1st-6th Grade

Facilities: SCL 231 & 310, SCC 122 & SCC 115

**Course: Kooky Craniums (1st-3rd)**

What makes a “mad” scientist tick? Join us as we explore the mind of mad scientist Minny to learn how the brain builds our understanding of the world around us. Get to go a little wild yourself with hands on activities explaining the basic anatomy of the nervous system, sensory perception of smell and taste, and memory!

Age Range: 1st-3rd grades

Developed by: Chloe Josefson

Number of Students: 10

Average Student Satisfaction Ranking: 4.75 (out of 5)

Average Parent Satisfaction Ranking: 4.63 (out of 5)

Course: Mecha Madness

Who said sports had to be played by humans? Join our Mecha Madness tournament for the chance to design your own robotic soccer match while learning about the design and programming behind your wheels and gears. Get ready for the robotics matchup of the year!

Age Range: 1st-3rd grades

Developed by: Frank Ware

Number of Students: 10)

Student Satisfaction Ranking: 5 (out of 5)

Parent Satisfaction Ranking: 5 (out of 5)

Course: Rollercoaster Rally (4th-6th)

Come make risky twists and breathtaking dips in a mad, mad race to see who can create the fastest and most exhilarating ride! In Rollercoaster Rally you will design and build your own roller coaster and pit your genius designs against the competition. Interested? Then join us at the rally!

Age Range: 4th-6th grades

Developed by: Andrew Click

Number of Students: 11

Average Student Satisfaction Ranking: 5 (out of 5)

Average Parent Satisfaction Ranking: 5 (out of 5)

Course: Trick Shot (4th-6th)

You may know how to dribble, how to pass, but do you really know how to shoot for the goal? Those who join Trick Shot will become masters of trajectory, learning the physics behind how you send something flying! Students will learn about the relationships between size, mass, energy, and trajectory while using catapults. Get ready for some target practice!

Age Range: 4th-6th grades

Developed by: Wayne Strickland

Number of Students: 11

Average Student Satisfaction Ranking: 4.6 (out of 5)

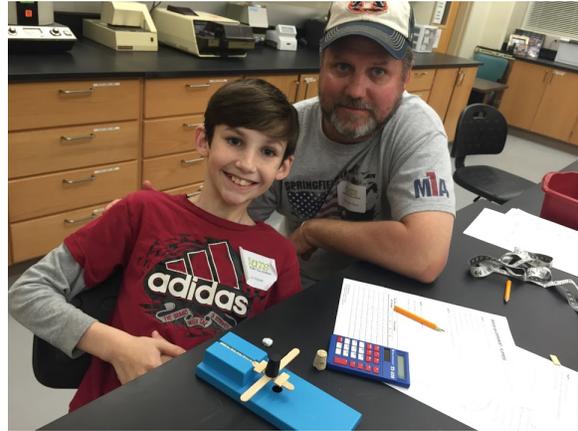
Average Parent Satisfaction Ranking: 4.6 (out of 5)



Program: Getting Under the Surface (G.U.T.S) – Spring (April)**Date:** Monday, April 11, 2016; 6:00 pm - 8:00 pm**Description:** Parent/Child teams act as lab partners in a 75-90 minute science activity.**Logistics:**AU Personnel: Josh King, Kristen Bond, Teddy DuBose, Hunter Whitten, Jacob Varner, Dr. Wendy Hood, Dr. Marsha Kluesing, Kat WestNon-AU Personnel: Andrea Riemer- Wrights Mill ElementarySchools Impacted: N/ATotal Number of Students: 38Total Number of Parents: 37Age Range: 1st-6th GradeFacilities: Chem 151, SCL 231 & 310, SCC 122**Course: Brains vs. Zombies (1st-3rd)**

Brains! Brains! Brains are what you will need to this exciting look at the spreading of infectious diseases. Learn the skills that you would require to survive an outbreak by avoiding contamination. Disclaimer:

No zombies were harmed in the creation of this learning experience.



Road

survive

Age Range: 1st-3rd gradesDeveloped by: Andrea RiemerNumber of Students: 11Average Student Satisfaction Ranking: 4.82 (out of 5)Average Parent Satisfaction Ranking: 4.73 (out of 5)**Course: The GUTS of Blood and Diseases**

Have you ever wondered what's inside your blood? Did you know that red blood cells travel 175 miles during their lifetime in our bodies? In this course, we'll look at white and red blood cells under a microscope, and check out interesting blood disorders. Is it true that a blood disease can cause you to look like a werewolf?! How about a disease that makes red cells look like the Washington Monument? Medical Laboratory Scientists will determine truths vs. myths and share fun facts about what is going on inside your body through interactive matching games and microscope demonstrations. Come join us as we discover the GUTS of Blood and Diseases!

Age Range: 1st-3rd gradesDeveloped by: Kat WestNumber of Students: 10Student Satisfaction Ranking: 4.75 (out of 5)Parent Satisfaction Ranking: 4.25 (out of 5)

Course: Starch Wars: The Force Awakens (4th-6th)

A long time ago, in a galaxy far, far away... the first calorie was born. In modern times, calories have been aligned with forces on both the dark and light sides of the universe. In this course, students will become food Jedi masters by burning food to measure calories, participating in games that show how the body burns through food to fuel growth and activity, and learning to identify and do battle with food from the dark side.

Age Range: 4th-6th grades

Developed by: Dr. Wendy Hood

Number of Students: 9

Average Student Satisfaction Ranking: 4.3 (out of 5)

Average Parent Satisfaction Ranking: 4 (out of 5)

Course: Dangerous Decibels (4th-6th)

How loud is too LOUD? Did you know that significant hearing loss affects 48 million Americans? With the help of scientific tools, students in Dangerous Decibels will become heroes against an invisible danger by learning how to measure sound, understanding decibels, and making models of their own ear. Students will explore sound, the way it travels, and how they can protect their hearing for years to come!

Age Range: 4th-6th grades

Developed by: Dr. Marsha Kluesing

Number of Students: 8

Average Student Satisfaction Ranking: 4.67 (out of 5)

Average Parent Satisfaction Ranking: 5 (out of 5)



Program: AU Explore**Date:** Friday, April 29th, 2016, 8:00 am - 2:00 pm**Description:** Science and Mathematics Open House**Personnel:**

AU: Mary Lou Ewald, Kristen Bond, Erika Dunavant, Jacob Varner, Hunter Whitten, Khori Dunn, Chloe Chaudhury, Teddy Dubose, Josh King

Non-AU: NA

Schools Impacted:

Beulah Elementary	Northside Intermediate School
Brookstone School	Pick Elementary
Calvary Christian School	Portis Homeschool
Clark Homeschool	Smiths Station Junior High School
Discovery Christian	Talladega County Homeschool Coop.
Fields Homeschool	Victory Baptist School
Gadsden Middle School	Wacoochee Elementary School
Lee-Scott Academy	West Forest Intermediate School
Morris Avenue Intermediate	West Smiths Station Elementary

Total Number of Students: approx. 1,100Age Range: 5th- 8th grade**Facilities:** Parker Hall, SCL , Parker Lawn, Amphitheater, SCC, BLC

Natural History Museum EXPO: 9:00 – 12:00 - The Natural History Museum hosted its own Biology EXPO which included a series of interactive displays.

Jon Armbruster

Jason Bond

Les Goertzen

Curtis Hansen

Brian Helms

David Laurencio

Kay Stone

Dave Werneke



Science EXPO: 9:00 – 12:00 - The EXPO is a series of interactive displays. Students browsed the displays at their own pace and were able to see, touch, hear, and smell the many wonders of science and math! Included in the Science EXPO are live animal displays, featuring snakes, lizards, turtles, spiders, insects, and many more fascinating creatures!

Nanette Chadwick
Debbie Folkerts
Ken Halanych
Aaron Rashotte
Ed Thomas
Allen Landers

Science Fun Shops – 9:00 – 2:00 “Science Fun Shops” are short, hands-on mini-courses focused on a particular topic. The courses typically last about 45 minutes with 25- 50 participants.

All About Eyeballs

Instructed by: Bob Lishak
1, 45 minute course
Number of students impacted: 26

Build a Motor

Instructed by: Dave Patrick
7, 45 minute courses
Number of students impacted: 139

Cartesian Diver

Instructed by: Dave Patrick
2, 45 minute courses
Number of Students impacted: 61

Medical Laboratory Science

Instructed by: Kat Milly West
3, 45 minute courses
Number of students impacted: 180

Genes in a Bottle

Instructed by: Mark Liles
1, 45 minute courses
Number of students impacted: 20

Seeing is Believing?

Instructed by: Linda Pastorello
3, 45 minute courses
Number of students impacted: 62

Sensing Our Beautiful Earth



Instructed by: Chandana Mitra
 2, 45 minute courses
 Number of students impacted: 60

Fur, Feathers, & Fins

Instructed by: Matt Kearley
 2, 45 minute courses
 Number of students impacted: 40

Math EXPO- 9:00 – 1:00 - The Math EXPO is an outdoor tent full of interactive math learning activities targeted at the 5th-8th grade ability level.

Andy Owens, Kat Perry (Department of Mathematics and Statistics)
 3, 45 minute sessions
 Number of students impacted: 236

Demo Shows- 9:00 – 2:00

Big Bang – 10:00

Number of students impacted: 221
 Allen Landers (Physics Department)

Dauphin Island Sea Lab – 9:00, 10:00, & 12:00

Number of students impacted: 613
 Rachel McDonald (Dauphin Island Sea Lab)

Glow Show – 9:00 & 1:00

Number of students impacted: 80
 Wei Zhan and Steve Mansoorabadi (Department of Chemistry/Biochemistry)

Physics Show– 11:00

Number of students impacted: 113
 John Gorden and Anne Gorden (Department of Chemistry/Biochemistry)

Wildlife Safari – 9:00, 10:00, 12:00, & 1:00

Number of students impacted: 860
 Katie (Wildlife Safari of Georgia)

Participation by Departments

Biology

Science EXPO (Interactive Displays)

Nanette Chadwick

Debbie Folkerts

Ken Halanych

Aaron Rashotte

Science Fun Shops

All about Eyeballs – Bob Lishak

Genes in A Bottle – Mark Liles

Seeing is Believing? – Linda Pastorello

Natural History Museum EXPO

Jon Armbruster

Jason Bond

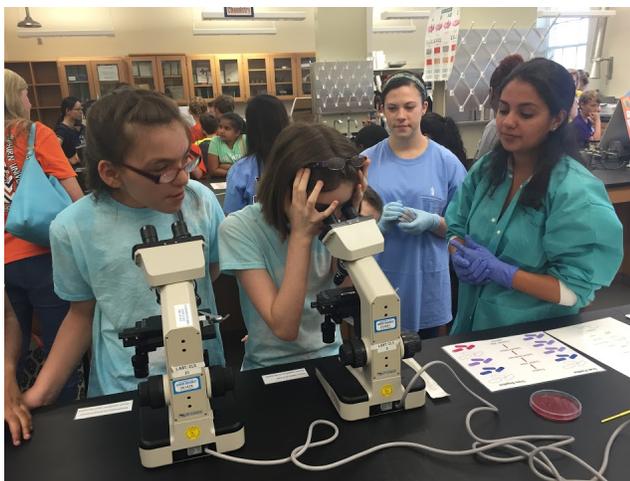
Les Goertzen

Curtis Hansen

Brian Helms

David Laurencio

Kay Stone



Chemistry/Biochemistry

Science Demo Shows

Big Bang – John Gorden and Anne Gorden

Glow Show – Wei Zhan and Steve Mansoorabadi

Science Fun Shops

Medical Lab Sciences - Kat Milly West

Geology and Geography

Science Fun Shops

Sensing Our Beautiful Earth - Chandan Mitra

Math/Statistics

Math EXPO

Andy Owens, Kat Perry (graduate students)

Physics

Science EXPO (Interactive Displays)

Allen Landers and graduate students

Science Fun Shops (Dave Patrick coordinating)

