



SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

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CEDARVILLE UNIVERSITY'S SOCIETY OF WOMEN ENGINEERS

The Society of Women Engineers (SWE) is an organization that connects women in Cedarville University's School of Engineering and Computer Science and supports their studies. SWE started the 2014–2015 school year with its annual welcome party for new freshmen, where new female freshmen have the opportunity to fellowship with their new classmates, the officers of SWE, and upperclassmen women.

The group meets twice a week in the dining hall to eat together and encourage one another, and this year they began a weekly Bible study of the book of Esther. As they studied God's Word together, they grew closer and stronger in their faith.

In order to encourage our female engineering students and build networks, SWE invited a female engineer and researcher from the Air Force Institute of Technology, Dr. Yun Xing, to give a presentation



about her work in the engineering field, her life as a wife and mom, her service in her church, and how she balances them all. The students were able to form connections and receive answers to questions they had about various topics through this presentation.

The school year ended successfully with SWE's finals week study party. The members all got together to study, which offered the opportunity for the younger members to get help from upperclassmen women. With 18 new members, there are 50 female engineering students.



TAU BETA PI PROVIDES SCHOLARSHIPS

Each year Tau Beta Pi (National Engineering Honor Society) awards \$2,000 undergraduate scholarships and \$10,000 graduate fellowships. Cedarville University successfully chartered our Ohio Nu Chapter on March 3, 2001. Since that time our Tau Beta Pi members have received approximately 20 undergraduate scholarships and one graduate fellowship. Last year four members received scholarships for their senior

year. For the 2015–16 year, two engineering students were awarded scholarships, Michael Kuhn and Forrest Thayer. Dr. Hardy Hegna, Professor of Mechanical Engineering, serves as the chapter adviser.

ASSISTANT PROFESSOR RECEIVES AWARD

Jay Kinsinger, Assistant Professor of Mechanical and Biomedical Engineering, was the recipient of the 2015 Environmental Award from the Greater Cincinnati Earth Day Coalition. Kinsinger accepted the award at a celebration at Sawyer Point in Cincinnati.

SOCIETY OF ENGINEERS AIDING MISSIONS HAS ACTIVE YEAR

The Society of Engineers Aiding Missions (SEAM) at Cedarville University had another active school year in 2014–15, featuring several interesting outside speakers, continuation and refinement of the solar light service project, a manual well-drilling opportunity on campus, and some global ministry opportunities.

During the first semester, the group hosted presentations by students Ryan Frazier and Peter Haugh, who described their summer missions engineering internship with SIM in Burkina Faso, where they served in troubleshooting water distribution networks and designed appropriate agricultural processing equipment; the SEAM Alumni-Student Dessert during homecoming, featuring a Skype conversation with Cedarville mechanical engineering alumnus Elizabeth Flow of LIMBS International in Kenya; a joint ASME/SEAM Seminar on Engineering Missions Internships featuring Dale Harlan of SIM Water Ministry, Bolivia, and Cedarville engineering alumnus Jeremy Maller of Reach Beyond Radio Planting in West Africa; and Mark Vanderkooi, TEAM Bible translator to the Kwong people of Chad.

The second semester started with a well-attended Technology in Missions Seminar (JAARS, LightSys, Reach Beyond, SIM, and TWR) moderated by SEAM President Ryan Frazier at Cedarville's annual Missions Conference in



January. Later in the semester SEAM meetings featured a Skype conversation with Cedarville mechanical engineering alumnus Cody Hall of SunSet Solutions describing his work designing, building, and installing progressive cavity deep well pump systems for remote locations and another Skype conversation with a Cedarville alumnus who is serving through engineering in Asia.

On many Saturdays and off-meeting Mondays, SEAM members worked diligently assembling and refining solar lights for Liberian church leaders. They were able to send 50 units with

Paul Mitchell, who was invited to ELWA as a worker essential to install water purification equipment for the hospital and Ebola wards.

Some members also studied “Appropriate Technology Engineering” in an engineering elective course, where they learned about technologies that provide power and water. They and other students worked together to test manual well-drilling techniques on the Cedarville University campus, and Jonnah Baker studied and designed specifications for a solar power system that could improve reliability and reduce costs for the Makarios house in the Dominican Republic, where she invested the summer after her graduation in an internship.

For a senior capstone design project, members endurance tested a user-buildable PVC hand pump that is being used by Bolivian farmers through the ministry of Dale Harlan of SIM.

In addition, SEAM members traveled with the engineering Global Outreach team to Bolivia in May 2015 with Dale and Helen Harlan of SIM to test the performance of water pumps in the field, to observe other water development activities, and to experience Bolivian churches. Members of the team were Dr. Thomas Thompson, Professor of Mechanical Engineering Tori Shrum, Ezra Fu, Stephanie Defore, Hannah Steele, Sam Koenig, and Grace Littlefield.



Few universities — Christian or not — offer the modern facilities, extensive hands-on experiences, and one-on-one faculty interaction that characterize Cedarville's programs. The rigorous classroom experience combined with a campus environment openly committed to Christ prepares our graduates to find jobs in a wide range of engineering and technology fields or to succeed in graduate school.