Build a Motor

Cartesian Diver

Outreach (AMSTI/ASIM)

Science Fun Shops

Science Demo Shows

Program: SWSM Women's Leadership Symposium**Date:** Thursday, May 5, 2016, 8:00 AM – 1:30 PM**Description:** High School girls, SWSM supporters, AU faculty, and students attend an annual symposium consisting of a panel discussion, break-out sessions, Career Corner, and luncheon with keynote speaker**Personnel:**

AU: Mary Lou Ewald, Kristen Bond, Teddy Dubose, Josh King, Erika Dunavant, Jacob Varner, Chloe Chaudhury, Hunter Whitten, Khorizon Dunn, Sherri Rowton, Brook Moates, Tammy Hartwell, Leisa Coleman

Facilities: AU Hotel & Conference Center**Total Number of Students:** 114**Age Range:** 9th-12th Grade**Schools Impacted:**

Auburn High School
 Beulah High School
 Childersburg High School
 Daphne High School
 Lanett High School
 Montgomery Catholic Preparatory School
 Notasulga High School
 Opelika High School
 Tallassee High School
 Wetumpka High School

**Panelists:**

Amber Derouen, Edward Via College of Osteopathic Medicine (Auburn Campus)
 Ebony Craig Jackson, Pharmacy
 Amber Holmes, Mathematics and Statistics
 Chloe Chaudhury, Biochemistry

Breakout session leaders:

Amber Derouen, VCOM Auburn Medical Student
 Chloe Chaudhury, Biochemistry
 Dr. Beth Yarbrough, Director of COSAM Student Services
 Krysta Diehl, COSAM Pre-Health Specialist



Career Corner:

- Amy Grilliot (Biology and Microbiology)
- Ashley Hill (Mathematics and Statistics)
- Eleanor Williamson (Physics)
- Goodney Zapp (Geosciences)
- Lauren Palmer (Pre-Health)
- Mary Beth Lloyd (Chemistry and Biochemistry)
- Paige Walton (Geosciences)

Distinguished Speaker: Dr. Cary Gannon – Podiatric Surgeon and Founder, AILA Cosmetics



Program: STEM-IQ Teacher Fellow Workshop

Description: The objective of STEM-IQ, a 5-year National Science Foundation funded initiative, is to advance teachers' motivation and ability to lead science fair projects and to test the hypothesis that improving science fair participation will enhance teachers' ability to lead scientific inquiry and enhance the quality and diversity of the STEM pipeline in Alabama. Specifically, we aim to develop a professional learning community that links Auburn University STEM faculty with 6th – 12th grade students, teachers and administrators, facilitated through the Auburn University College of Sciences and Mathematics Outreach Center. We will use existing science fair infrastructure as a framework to provide teacher professional development and enhance the STEM pipeline for students from Southeastern Alabama.

Project Goals:

- To establish a network of STEM teachers and area administrators that advocate for students to engage in research experiences and give teachers the tools they need for classroom implementation.
- To develop a culture of participation in science and engineering fairs in Southeastern Alabama.
- To increase the number of students from underrepresented groups in rural Alabama participating in high quality, meaningful science and engineering research projects.
- To increase positive student attitudes towards STEM through interactions with university research mentors who serve as role models for the students.
- To build a sustainable relationship between Auburn University and regional public schools.

This year, COSAM Outreach provided two STEM-IQ Fellows workshops – a 2-day workshop for continuing training of our Cohort 1 fellows and a 5-day workshop for our Cohort fellows. The Cohort 1 workshop went deeper into the process of organizing and running a science fair at one's own school, how to get students involved in science fairs, and continuing support on inquiry and science literacy skills. The Cohort 2 workshop provided an overview of the Science Fair system and equipped the Cohort 2 teachers with further skills in project and inquiry based learning, information on how to mentor students on a science fair project, and other key topics.

Date: Wednesday, June 1st – Thursday, June 2nd (Cohort 1) & Monday, June 27th – Friday, July 1st (Cohort 2)

Facilities: AU Sciences Center Laboratory building, AU Sciences Center Classroom building

Personnel:

Mary Lou Ewald (COSAM Outreach), Janie Marino (COSAM Outreach), Josh King (COSAM Outreach), Roger Birkhead (ASIM), Allen Landers (Physics), Virginia Davis (Chemical Engineering), Paul Cobine (Biology), Brian Helms (Biology), Tim Mitchell (Biology), Joni Lakin (College of Education), Ann Johnson (Opelika Middle School), Jacque Middleton (Auburn City Schools)

Impact:

Number of Participants:

- Cohort 1:
 - 15 teachers from the following schools: Auburn Jr. High School, J.F. Drake Middle School, Hayneville Middle School, Lowndes Middle School, Central High School, Opelika Middle School, Opelika High School, Dothan High School, Beverlye Magnet School
- Cohort 2:
 - 17 teachers from the following schools: Auburn High School, Auburn Jr. High School, Carroll High School, Central Freshman Academy, Central High School, Coppinville Jr. High School, D.A. Smith Middle School, Harrand Creek Elementary, Opelika Middle School, Phenix City Intermediate

Program: Flipped Learning and Instruction in Physics (FLIP)

Dates: June 6 – June 9

Facilities: Allison Labs

Description:

The FLIP (Flipped Learning and Instruction in Physics) project aims to support teachers in developing the necessary skills, knowledge and beliefs to effectively implement research based inquiry instruction using flipped/inverted approaches in high school physics courses. The 2-year professional development program, funded by a Math Science Partnership grant from the AL State Department of Education, emphasizes content mastery, pedagogical knowledge and the use of professional learning communities (PLC). One unique feature of the program is the extensive use of online technologies – both to facilitate teacher learning (in physics and pedagogy), as well as support the year-round PLC.

In summer 2016, five physics faculty members (Drs. Fogle, Landers, Kolarkar, Loch, and Chaudhury) developed and taught a 4-day training workshop for 9 high school physics teachers from the central Alabama region.

Personnel:

AU Faculty: Drs. Fogle, Landers, Kolarkar, Chaudhury, and Ross.

Other AU Support: Mary Lou Ewald, Christina Steele, Jacob Varner, TJ Nguyen

Impact:

9 high school physics teachers from the central Alabama region from the following schools:

- Stanhope Elmore High School
- Auburn High School
- Lee-Scott Academy
- St. James School
- Central High School
- Montgomery Catholic Prep School
- Tallassee High School
- Springwood School



Program: Science Matters

Dates:

- Monday, June 6-Friday, June 10; 8:00 AM – 4:00 PM
- Monday, June 13-Friday, June 17; 8:00 AM – 4:00 PM
- Monday, June 20-Friday, June 24; 8:00 AM – 4:00 PM
- Monday, June 27-Friday, July 1; 8:00 AM – 4:00 PM
- Monday, July 18-Friday, July 22; 8:00 AM – 4:00 PM
- Monday, July 25-Friday, July 29; 8:00 AM – 4:00 PM

Facilities: Parker 112, Parker 122, Parker 352, Parker 354, Parker 356, and Natural History Museum

Description: Science Matters is a summer enrichment academy in which elementary and middle school children attend themed weeks filled with experiments, field trips, and make-and-take projects.

Personnel:

- AU: Kristen Bond, Erika Dunavant, Jacob Varner, Khorizon Dunn, Teddy Dubose, Hunter Whitten, Maya Thomas, Kelly Joyner, Britt Cawthon, Emily Dearing, Meredith Kelsoe
- Non-AU: Hannah Jackson, Gina Watkiss, Andrea Reimer, Brittany Duncan, Nicole Engleman, Andrew Click, Whitney Lowry, Shelley Patterson, Kenzie Strickert, Aleesa Zutter, Dr. Bruce Zutter, Tara McAdam, Julie Price, Amy Grilliot, Caroline Starr, Frank Ware

Statistics:

- Total Number of Student Places Filled: 300/360
- Capacity: 83%
- Total Number of Students: 180 students
- Age Range: rising 1st-8th grade

Courses:

Monday, June 6 - Friday, June 10

Investigation: Earth

Instructor: Hannah Jackson

- Grades: 1 – 2
- Total Number of Students: 22

Elements of Surprise

- Instructor: Gina Watkiss
- Grades: 3 – 4
- Total Number of Students: 24

Minute to Win It

- Instructor: Andrea Riemer
- Grades: 5 – 6
- Total Number of Students: 15



Monday, June 13 - Friday, June 17*Animal Kingdom*

- Instructor: Brittany Duncan
- Grades: 1 – 2
- Total Number of Students: 22

Space Odyssey

- Instructor: Nicole Engleman
- Grades: 3 – 4
- Total Number of Students: 24

Amusement Park Adventure

- Instructor: Andrew Click
- Grades: 5 – 6
- Total Number of Students: 24

Back to the Future

- Instructor: Museum Curators
- Grades: 7 – 8
- Total Number of Students: 20

Monday, June 20 - Friday, June 24*Under the Sea*

- Instructor: Whitney Lowry
- Grades: 1 – 2
- Total Number of Students: 22

Double Bubble

- Instructor: Shelley Patterson
- Grades: 3 – 4
- Total Number of Students: 24

Grocery Games

- Instructor: Kenzie Strickert
- Grades: 5 – 6
- Total Number of Students: 19

Back to the Future II

- Instructor: Museum Curators
- Grades: 7 – 8
- Total Number of Students: 20

Monday, June 27 - Friday, July 1*Body Shop*

- Instructor: Aleesa Zutter
- Grades: 1 – 2
- Total Number of Students: 22

Good Things Come in Trees

- Instructor: Dr. Bruce Zutter
- Grades: 3 – 4
- Total Number of Students: 24

Let's Take a Selfie

- Instructor: Tara McAdam



- Grades: 5 – 6
- Total Number of Students: 24

Monday, July 18 - Friday, July 22

I Dig Dinosaurs!

- Instructor: Julie Price
- Grades: 1 – 2
- Total Number of Students: 22

Creepy Crawly Olympics

- Instructor: Andrea Reimer
- Grades: 3 – 4
- Total Number of Students: 24

Circle of Life

- Instructor: Amy Grilliot
- Grades: 5 – 6
- Total Number of Students: 24



Monday, July 25 - Friday, July 29

Natural Wonders

- Instructor: Caroline Starr
- Grades: 1 – 2
- Total Number of Students: 22

The Egg-Stravaganza

- Instructor: Frank Ware
- Grades: 3 – 4
- Total Number of Students: 24

Toying with Physics

- Instructor: Dr. Bruce Zutter
- Grades: 5 – 6
- Total Number of Students: 24



Program: Summer Science Institute Week 1

Support: All expenses are covered for SSI students thanks to support from The Daniel Foundation, National Science Foundation, the AU Physics Department, and the Society for Women in Sciences and Mathematics.

Dates: Sunday, June 12 - Saturday, June 18, 2016 (residential)

Description: This summer science program is open to outstanding 11th-12th grade students interested in science and mathematics and reside in Alabama or Georgia. Spots in the program were limited to 12 (4 females and 8 males) and were granted on an academically competitive basis. During the institute, students engaged with real-world applications and practitioners of science, performed experiments using cutting edge research equipment, and partnered with COSAM researchers to gain lab skills not taught in high school.

Personnel:

Counselors: Chloe Chaudhury (Chemistry and Biochemistry), Jessica Gilpin (Biological Sciences), Ricky Strom (Physics), Jacob Varner (Software and Computer Engineering)

COSAM Faculty and Staff:

Department of Biological Sciences: Dr. Paul Cobine, Shawn Jacobsen, Dr. Mark Liles, Dr. Mary Mendonca

Department of Chemistry and Biochemistry: Dr. Anne Gorden, Dr. John Gorden, Dr. Steve Mansoorabadi, Dr. Konrad Patkowski, Dr. Brad Merner

Department of Mathematics and Statistics: Dr. Chris Rodger

Department of Physics: Dr. Dave Maurer, Dr. Allen Landers, Dr. Uwe Konopka, Dr. Mike Fogle

Additional AU faculty/staff: Mary Lou Ewald (Director of COSAM Outreach), Dr. Nick Giordano (Dean of COSAM), Beth Yarbrough (COSAM Student Services)

Impact:

Total Number of Students: 12 students

Age Range: rising 11th-12th grades

Counties Impacted:

Alabama: Autauga, Calhoun, Elmore, Fayette, Jefferson, Lee, Montgomery, Shelby, Talladega

Georgia: Jackson

Facilities: SCC, SCL, SCA, Chemistry Bldg., Rouse Life Sciences Building, Leach Science Center, Petrie Hall, Parker Hall, Allison Hall, Foy Auditorium

The 2016 Summer Science Institute hosted 12 highly motivated, high achieving students who were chosen to participate by a competitive application process. The students were also selected based on interest in science, mathematics, and Auburn University. The average ACT score of the participants was **31.2**, with a range of 28 to 34. During the first evening of the program, the students completed a short, informational pre-program survey. On the last day of the program, all of the 12 participants responded to a 29 question survey. The following section highlights some of the key results from the surveys.

Survey Results:

Quantitative Results

- **91.67%** of the students indicated they would recommend SSI to a friend.
- **100%** of the students reported they were very satisfied (25%) or extremely satisfied (75%) with their overall experience at SSI.
- **100%** of students reported an increase (41.67%) or great increase (58.33%) in their understanding of how to engage in scientific research after participating in AU-SSI.
- **83.33%** of students reported an increased interest in attending Auburn University because of SSI, with **58.33%** of students indicating they were very or extremely interested.
- **83.33% reported a greater interest in becoming a scientist after participating in SSI.**
- After participating in SSI, **83.33%** reported increased interest in biology, **58.33%** reported increased interest in chemistry, **75%** reported increased interest in mathematics, and **83.33%** reported increased interest in physics.
- After participating in SSI, **91.66%** of students reported an increased awareness and knowledge of careers in biology, chemistry, and physics, and **58.33%** reported an increased awareness and knowledge of careers in mathematics.
- **100%** of the students responded that the iPads contributed positively to their experience in AU-SSI. One student commented, “The use of the iPad was a very positive addition. I learned the most with the application of ideas the classes talked about, especially in computational chemistry where we could see and interact with the molecules.”
- The students rated the most enjoyable academic sessions as the biochemistry (bioluminescence) lab and the microbiology (Gram stain) lab, with average ratings of 4.67 out of 5. The two modules also received high scores in knowledge acquired during the session, 4.42 and 4.58, respectively.
- **91.66%** of the students rated the lunchtime sessions as very or extremely satisfying. These sessions included radioactive chemistry lecture/demo, plasma talk/tour of Leach Science Center, and advising Q&A, all of which received ratings of over 4 out of 5.
- All of the nighttime activities received ratings over 4 out of 5; the most enjoyable evening program was the Science Demo Show outside of the Chemistry Building, with a rating of 4.75 out of 5.

Summer Science Institute Class of 2016

Testimonials from 2016 Week 1

“I thoroughly enjoyed this camp and got a lot of experience I wouldn't have gotten elsewhere.”

“Keep it up. It was very fun and has inspired me to think about becoming a scientist.”

“I enjoyed how relevant it [Molecular Biology DNA Lab] was and that it seemed we were participating in real research.”

“This lab was hard. However, the challenge was fun, and I would not change anything.”

“I started the program thinking that each science was independent of each other, but I ended it understanding that science is actually homogenous and that each different subdivision are related.”



Program: Summer Science Institute Week 2

Support: All expenses are covered for SSI students thanks to support from The Daniel Foundation, National Science Foundation, the AU Physics Department, and the Society for Women in Sciences and Mathematics.

Dates: Sunday, July 24 - Saturday, July 30, 2016 (residential)

Description: This summer science program is open to outstanding 11th-12th grade students interested in science and mathematics and reside in Alabama or Georgia. Spots in the program were limited to 14 (7 females and 7 males) and were granted on an academically competitive basis. During the institute, students engaged with real-world applications and practitioners of science, performed experiments using cutting edge research equipment, and partnered with COSAM researchers to gain lab skills not taught in high school.

Personnel:

Counselors: Kathryn Gill (Physics), Kelly Joyner (Biological Sciences), Ricky Strom (Physics), Jacob Varner (Software Engineering)

COSAM Faculty and Staff:

Department of Biological Sciences: Dr. Paul Cobine, Shawn Jacobsen, Dr. Mary Mendonca, Dr. Aaron Rashotte

Department of Chemistry and Biochemistry: Dr. Anne Gorden, Dr. John Gorden, Dr. Steve Mansoorabadi, Dr. Konrad Patkowski

Department of Geosciences: Dr. Stephanie Shepherd, Dr. Lorraine Wolf

Department of Physics: Dr. Dave Maurer, Dr. Allen Landers, Dr. Mike Fogle

Additional AU faculty/staff: Mary Lou Ewald (Director of COSAM Outreach), Beth Yarbrough (COSAM Student Services)

Impact:

Total Number of Students: 14 students

Age Range: rising 11th-12th grades

Counties Impacted:

Alabama: Autauga, Calhoun, Chambers, Cullman, Elmore, Jefferson, Lee, Mobile, Montgomery, Shelby

Georgia: Coweta, Fulton, Gwinnett

Tennessee: Hamilton

Facilities: SCC, SCL, SCA, Rouse Life Sciences Building, Leach Science Center, Allison Hall, Student Center

The 2016 Summer Science Institute hosted 14 highly motivated, high achieving students who were chosen to participate by a competitive application process. The students were also selected based on interest in science, mathematics, and Auburn University. The average ACT score of the participants was **30.7**, with a range of 28 to 33. During the first evening of the program, the students completed a short, informational pre-program survey. On the last day of the program, all of the 14 participants responded to a 29 question survey. The following section highlights some of the key results from the surveys.

Survey Results:

Quantitative Results

100% of the students indicated they would recommend SSI to a friend.

100% of the students reported they were very satisfied (42.86%) or extremely satisfied (57.14%) with their overall experience at SSI.

100% of students reported an increase (42.86%) or great increase (57.14%) in their understanding of how to engage in scientific research after participating in AU-SSI.

71.43% of students reported an increased interest in attending Auburn University because of SSI, with **63.28%** of students indicating they were very or extremely interested.

92.86% reported a greater interest in becoming a scientist after participating in SSI.

After participating in SSI, **92.86%** reported increased interest in biology, **71.43%** reported increased interest in chemistry, and **57.14%** reported increased interest in physics.

After participating in SSI, **92.86%** of students reported an increased awareness and knowledge of careers in biology and chemistry, and **64.29%** reported an increased awareness and knowledge of careers in geosciences.

100% of the students responded that the iPads contributed positively to their experience in AU-SSI. One student commented, “Visualization of molecules in the chemistry session was very helpful, in that it allowed for a better understanding of what we were studying, and provided a glimpse into what technology is being utilized by those in the 21st century studying science.”

The students rated the most enjoyable academic sessions as the biochemistry (bioluminescence) lab and the math puzzle challenge session, with average ratings of 4.57 and 4.50 out of 5 respectively. The two modules also received high scores in knowledge acquired during the session, 4.64 and 4.36, respectively.

All of the nighttime activities received ratings over 4 out of 5; the most enjoyable evening program was the Science Demo Show outside of the Chemistry Building, with a rating of 4.79 out of 5.

Summer Science Institute Class of 2016

Testimonials from 2016 Week 2

“By far the highlight of my summer! Not only has this opportunity allowed me to learn more about the science field, it has also confirmed that I WILL do something in the science field. BEST, Vex, and some of the other programs I have participated in throughout high school has made my experience unforgettable. I hope I have a chance to pay it forward in the future. The dorm, the campus, the attendees, the activities and especially the counselors/students (specifically Jacob) have made this week so much fun, and has made me reconsider my college choices. I will definitely be looking into Auburn in the future. All in all, this was a great week that everyone should have a chance to participate in the future. Thank you so much for putting this on each year and molding the minds of the future!”

“I found the learning environment to be challenging, but in most cases, not too overwhelming. I have been exposed to several branches of pure science that I did not know existed; this has allowed me to look at more options and identify what I enjoy most.”

“The camp was very fun and beneficial. Mr. Dr. Professor Gordon and Dr. Landers were both exceptional.”

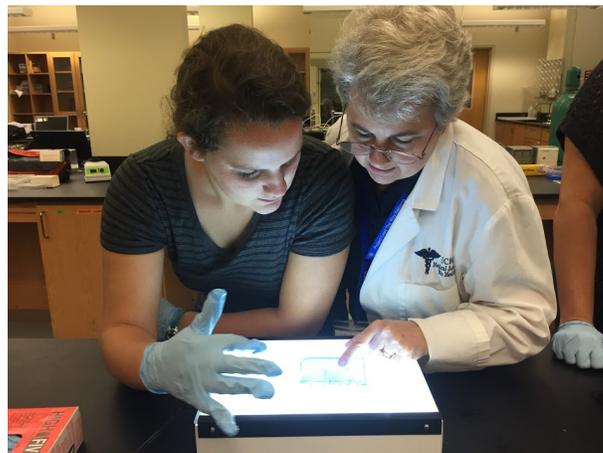


Program: Project Lead the Way Core Training**Dates:** June 6 – July 22**Facilities:** SCA, SCL 102,105, 231, 302, 306, & 310; Opelika High School**Description:**

Project Lead The Way (PLTW) is a non-profit organization that focuses on STEM programs throughout the nation by providing activity-, project-, and problem-based curricula and professional development for STEM educators. By partnering with PLTW, Auburn University was able to facilitate the training of 170 teachers from 20 states across 12 different PLTW courses in 2016. Acting as PLTW's Affiliate University for Engineering, Biomedical Sciences, Gateway, and Launch courses for the state of Alabama, COSAM Outreach and the AU Women in Science and Engineering (WISE) Institute personnel aided in hospitality, lab and classroom resources, staff support, and general facility resources to support instruction.

Courses:

- Gateway Courses
 - Automation and Robotics
 - Medical Detectives
 - Design and Modeling
- Engineering Courses
 - Engineering Design and Development
 - Principles of Engineering
 - Digital Electronics
 - Computer Integrated Manufacturing
 - Introduction to Engineering Design
- Biomedical Sciences Courses
 - Principles of Biomedical Sciences
 - Human Body Systems
 - Medical Interventions
 - Biomedical Innovations

**Personnel:**

AU: Mary Lou Ewald, Bonnie Wilson, Josh King, Teddy Dubose, Dr. Charles Eick, Roger Birkhead, Jacob Varner, Chloe Chaudhury, Madison Hutto

PLTW, Master Teachers, and Others: Shabaka McKey, Melanie Montel, Chris Bond, Jackie Archer, Julie Beck, Shane Clay, Jason Dooley, Bruce Hermes, Ryan Higgins, Jean Langevine, Patrick Lyons, Leah McRae, Jessica Mahlfelt, Matthew Michalke, Andy Northard, Andrea Obryan, Brian Rickard, Devon Stewart, Vicki Walter, Lisa Weier, Charity Woodard, Paul Zurek

Impact:

170 teachers trained from the following schools (states):