FACULTY

- Robert Chasnov, Ph.D. (Dean)
- Samuel SanGregory, Ph.D. (Assistant Dean)
- Gerald Brown, Ph.D.
- Timothy Dewhurst, Ph.D.
- Patrick Dudenhofer, M.S.
- Vicky Fang, Ph.D.
- David Gallagher, Ph.D.
- Seth Hamman, M.S.
- Frederick Harmon, Ph.D.
- Harwood Hegna, Ph.D.
- Darren Holland, Ph.D.
- Jay Kinsinger, M.S.
- Clinton Kohl, Ph.D.
- Timothy Norman, Ph.D.
- George Qin, Ph.D.
- Keith Shomper, Ph.D.
- Jeffrey Shortt, Ph.D.
- Thomas Thompson, Ph.D.
- Timothy Tuinstra, Ph.D.
- Lawrence Zavodney, Ph.D.

MAJORS

- Computer Engineering (B.S.Cp.E.)
- Computer Science (B.S.)
- Electrical Engineering (B.S.E.E.)
- Mechanical Engineering (B.S.M.E.)

MINORS

- Biomedical Engineering
- Computer Science

SPECIAL PROGRAMS

- Cooperative Education Program
- Engineering Honors Program

INTERSHIPS

Cedarville's Career Services staff will help you prepare for your career through discipline-related experiences, or internships. You will have an advantage in a competitive job market because of real-life, hands-on experience. Students in our department have enjoyed internships with organizations including:

- 3M
- Advanced Navigation
- Air Force Institute of Technology
- Amazon.com
- Avetec
- BAE Systems
- Ball Aerospace
- Belcan Corporation
- BMW
- Boeing
- Booz Allen Hamilton
- CAT
- Century Engineering
- Cisco
- Cummins
- Fastenal
- Honda Research and Development
- John Deere
- Microsoft Corporation
- NASA Glenn Research Center
- Northrop Grumman
- Procter & Gamble
- Rockwell Automation
- Toyota
- Wright-Patterson Air Force Base

GREETINGS FROM THE DEAN

It gives me great joy to update you on the happenings of the School of Engineering and Computer Science during the past year. This year's newsletter focusses on our student organizations: ACM, ASME, IEEE, SAE, SEAM, SWE, and TBP. You will read how the Lord has opened the doors to a variety of ministry and service oppor-



tunities, which our students boldly walked through. Many of these societies grant scholarships to students whose service and academic achievements rise above the norm. You will read how some of our students were honored in this way.

We are also excited to tell you that the renovation of the Engineering and Science Center, the campaign to which many of you contributed, has been completed. What were once old, outdated biology laboratories in the basement of the original Science Center have been transformed to modern engineering laboratory facilities. Having 2,300 square feet of new floor space allows us to shift assignments for seven of our existing labs in order to make the best use of our space. Be sure to ask to see the new labs when you next visit campus!

You will also see some updates from our competition teams. Cedarville students won the ASEE Robotics competition for the third year in a row, and our Solar Splash team regained its place as Collegiate World Champions of Solar/Electric Boating. Our Shell Eco-marathon team was given the opportunity to showcase its hybrid-electric vehicle at the 2015 Detroit Auto Show. Since Shell is one of the sponsors for the Penske Racing Team, Joey Logano and Brad Kesowski spent time with our students just prior to a very successful year of racing.

Surely God has been gracious to us, has blessed us, and has made His face to shine upon us (Ps. 67:1) over this past year. May you also be partakers of His blessings!

Robert Chasnov, Ph.D., P.E.
Dean, School of Engineering and Computer Science

SOLAR BOAT TEAM WINS EIGHTH TITLE

The 2015 World Solar Splash championship returned to the Miami Valley as Cedarville University won the competition with an impressive 932.44 score (out of 1,000 points) over the four-day event. The competition was held June 10–14 at Eastwood MetroPark in Dayton, Ohio.

“We’re just very thankful that God has blessed us in this way,” said Dr. Tim Dewhurst, Ph.D., Senior Professor of Mechanical Engineering. “We have a core group of talented students who worked hard to develop state-of-the-art engineering designs. They overcame some early obstacles and developed innovative solutions.”

Middle Tennessee State University (802.54) placed second, while Geneva College (740.69) finished third. Other notable institutions included the University of Arkansas (sixth place, 631.53), University of Dayton (seventh place, 590.65), and the University of South Carolina (eighth place, 530.15).

The championship marks the eighth time in the last 12 years that Cedarville’s solar boat team has taken home the overall title, making it the most decorated team in Solar Splash history. Cedarville’s victory came on the strength of wins in the endurance, qualifying, and sprint events.

“We’ve been fortunate to have a really solid foundation of technology that’s been developed by our solar boat teams over the past 12 years,” said Dewhurst. “The faculty is also very important as they work tirelessly to guide students through the obstacles to come up with solutions.”

In addition to winning the on-water competition, Cedarville also won awards for outstanding technical report, outstanding system design, outstanding electrical system design, and most improved team.