Lathrop High School (AK)
 ACMS (AL)
 Admiral Moorer Middle School (AL)
 Albertville Middle School (AL)
 Athens High School (AL)
 Auburn High School (AL)
 Austin High School (AL)
 Autauga County Technology Center (AL)
 Bay Minette Middle (AL)
 Boaz High School (AL)
 Boaz Middle School (AL)
 Brewbaker Technology Magnet High School (AL)
 Brookhaven Middle School (AL)
 Buckhorn High School (AL)
 Central High School of Clay County (AL)
 Chambers Co Career tech Center (AL)
 Chickasaw High School (AL)
 Childersburg High School (AL)
 Clanton Middle School (AL)
 Clark-Shaw Magnet (AL)
 Columbia High School (AL)
 Discovery Middle School (AL)
 Drake Middle School (AL)
 Eastwood Middle (AL)
 Enterprise High School (AL)
 Eufaula High School (AL)
 Fort Payne Middle School (AL)
 Francis Marion High School (AL)
 Gulf Shores High School (AL)
 Hale County College & Career Academy (AL)
 Hartselle Junior High School (AL)
 Hewitt Trussville High School (AL)
 Irondale Middle School (AL)
 John Herbert Phillips Academy (AL)
 Johnson High School (AL)
 Liberty Middle School (AL)
 Madison County Elementary School (AL)
 Mary G. Montgomery High School (AL)
 Murphy High School (AL)
 Muscle Shoals Career Academy (AL)
 New Century Technology High School (AL)
 Nichols Lawson Middle School (AL)
 Oak Mountain High School (AL)
 Opelika High School (AL)
 Opelika Middle School (AL)
 Oxford High School (AL)
 Pelham High School (AL)
 Pike County Schools STEM Academy (AL)
 Pike Road School (AL)
 Prattville Christian Academy (AL)
 Ramsay High School (AL)
 Riverchase Middle School (AL)
 Robert C Hatch High School (AL)
 Satsuma High School (AL)
 Semmes Middle School (AL)
 Sparkman High School (AL)
 Thompson Middle School (AL)
 Westlawn Middle School (AL)
 North Little Rock Middle School (AR)
 El Segundo Unified School District (CA)
 Valley High School (CA)
 Fort Walton Beach High School (FL)
 Lockhart Middle School (FL)
 New Dimensions High School (FL)
 Orlando Science Middle/High School (FL)
 Riviera Preparatory School (FL)
 Effingham College & Career Academy (GA)
 Harrison High School (GA)
 Heritage High School (GA)
 Hightower Trail Middle (GA)
 McIntosh High School (GA)
 Northside High School (GA)
 Sandy Creek High School (GA)
 Westside High School (GA)
 Barrington High School (IL)
 Jessamine Career & Technology Center (KY)
 Christian Brothers School (LA)
 David Thibodaux STEM Magnet Academy (LA)
 Lusher Charter High School (LA)
 St. Pauls School (LA)
 East Central High School (MS)
 Grenada High School (MS)
 Millsaps CTC/Starkville High School (MS)
 Moss Point High School CTE (MS)
 Northwest Rankin High School (MS)
 Ocean Springs Middle School (MS)
 Pascagoula College and Career Technical Institute (MS)
 Vancleave High School (MS)
 Anson High School (NC)
 Cane Creek Middle School (NC)
 Chapel Hill High School (NC)
 Koontz Intermediate (NC)
 Nesbitt Discovery Academy (NC)
 High Technology High School (NJ)
 Four Points Middle School (OK)
 Chartiers Valley High School (PA)
 Lakeland Jr/Sr High school (PA)
 Irmo High School (SC)
 Newberry County School District (SC)
 George S. Mickelson Middle School (SD)
 Christian Brothers High School (TN)
 CD Fulkes Middle School (TX)
 W.C. Akins High School (TX)
 Westwood High School (TX)
 Warhill High School (VA)
 J A Craig High School (WI)

Program: Science in Motion (Teacher Training)

Date: Physics (June 8-17), Chemistry (June 16-25), Biology (June 29 – July 10)

Description: A state funded initiative that provides high-tech laboratory experiences for high school students and effective professional development for teachers. The information here is for the summer teacher workshops which trains teachers on pedagogical techniques and how to use the equipment ASIM provides the schools.

Facilities: SCL 302 and 310, Parker Hall

Personnel:

AU: Roger Birkhead, Dewayne Riddle, Christina Steele, Pam Pearson

Impact:

Number of Teachers: 27

**Program: AP Summer Institute**

Date: June 27 – July 1 & July 11 - 22

Description: Teacher training that prepares high school teachers to teach an Advanced Placement (AP) course

Facilities: SCL 102, 105, 231, and 302; SCC 155; SCA; Allison 306; and Parker Hall

Impact: 242 high school teachers from Alabama

Program: Pave the Way Robotics**Dates:** July 12 – 14 & July 19 - 21**Facilities:** Opelika High School**Description:**

With Alabama's adoption of the College and Career Ready Standards for Mathematics and the adaption of new science standards in Fall, 2016, ongoing support of teacher growth in both content and pedagogy is of the utmost importance. In order for teachers to teach the new content standards successfully for the needed increase in rigor, to incorporate the mathematics practice standards, and to affect student achievement, quality professional development experiences are needed to both deepen content and pedagogical knowledge at all levels of the K-12 spectrum. Science, Technology, Engineering, and Mathematics content and pedagogy will be addressed at grades 3, 4, and 5 by applying research-based practices and emphasizing project-based learning as an outcome.

Personnel:

AU: Mary Lou Ewald, Kristen Bond, Tj Nguyen, Jacob Varner, Frank Ware

AMSTI: Beth Hickman, Seth House, Wayne Strickland

Impact:

44 teachers attended from the following schools in Alabama:

Beauregard Elementary School

Beulah Elementary School

East Smiths Station Elementary School

Loachapoka Elementary School

Morris Avenue Intermediate School

Northside Intermediate School

Sanford Middle School

Wacoochee Elementary School

West Forest Intermediate School

West Smiths Station Elementary School

Program: The Alabama STEM Studio for Afterschool Learning (TASSAL)

Description: COSAM Outreach, in partnership with the College of Education's Department of Curriculum and Teaching and the Truman Pierce Institute, received funding to implement a statewide afterschool STEM training program. TASSAL utilizes a series of hands-on, inquiry based activities that integrate science, technology, engineering and mathematics principles in a fun, non-threatening learning environment. The target audience is afterschool educators located at 21st Century Community Learning Centers (CCLC) in Alabama. In Summer, 2016, we hosted 2 TASSAL workshops focused on integrating robotics into afterschool programs. The teachers used VEX IQ robotics kits to build a robot and were then trained on programming the robot using easyC programming software.

Dates: July 12 – 14 and July 19 - 21

Personnel:

AU: Mary Lou Ewald, Allen Landers, Tj Nguyen, Frank Ware, Seth House, Wayne Strickland

Impact:

Number of Participants: 33

CCLC Sites Impacted: Valley Head High School, City of Andalusia, N.E.S.T., CIRCLES (Choctaw County), Eclectic Middle School, AC Moore, Bridges Afterschool (SAFE), WS Harlan Elementary School, Elsanor Elementary School, Foley Elementary, Wetumpka Middle 21st CCLC, Millbrook Middle 21st CCLC, US Jones Elementary, Wall Street 21st CCLC, and Winfield BOE

Program: Drone Camp**Dates:** July 25 – July 29**Facilities:** Science Center Auditorium**Description:**

Drone Camp is a week-long camp for rising 7th-9th grade students interested in learning about the world of quadcopters, drones, and UAVs. Participants learned about the basics of flight, the anatomy of a drone, different uses of drones in research and industry, as well as how to program and pilot their drone to fly through an obstacle course designed by the participants. The focus of the camp was to introduce the world of drones through the lens of an engineer or scientist in a fun, engaging, and collaborative environment. Drone Camp was hosted by the Southeastern Center of Robotics Education (SCORE), housed in the COSAM Outreach department, in collaboration with the Auburn Aviation Center, the Auburn Airport, the Samuel Ginn College of Engineering, and Alabama 4-H.

Personnel:

AU: Tj Nguyen, Dr. Thad Roppel, Mary Lou Ewald, Mark Jones

Non-AU: Melvin Thompson, Rob Harlan

Impact:

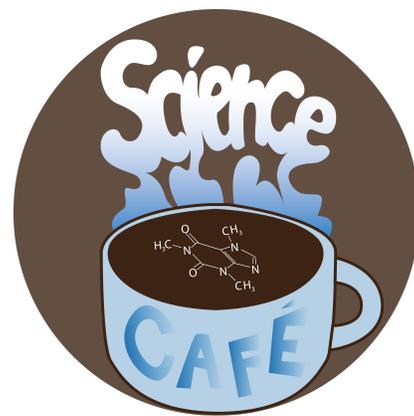
Students participating in the camp were from the following schools:

- Auburn Junior High School
- Discovery Christian School
- Drake Middle School
- Lee-Scott Academy
- New Foundations Academy
- Opelika Middle School
- Sanford Middle School
- Springwood School



Program: Science Café**Date:** Monthly Recurring Program**Description:** Monthly community science presentation and discussion night featuring local scientists**Facilities:** Mama Mocha's Coffee Emporium**Personnel:**AU: Josh King, Erika Dunnivant, Khorizon Dunn, Mary Lou Ewald, and various presenters**Impact:**Total Audience Attendance (6 nights): 312Grade Range: All ages**Presenters:**

- Dr. Paul Cobine – June 28 – “The Pennies Inside of You: Copper Chemistry”
- Dr. Allen Landers – July 26 – “Singing with Electrons”
- Dr. Jon Armbruster – August 23 – “Drones, Fish, & Waterfalls”
- Dr. David Steen – September 27 – “Why I Want Alabama to Have More Snakes”
- Dr. Anne Gorden – October 25 – “Radiation, Energy, & U”
- Rasika Ramesh – November 15 – “The Waters Around Us”



Program: Project Lead The Way (PLTW) Alabama State Conference

Date: November 9 - 10

Facilities: AU Student Center

Description: School counselors, teachers and administrators play a key role in promoting Project Lead The Way to students and parents. To successfully enroll students in appropriate PLTW courses, counselors, teachers and administrators need a solid understanding of the program and the curriculum, especially when students are considering engineering technology or health sciences as a career or have strong aptitude in science and math.



As a state affiliate university, Auburn provides training annually in the form of a State Conference. School districts agree to permit appropriate counselors, teachers and administrators to attend the conference and pay all fees and expenses incurred. Although school districts may encourage all counselors, teachers and administrators to attend the conference at least once, each district is encouraged to send at least one representative to the conference yearly. The 2016 PLTW state conference for teachers, counselors and administrators from Alabama and was co-hosted by COSAM Outreach and the WISE Institute. 32 breakout sessions were offered at the one-day conference.

Personnel:

COSAM Outreach: Mary Lou Ewald, Kristen Bond, Josh King, Charles Eick, Teddy Dubose, Erika Dunavant, Jacob Varner, Khori Dunn, Hannah James, Janie Marino, Frank Ware, TJ Nguyen

WISE Institute: Bonnie Wilson, Stephanie Bickerstaff

Project Lead The Way: Shabaka McKey, William White

Keynote Speaker: Dave Dimmett (PLTW Senior Vice President and Chief Engagement Officer)

Impact:

Number of Participants: Approximately 216 teachers, school administrators, counselors, and other STEM stakeholders

Conference Sessions:

Programs Covered:

- Launch
- Gateway
- Engineering
- Biomedical
- Computer Science
- Administrator/Counselor



Program: Getting Under the Surface (G.U.T.S) - Fall

Date: Thursday, October 27, 2016; 6:00 pm - 8:30 pm

Description: Parent/Child teams act as lab partners in a 75-90 minute science activity.

Logistics:

AU Personnel: Josh King, Hunter Whitten, Erika Dunavant, Dr. Jon Armbruster, Frank Ware, Amber Holmes Kay Stone

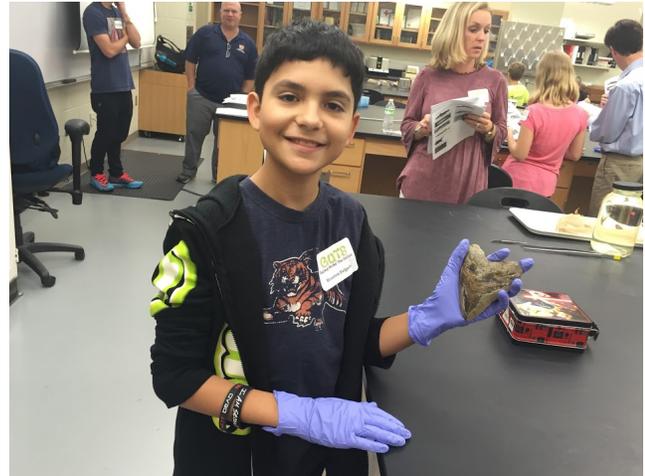
Schools Impacted: N/A

Total Number of Students: 37

Total Number of Parents: 37

Age Range: 1st-6th Grade

Facilities: SCA, SCL 231 & 310, SCC 115



Course: Monsters of the Past

Digging deep under the surface, we will explore monsters from past geologic times. While dinosaurs are best known, learn about other monsters that ruled ancient seas and not so monster-like creatures you can locate right here in Alabama. You will explore Alabama as it existed millions of years ago and even get to “GUTS” of your own bag of “dirt” to find and identify fossils, some of which were collected right here in our home state.

Age Range: 1st-3rd grades

Developed by: Kay Stone

Number of Students: 10

Average Student Satisfaction Ranking: 4.78 (out of 5)

Average Parent Satisfaction Ranking: 4.55 (out of 5)

Course: Daring Detectives

A wrong has been wrought, a crime committed, a dastardly deed done, a victim victimized! Can you crack the case and solve the crime? How good are your powers of observation? Come to our crime scene during GUTS and take your best shot. You’ll need all five of your senses and that sixth sense, intuition, to succeed. You were recommended to us by the FBI, Scotland Yard, and Interpol, so we know you’re up to the task!

Age Range: 1st-3rd grades

Developed by: Frank Ware

Number of Students: 9

Student Satisfaction Ranking: 4.78 (out of 5)

Parent Satisfaction Ranking: 4.67 (out of 5)

Course: Monsters of the Deep

It's a fish eat fish world. What does it take to be the fish that eats other fish? We will examine the bodies of underwater predators to see the different adaptations for catching and consuming prey. Teeth, big mouths, long jaws, lures, and electricity can all contribute to catching prey. We will look at the insides too to see what the guts tell us of the predators of the deeps.

Age Range: 4th-6th grades

Developed by: Dr. Jon Armbruster

Number of Students: 9

Average Student Satisfaction Ranking: 4.33 (out of 5)

Average Parent Satisfaction Ranking: 4.5 (out of 5)

Course: The Terrible Pink Pumpernickel

In the city of Townsville, a horrible and mysterious criminal known only as the "Pink Pumpernickel" is creating chaos. No one knows the Pumpernickel's objectives, but the Pumpernickel has already infected the town's water supply, trapped a family on a cliff, and created all sorts of mischief. Townsville has hired you to catch the Pumpernickel, but it will take your best skills of observation, deduction, logic, and even math to catch this clever criminal! The mayor of Townsville asked for you by name, so we know you can do it!

Age Range: 4th-6th grades

Developed by: Amber Holmes

Number of Students: 9

Average Student Satisfaction Ranking: 4.09 (out of 5)

Average Parent Satisfaction Ranking: 4.45 (out of 5)



Program: Middle School AMP'd**Date:** Saturday, October 29, 2016**Description:** Mathematical Puzzle Challenge**Personnel:**

AU: Kristen Bond, Teddy Dubose, Josh King, Khorizon Dunn, Jacob Varner, Erika Dunavant, Andrew Owens, Katherine Perry, Josh Harrelson, Dr. Jessica McDonald, Amber Holmes, Math Graduate Students

Non-AU: Math/Science/Technology Teachers from participating schools

Facilities: Parker Hall, Science Center Auditorium**Impact:**

Schools: Beulah High School, Central Educational Center, East Coweta Middle School, Evans Middle School, Lee Middle School, Madras Middle School, Montgomery catholic Preparatory School, Opelika Middle School, Sanford Middle School, Smokey Road Middle School

Total Number of Students: approx. 150

Age Range: 7th – 8th grade



Program: War Eagle BEST**Dates:**

Wednesday, August 24th; 2:30 PM – 7:30 PM (Kick Off Day)

Sunday, September 25th; 12:00 – 5:00 PM (Mall Day)

Thursday, October 6th; 12:00 – 5:00 PM (Competition Day)

Saturday, October 8th; 7:00 AM – 5:00 PM (Competition Day)



Description: Middle and high school local robotics program

Personnel:

AU: Mary Lou Ewald, Kristen Bond, Teddy Dubose, Erika Dunavant, Khori Dunn, Garron Griffiths, Hannah James, Josh King, Jessica Taylor, Jenny Jones, Jacob Varner, Hunter Whitten, TJ Nguyen, Frank Ware, Bob Ashurst Mike Fogle and various student volunteers and judges

Non-AU: Barbara Bryan, Pete O'Day, Dan Schnittka, Lucas Hunter, and various judges

Schools Impacted:

Alabama Christian Academy
 Central Educational Center
 Central High School
 Early College Academy/Jordan High School
 Eastwood/Cornerstone School
 Edward Bell Career Technical Center
 Glenwood School
 Holtville Middle School
 LaGrange Academy
 LAMP High School
 Lanett High School
 Lee-Scott Academy
 Millbrook Middle School
 Opelika High School
 Opelika Middle School
 Saint James School
 Sanford Middle School
 Southside Middle School
 Springwood School
 Tallassee High School
 Wetumpka High School

Total Number of Students: approx. 500 **Age Range:** 5th – 12th grade

Bet the Farm Storyline

For the last 155 years, BLT Farms, Inc. have done things the old-fashioned way on their family farm. Horse-drawn plows slowly gave way to tractors and combines. BLT Farms has always been an early adopter of new technology, but not much has really changed for the small family farmer recently. The Bread's four children have all gone away to college and come home with some new ideas about the future of their family farm including hydroponics and using robots on the farm. Their ideas are not the same, and arguments between the siblings has caused a ruckus on the homestead. To add to the problem, there's been a bit of a drought lately and water is scarce.

To determine what to do in terms of technology implementation on the farm, the Breads are seeking input from your Company to: **Plant corn seeds, harvest and deliver ripe corn, harvest and deliver hydroponic lettuce, corral and secure loose pigs and feed them, and turn on water valves.**



BEST Award Winners

- 1st Place: Wetumpka High School*
- 2nd Place: Eastwood/Cornerstone School*
- 3rd Place: Saint James School*
- 4th Place: Opelika High School*

Game Winners

- 1st Place Robotics: Eastwood/Cornerstone Schools*
- 2nd Place Robotics: Wetumpka High School*
- 3rd Place Robotics: Tallassee High School*
- 4th Place Robotics (finalist): Southside Middle School

*Advanced to South's BEST Regional Competition

Facilities: AU Student ACT, AU Student Center, Auburn Mall, and Opelika High School

Sponsors of the Program:

AO Tourism Bureau
 Auburn University Outreach
 Boeing
 Brasfield & Gorrie
 Briggs & Stratton
 Donaldson Company Foundation
 Hyundai Motor Manufacturing AL
 Southern Company
 Visual Edge



Program: Robotics Merit Badge Day**Dates:** October 29**Facilities:** Auburn University Science Center Classroom 115**Description:**

Robotics Merit Badge Day was an opportunity for local Boy Scouts to fulfill the requirements for the Robotics Merit Badge Day. The Scouts researched different types of robots, competitions, safety procedures, and careers in robotics in addition to building, programming and designing robots for a game created by SCORE staff called Entropy. Students worked in pairs during the design, build, and competition stages of the day.

Personnel:

AU: Tj Nguyen, Frank Ware

Impact:

17 scouts participating in the camp were from Boy Scout Troops in Auburn, Tuskegee, and Columbus, Georgia.



Program: STEM Discovery Day

Description: The objective of STEM Discovery Day was to expose 60 middle and 30 high school students from Lowndes County to STEM and a college campus on November 8th, 2016. This day included two activity sessions followed by a networking luncheon. The first 1 hr and 15 min session was an open house style format for both middle and high school students to move through a variety of hands on stations that included activities from a variety of different disciplines of science. Chemistry, engineering, robotics, biology and physics disciplines were represented. Our goal was to broaden the students' perspective of what they think is represented by the term "science" and meet college students and role models who are in these disciplines. During the second session, High School students went on Cupola tours of engineering while Middle School students participated in a three-station live animal demonstration show from the Natural History Museum. The program concluded with a luncheon with guest speakers from Auburn University's Diversity department, Engineering, and Physics. The Center for Educational Outreach and Engagement and NSF funded STEM-IQ grant cosponsored the luncheon as well as the complimentary participant t-shirts.

Project Goals:

- To increase exposure of STEM and a college campus to Lowndes county students
- To create excitement for science and engineering, in hopes of sparking ideas for science fair projects
- To provide college and faculty role models for students

Date: Tuesday, November 8, 2016
(9:00am-1:30pm)



Facilities: Shelby Engineering Building Atrium and Kingsley Courtyard

Personnel:

Mary Lou Ewald (COSAM Outreach), Janie Marino (COSAM Outreach), Emily Hardy (COSAM Outreach), Josh King (COSAM Outreach), Allen Land ers (Physics), Virginia Davis (Chemical Engineering), Paul Cobine (Biology), Haruka Wada (Biology) Brian Helms (Biology), Tim Mitchell (Biology), Natural History Museum Outreach Staff, Cordelia Brown (Engineering), Ed Thomas (Physics), Kimberly Mulligan (Office of Diversity), Tanja Redd (Center for Educational Outreach and Engagement), 58 graduate and undergraduate volunteers representing SHPE, Honors General Chemistry, Tau Beta Pi, AED, GWIS, AWIS, PLU, Pi Tau Sigma, COSAM, and Engineering and Cupola Student Tour Guides.

Impact:Number of Participants:

- 30 Lowndes Middle School, 30 Hayneville Middle School and 30 Central High School students, 3 classroom teachers and 6 parent/staff chaperones
- Quote, Lester Turk (teacher): “The discovery day was great for my students, they discussed it on the ride back saying how much they learned and how much fun they had at each station that was set up for them. I now have other students saying that they wish they could have went on the trip to the university. The entire trip was very beneficial... If an opportunity presents itself, I would love to have the chance to bring different students. Tell everyone that made this happen that I say thank's”



Program: SCORE On the Road

Sanford Middle School STEM Days

Dates: October 20 – October 21

Facilities: Sanford Middle School gymnasium and technology lab

Description:

STEM Days are an annual event organized at Sanford Middle School to expose students to different STEM careers. Students rotate through the various activities. The Southeastern Center of Robotics Education (SCORE) provided two activities at the event. Tj Nguyen led the students through a drone obstacle course and discussed drone safety and career paths. Frank Ware discussed different robot systems with students and the students competed against each other in FreezeTag, a VEX IQ game developed and programmed by SCORE.

Personnel:

AU: Tj Nguyen, Frank Ware

Impact:

Sanford Middle School is in the Lee County, Alabama school system. All students in Sanford Middle School (grades 5-8) participated in STEM day. Approximately 400 students and 30 adults rotated through each of the two stations.



Montgomery Academy Lower School STEAMfest

Dates: November 5

Facilities: Montgomery Academy Campus

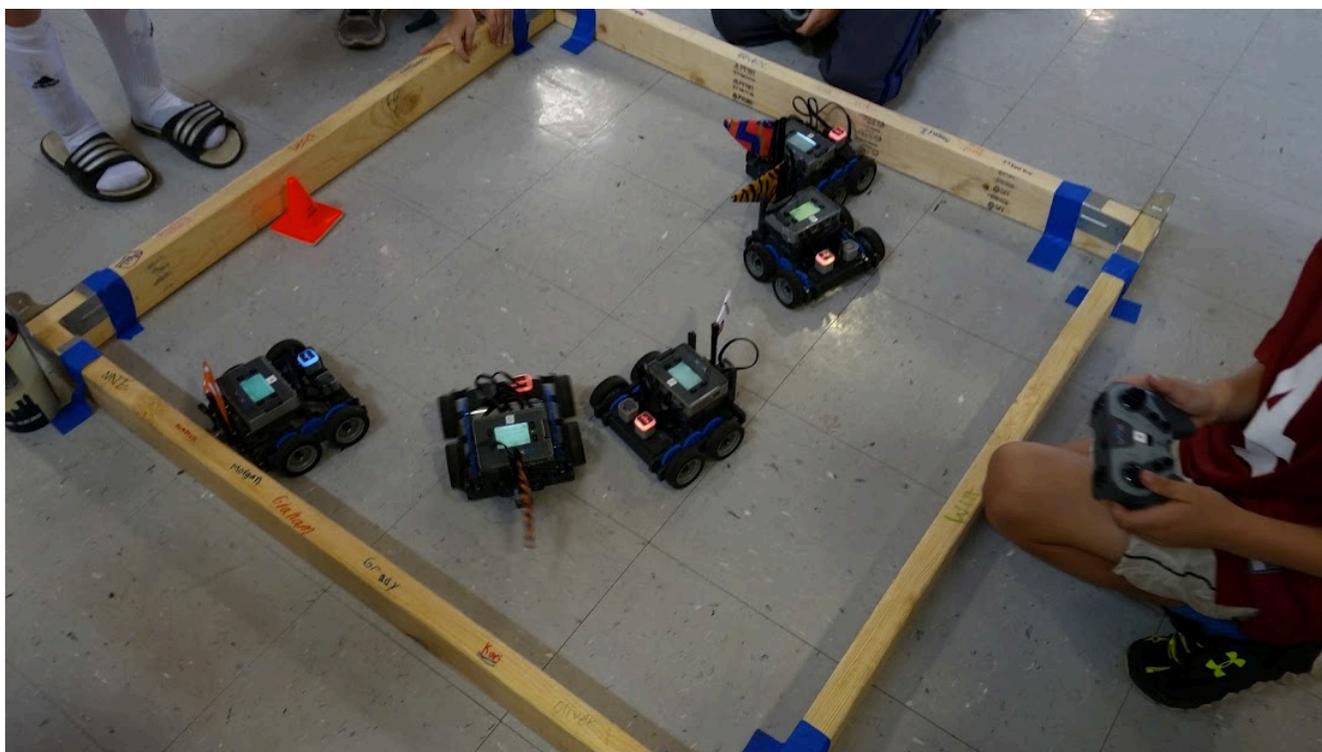
Description: Montgomery Academy organized a STEAMfest for the local community to showcase different careers and activities that relate to science, technology, engineering, art, or science. During this three-hour event, students rotated at their own pace through the SCORE table. Two robotic events, FreezeTag and Ike Drive were operated simultaneously. Students had the opportunity to play with different types of robots and learn more about the SCORE mission and programs offered.

Personnel:

AU: Frank Ware

Impact:

Montgomery Academy Lower School is a private school in Montgomery, Alabama serving grades k-4. Approximately 135 students rotated through the SCORE activity.



Moss Rock Preserve Festival

Dates: November 5 – November 6

Facilities: Ross Mock Preserve (outdoor event)

Description: During this annual two-day event, at the Ross Moss preserve, thousands of attendees of all ages explore nature, art, and design through various activities and presentations. SCORE promoted STEM education by interacting with children and families passing through the booth. Children and adults alike had the chance to play with VEX IQ robots by playing the SCORE favorite, FreezeTag. They also explored their artistic side by creating art for our Ozobots to follow. They also experimented with programming using markers.

Personnel:

AU: TJ Nguyen

Impact:

Moss Rock Preserve Festival in Hoover, Alabama welcomes 12,000 visitors annually to explore Nature, Art+Design, and SmartLIVING themes.



Program: South's BEST Robotics Championship

Date: Friday, December 2nd; 3:00 – 7:00 PM (Team Registration and Hub Council Meeting)
 Saturday, December 3rd; 8:00 AM – 7:15 PM (Competition Day)
 Sunday, December 4th; 8:00 AM – 5:00 PM (Competition Day)

Description: Middle and high school regional robotics championship program for winning teams from 16 BEST hubs across the south

Personnel:

- **AU:** Mary Lou Ewald, Kristen Bond, Jessica Taylor, Garon Griffiths, Teddy Dubose, Josh King, Erika Dunavant, Khori Dunn, Jacob Varner, TJ Nguyen, Hunter Whitten, Hannah James, Hunter Terry, Frank Ware, Bonnie Wilson, and various student volunteers and judges
- **Non-AU:** Lucas Hunter (Head Ref), Pete O'Day (Field Construction), Dan Schnittka (Technical Director), Matt Schuster (Production Manager), Science teachers from participating schools

Total Number of Students: approx. 2,000

- **Age Range:** 1st – 12th grade
- **Facilities:** AU Student Center, Wiggins Hall, SCC, SCL, SCA, and the AU Beard-Eaves Memorial Coliseum

Schools Impacted (Hub Affiliation):

School Name	Hub
Academy for Science and	Tennessee
Bankhead Middle School	Bevill
Brooks High School	Northwest
Central Magnet School	Music City
Clarke Preparatory School	River
Cottonwood High School	Wiregrass
Covenant Christian School	Northwest
Creekside Academy	Northwest
D.A.R.T.	Music City
DARC	Tennessee
East Rankin Academy	Mississippi
Eastwood/Cornerstone School	War Eagle
Episcopal Day School	Central
Evangel Christian School	Selma
Fairview High School	North
Faith Academy	Jubilee
Fyffe High School	Northeast
Good Hope Middle School	North
Gulf Breeze High School	Emerald
Lauderdale County High	Northwest
LIGHT Robotics	Northeast
MACH Robotics	Jubilee
Martin Middle School	Selma
McNairy Central High School	Mississippi
MHMS Robotics	Music City
Moulton Middle/Lawrence	Northwest
North Cobb Christian School	Georgia
Oak Mountain High School	Central
Opelika High School	War Eagle
School Name	Hub

Opifex	Shelton State
Oxford High School	Central
Pace High School	Emerald
Piedmont Academy	Georgia
Prince of Peace Catholic	Shelton State
Ridgecrest Christian School	Wiregrass
Saint James School	War Eagle
Saraland Middle School	Jubilee
SCHE	Mississippi
Seaside Neighborhood School	Emerald
Selma High School	Selma
South Forsyth High School	Georgia
Spain Park High School	North
St. Benedict of Auburndale	Mississippi
St. Luke's Episcopal School	Jubilee
St. Vincent de Paul Catholic	Jubilee
Starkville High School	Mississippi
Sweet Water High School	Shelton State
Talladega Career Tech Center	Jubilee
Tallasse High School	War Eagle
Thomasville High School	River
Thomasville Middle School	River
Tuscaloosa Christian School	Shelton State
W.P. Davidson High School	Jubilee
Wetumpka High School	War Eagle
Wheeler High School	Georgia
Wicksburg High School	Wiregrass
Winfield Middle School	Bevill
Woodlawn Beach Middle	Emerald



- Program Sponsors:**
- Auburn and Opelika Tourism Bureau
 - Auburn University Outreach
 - Boeing
 - Brasfield & Gorrie General Contractors
 - Briggs & Stratton
 - Donaldson Filtration Solutions
 - Hyundai Motor Manufacturing AL
 - Little Italy Pizza Auburn
 - Marco's Pizza
 - Moe's Original Barbeque
 - Panera Bread
 - S²P Sound Source Productions
 - Southern Company
 - Tennessee Valley BEST
 - Towne Place Suites Marriott
 - Visual Edge Robotics

- BEST Award Winners**
- 1st Place: W.P. Davidson High School (Jubilee BEST)
 - 2nd Place: Brooks High School (Northwest Alabama BEST)
 - 3rd Place: DARC (Tennessee Valley BEST)
- Game Winners**
- 1st Place: DARC (Tennessee Valley BEST)
 - 2nd Place: Evangel Christian School (Selma BEST)
 - 3rd Place: MHMS (Music City BEST)
 - Finalist: Oak Mountain High School (Central Alabama BEST)

South's BEST 2016 Steering Team**Director & Awards/Judging Coordinator**

Mary Lou Ewald

Awards/Judging Assistant

Emily Hardy

EmceeJay Knorr
Allen Landers**Field Management**

Pete O'Day

Floor Boss

Beth Patrick

Floor Manager

Garon Griffiths

Graphic Design

Khorizon Dunn

Head JudgesBob Ashurst
Mike Fogle**Head Referees**Tj Nguyen
Luke Hunter**Head Field Referees**Tawnya Gilbertson
Vaughn Nichols
Mark Rose**Hospitality**Josh King
Janie Marino**Pit Boss and Technical Director**

Dan Schnittka

Photography

Barbara Bryan

Production Manager

Matt Schuster

Registration and SalesTeddy Dubose
Jessica Taylor**Head Scorekeeper & Webmaster**

Jacob Varner

Signage and StagingHunter Whitten
Danny Coleman**Team Advocates**Sid Stubbs
Eleson Tanton
Nancy Therrien**Team Coordinator**

Kristen Bond

Video Production/Coordination

Greg Ruff

Volunteer Coordinator

Erika Dunavant

WISE Luncheon Coordinator

Bonnie Wilson

South's BEST 2016 Represented Hubs

Bevill BEST

Bevill State Community College (Sumiton, Alabama)

Northeast Alabama BEST

Northeast Alabama Community College (Rainsville, Alabama)

Central Alabama BEST

Central Alabama Community College (Talladega, Alabama)

Northwest Alabama BEST

Northwest Shoals Community College (Muscle Shoals, Alabama)

Emerald Coast BEST

University of West Florida (Pensacola, Florida)

River BEST

Thomasville, AL

Georgia BEST

Southern Polytechnic State University (Marietta, Georgia)

Selma BEST

Wallace Community College (Selma, AL)

Jubilee BEST

Mobile, Alabama

Shelton State BEST

Shelton State Community College (Tuscaloosa, AL)

Mississippi BEST

Mississippi State University (Starkville, Mississippi)

Tennessee Valley BEST

Calhoun Community College (Decatur, Alabama)

Music City BEST

Lipscomb University (Nashville, Tennessee)

War Eagle BEST

Auburn University (Auburn, Alabama)

North Alabama BEST

Wallace State Community College (Hanceville, Alabama)

Wiregrass BEST

Dothan, Alabama

2016 South's BEST Student Survey Summary

Introduction

The 2016 South's BEST Robotics Championship Competition was held December 3-4 at the Beard Eaves Memorial Coliseum on the campus of Auburn University.

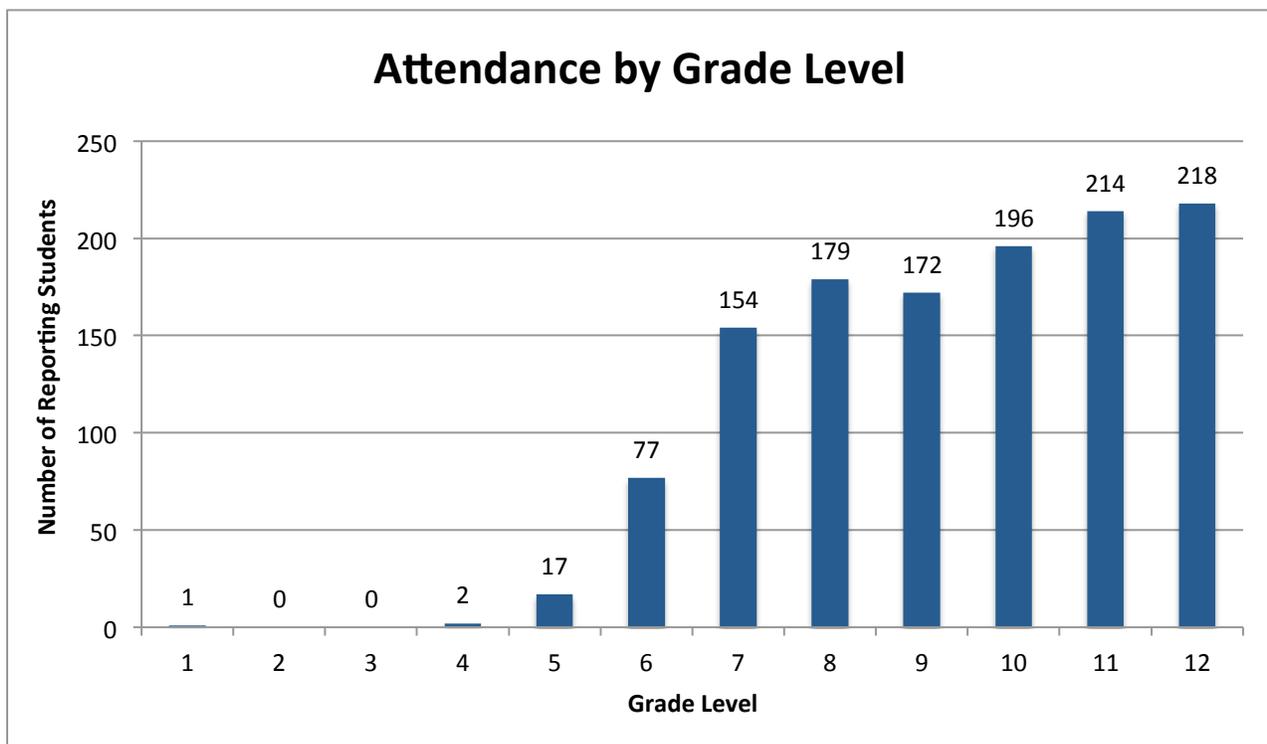
58 teams from five states were in attendance, with 40 of the teams (69%) from Alabama. The other represented states included Georgia, Florida, Mississippi, and Tennessee.

A total of 1,253 students in attendance at the event completed a brief one-page survey. Student surveys were a requirement of team participation in the event, but did not necessarily represent all team members and visitors.

Grade Level

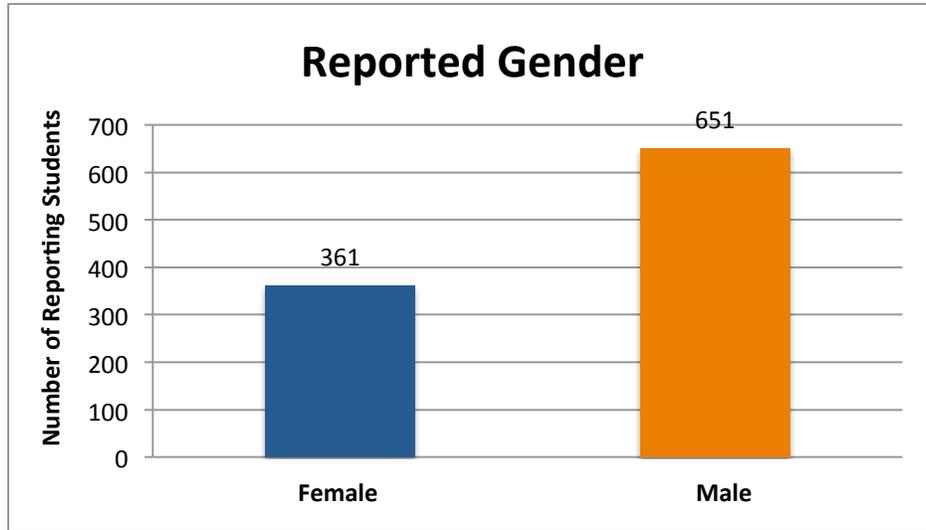
Of the 1,253 students who completed surveys, 1,230 provided their grade level. *Middle school students* (5th-8th grade) accounted for 427 (35%) of reporting students, while *high school students* (9th – 12th grade) accounted for 800 (65%) of reporting students.

The graph below shows the number of reporting students in each grade level 1st through 12th.



Gender

Of the 1,253 completed surveys, 1,012 students provided their gender. 361 (36% of reporting students) were *female* and 651 (64% of reporting students) were *male*, shown in the graph below.

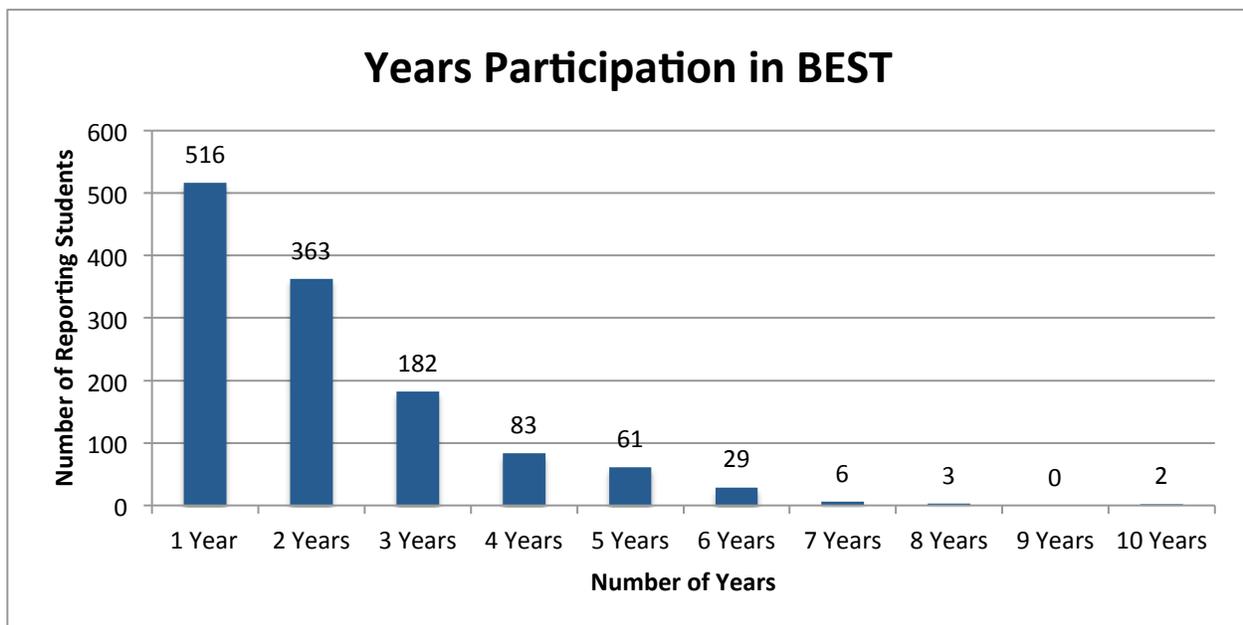


Years in the Program

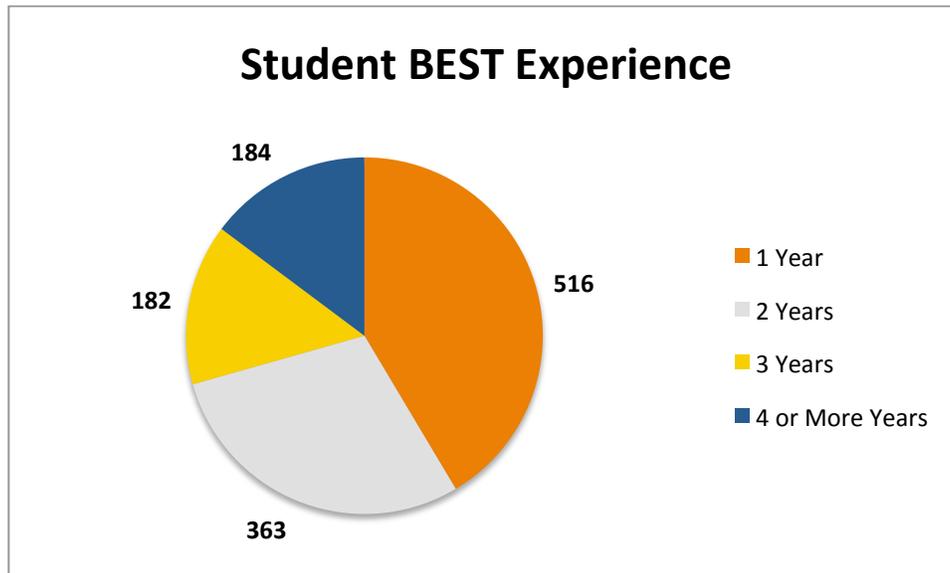
A total of 1,245 students provided the number of years they've participated in BEST.

There were 516 *first-year students*, accounting for 41.4% of reporting students; 363 *second-year students*, accounting for 29.2% of reporting students; 182 *third-year students*, accounting for 14.6% of reporting students; and 184 students who have participated for *four or more years*, accounting for 14.8% of reporting students. The longest reported participation was 10 years.

The graph below shows the numbers of years that reporting students have participated in BEST.

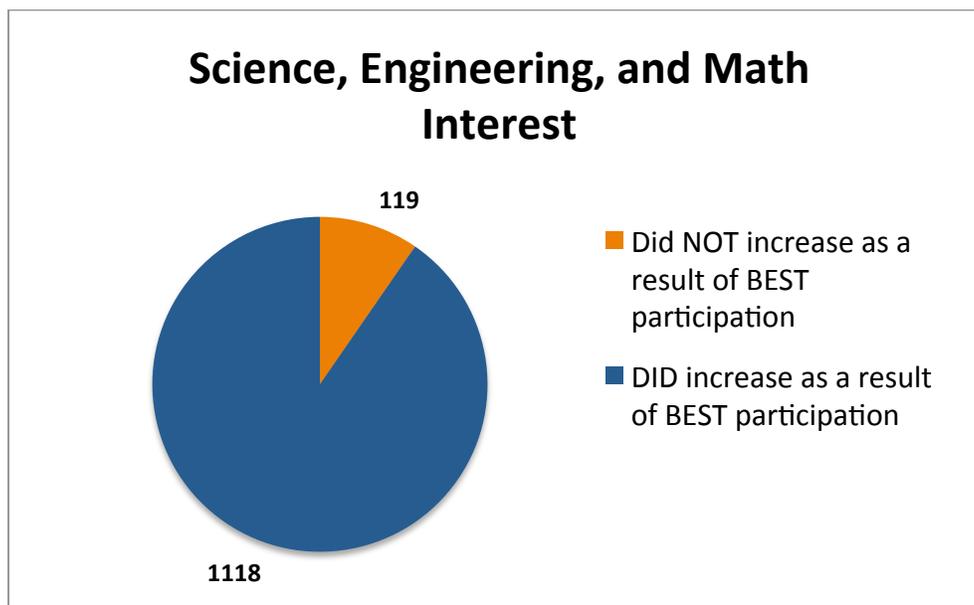


As the BEST program continues to grow yearly, new teams and competition sites are added, attracting new groups of students. These data show the innovation and competitive spirit of first-year teams and participants, as almost half of competitors are new to the program, seen more clearly in the graph below.



Increased Interest in Science, Engineering, and Mathematics

Of the 1,253 completed surveys, 1,237 responded to a question regarding their interest in science, engineering, and mathematics fields *as a direct result* of their participation in BEST. A majority of students reported an increase in interest, shown in the graph below. 1,118 (89.2%) expressed an *increased interest* in math, science, and/or engineering because of their participation in BEST, while 119 (9.5%) expressed *no such increase*. It is worth noting that one student reported an *increased interest in business* as a direct result of BEST participation.



Plans to Attend College Among All Students

Of the 1,253 completed surveys, 1,244 students responded to a question regarding intent to attend college/university. 29 students (2.3%) reported that they were *not planning to attend college*, while 1,215 (97.7%) reported that they were *planning to attend* (98%).

Of those who did not plan to attend college, seven were *female*, 16 were *male*, and six *did not report their gender*. The majority of these students indicated that they did not plan to attend college due to specific reasons, some of which include *lack of interest, lack of money, plans to get a job that do not require college/university education, and/or plans to enter technical/vocational school*.

As stated before, 1,215 students indicated that they intend to attend a college or university. Of these 1,215 students, 779 (64%) were *high school students*. 69 students overall (5.7% of all responding students intending to attend college/university) were *undecided* on a specific college/university. 42 high school students (5.4% of responding high school students intending to attend a college/university) were also *undecided* on a specific college/university.

Of the 779 high school students who plan to attend a college or university, there were 609 students who indicated which school(s) they were interested in attending. There was no limit to the number of schools a student could list, and most students who indicated at least one school listed 1-3 preferred colleges or universities. The following were listed as primary schools of interest:

Auburn Univ. – 22.0%	UAH – 3.5%	Vanderbilt Univ. – 1.4%
Univ. Alabama – 11.2%	Univ. South Alabama – 2.5%	Florida State Univ. – 1.4%
Mississippi State – 6.3%	Univ. North Alabama – 2.4%	Harvard Univ. – 1.3%
Georgia Tech – 4.5%	Troy Univ. – 2.2%	Univ. of Mississippi – 1.3%
MIT – 3.6%	Univ. TN Knoxville – 1.5%	Tennessee Tech – 1.2%

The other indicated schools were listed very infrequently, each less than 1% of the total number of colleges indicated.

Field of Study Interest Among All Students

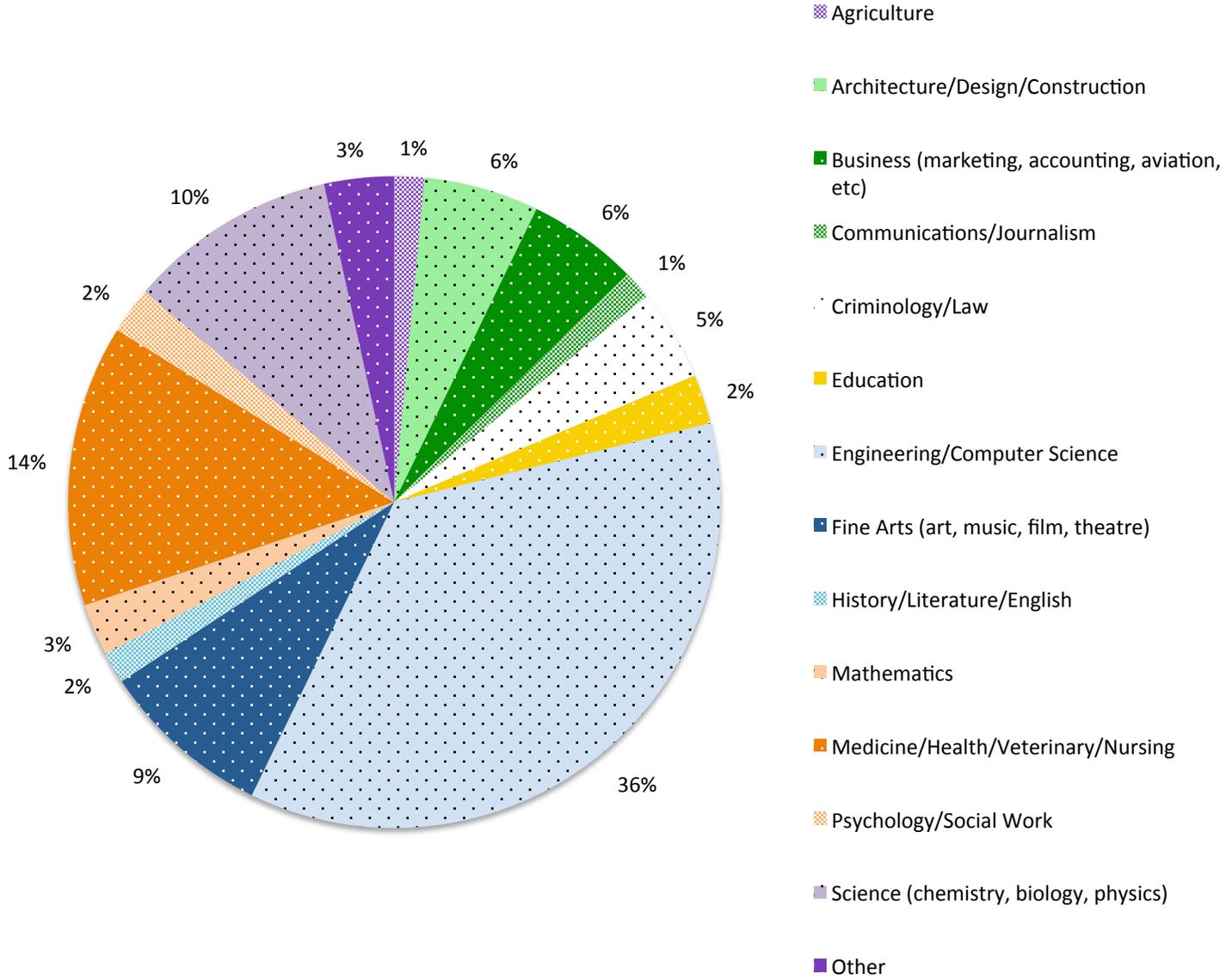
There were thirteen available fields of study and an “other” write-in option for students to choose from. As students were allowed to select one or more fields, the data below represents the frequency of occurrence for the intended fields of study.

Of the 1,215 students who indicated intent to attend college, 69 students (5.7%) reported that their intended field of study was *Undecided*.

The most commonly indicated field was Engineering/Computer Science, which accounted for 43.8% of student interest. Sciences and Mathematics (including health and medical related fields) accounted for 32.7% of fields indicated by students. 4.2% of students indicated *Other* as their intended field of study with write-in responses that included vocational specialties, theology, sports, game design, political science, and more.

The overall response breakdown (aside from *Undecided*) can be seen in the following graph.

Intended Fields of Study of All Reporting Students



Field of Study Interest Among High School Students

As stated previously, 29 students said they had no plans of attending college, 18 of which reported being in high school. 779 high school students responded with intentions to attend college/university.

42 (5.4%) of high school students intending to attend college/university reported that their intended field of study was *Undecided*. **The most commonly indicated field was Engineering/Computer Science, which accounted for 47.0% of student interest. Sciences and Mathematics (including health and medical related fields) accounted for 29.4% of fields indicated by students.** 5.0% of high school students reporting intentions to attend college/university reported their intended field of study as *Other*.

The following chart represents the overall response breakdown of high school students interested in attending college/university (aside from *Undecided*):

Field of Study	Percentage of High School Students That Chose Each Field
Agriculture	1.7%
Architecture/Design/Construction	5.0%
Business (marketing, accounting, aviation, etc.)	6.8%
Communications/Journalism	1.8%
Criminology/Law	4.9%
Education	2.6%
Engineering/Computer Science	47.0%
Fine Arts (art, music, film, theatre)	8.7%
History/Literature/English	1.7%
Mathematics	2.3%
Medicine/Health/Veterinary/Nursing	15.3%
Psychology/Social Work	3.6%
Science (chemistry, biology, physics)	11.8%
Other	5.0%



Student Survey 2016

Name: _____ City/State: _____

School: _____ Grade: _____ Gender: Female Male

1.) Do you intend/want to go to college?

- Yes
- No

If so, where would you like to attend? _____

What field of study do you plan to major in?

- | | |
|--|--|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Fine Arts (art, music, film, theatre) |
| <input type="checkbox"/> Architecture/ Design/ Construction | <input type="checkbox"/> History/ Literature/ English |
| <input type="checkbox"/> Business (marketing, accounting, aviation, etc) | <input type="checkbox"/> Mathematics |
| <input type="checkbox"/> Communications/ Journalism | <input type="checkbox"/> Medicine/ Health/ Veterinary/ Nursing |
| <input type="checkbox"/> Criminology / Law | <input type="checkbox"/> Psychology/ Social Work |
| <input type="checkbox"/> Education | <input type="checkbox"/> Science (chemistry, biology, physics) |
| <input type="checkbox"/> Engineering/ Computer Science | <input type="checkbox"/> Other: _____ |

2.) If you are NOT planning to attend college, why not?

- | | |
|--|---|
| <input type="checkbox"/> I have no interest in attending college | <input type="checkbox"/> I can't afford to attend college |
| <input type="checkbox"/> I plan to get a job | <input type="checkbox"/> Other: _____ |

3.) Has participating in the BEST Program increased your interest in the fields of math, science, and/or engineering?

- Yes
- No

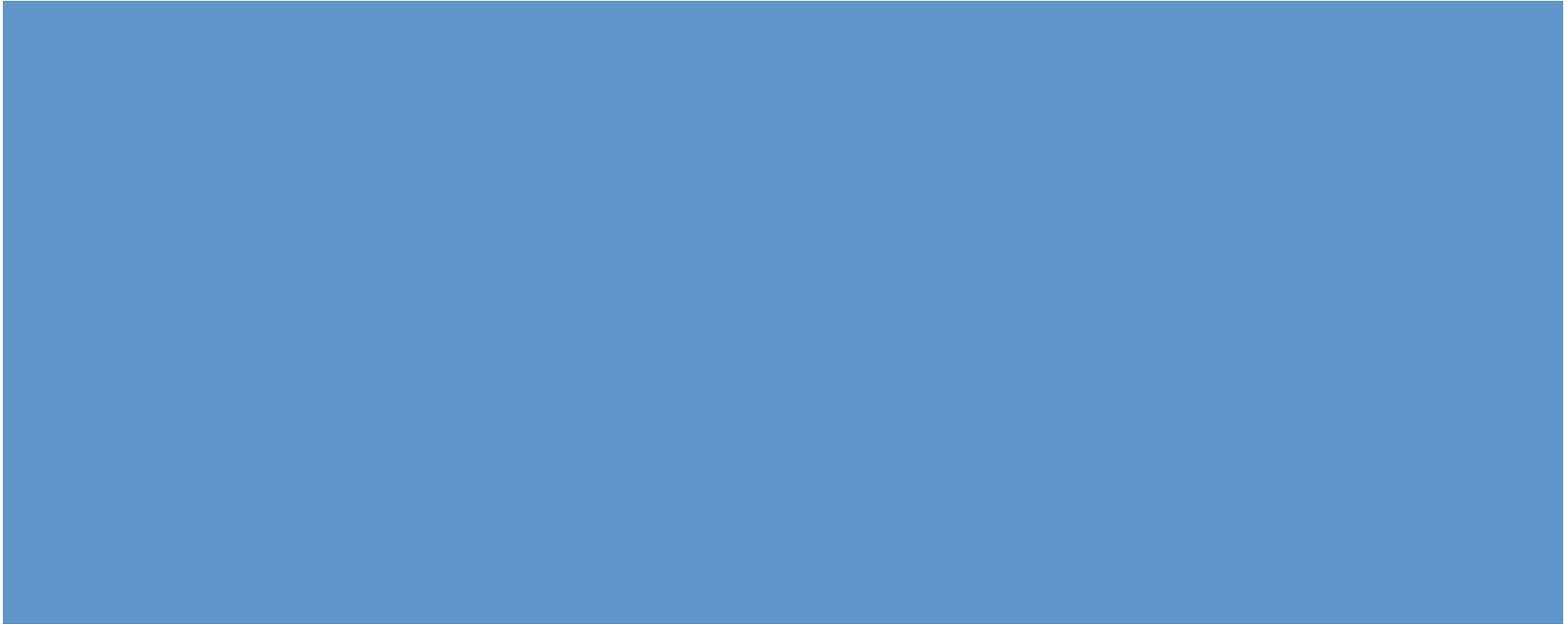
4.) How many years (including this year) have you participated in BEST?

- | | |
|----------------------------------|---|
| <input type="checkbox"/> 1 year | <input type="checkbox"/> 3 years |
| <input type="checkbox"/> 2 years | <input type="checkbox"/> More than 3 years: _____ |

5.) Are you a member of your school's BEST team or are you attending as a visitor supporting your schools' BEST team?

- Team Member
- Visitor





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