STUDENT EARNS SECOND IEEE SCHOLARSHIP



Cedarville University senior Jared Newman, an electrical engineering major from Pataskala, Ohio, has been awarded a scholarship from the Institute of Electrical Engineers (IEEE) Power and Energy Society (PES) for the second-straight year.

The IEEE scholarship encourages electrical engineering students to use their talents to create new power solutions in sustainable energy. The renewable energy field, which includes wind power, solar electric power, hybrid vehicles, and battery technology, will continue to rapidly increase over the next several decades.

Newman is one of 209 recipients from around the country to win the scholarship, which is awarded based on success in the classroom and in the field of engineering. Newman renewed his scholarship with IEEE based on an internship in the power and energy field,

recommendation letters, and extracurricular activities. Newman completed his fourth season with Cedarville’s men’s soccer team, which won its third-straight Great Midwest Athletic Conference (G-MAC) championship this year and advanced to the second round of the NCAA Division II tournament.

Through assistance of the IEEE, Newman obtained a three-month internship with American Electric Power in Columbus, Ohio. AEP is one of the largest electrical utilities in the United States, servicing five million people in 11 states.

“Electrical engineering is such a broad field, but I was able to focus my studies on power and energy through three Cedarville classes and gain hands-on experience with power distributors, transmissions operations, and power grids at my internship,” said Newman.

ENGINEERING STUDENTS INTERN WITH SONSET SOLUTIONS

For three Cedarville University engineering students, a summer internship is much more than just a chance to gain real-world experience; it's a chance to make a difference in the lives of people around the world.

Dillon Henschen (computer engineering), Anne Shipman (electrical engineering), and Michael Tapia (electrical engineering) worked for SonSet Solutions to design software and hardware for use in a variety of equipment.

SonSet Solutions is an organization that uses the technical expertise of its staff to spread the Gospel of Jesus Christ through radio and clean-water ministries, as well as other technology-based initiatives.

Formerly known as the HCJB Technology Center, SonSet Solutions develops, designs, builds, and fabricates equipment for use in developing countries around the globe.

"We want our engineers to be able to use their technical abilities to minister to others," said Dr. Jeff Shortt, Professor of Electrical Engineering. "I've personally worked with SonSet for over a decade, and it's a great opportunity for our students to use their skills to spread the Gospel.

In addition to sending students to SonSet as interns, Shortt has also led several spring break trips to the organization's headquarters in Elkhart, Indiana, to work on a number of different projects.

"Two of the three students (Henschen and Shipman) were part of our spring break team this year," said Shortt. "They'll get a chance to finish what they started in March while Michael will gain valuable experience from his project."

Henschen and Shipman will continue work on an equipment power protection unit that is designed to protect electrical equipment, such as X-ray machines and radio transmitters from "dirty" power that is often found in developing countries.

Henschen will focus on the control and display software for the unit while Shipman works on system design, assembly, and testing.

Anne Shipman and Dillon Henschen traveled to Elkhart, Indiana, to work at SonSet during their spring break with six other engineering students from Cedarville. Projects included the following:

- Develop Basic I/O for Arduino Microprocessor
- Equipment Power Protection Control Prototype
- Sollatek Performance Testing
- Power Harvesting Circuit for Pump Monitor
- Power Protection Test Fixture User's Manual



*Back Row left to right: Jared Newman, Dillon Henschen, Kyle Nelson, Tyler Drake
Front Row left to right: Mark McTaggart, Anne Shipman, Micah Price, Mathew Wagner*

The team not only worked on the projects listed above, but enjoyed the fellowship of their host families, a tour of two local manufacturing facilities (Harmin Kardon Factory and Forest River Factory), staff devotions, and a breakfast on Saturday morning as a send-off for their trip back to Cedarville.

Tapia has been assigned to work on the design of an electrical monitor that keeps track of the overall health of water wells. The monitor records the number of pump revolutions and volume of water pumped each day to help ensure the well is operating at maximum capacity.

The crown jewel of SonSet's efforts is a solar-powered radio that is pre-programmed to receive signals from Christian radio stations that partner with SonSet. More than 500 local FM stations in developing countries use antennas,

studios, transmitters, and other equipment that has been made at SonSet Solutions.

In the last eight years, SonSet has assisted nearly 250 ministries in almost 100 countries as they bring the Word of God to those who otherwise may not hear it.

SCHOOL YEAR KICKED OFF WITH ACM CS WELCOME BACK PICNIC

The Association for Computing Machinery (ACM) student chapter exists to serve the computer science (CS) majors at Cedarville by organizing social, educational, and professional development events. Our aim is to help cultivate both a vibrant and supportive community among CS majors, which currently numbers in the 80s, and has been growing every year. The group organized several events this past year to help live out their mission.



The school year kicked off with the annual ACM CS welcome back picnic hosted off campus at the home of Dr. Keith Shomper, Professor of Computer Science. The Saturday afternoon was filled with fun games and delicious grilled

food. The setting provided a casual and relaxed atmosphere where students could freely mingle with one another and faculty.

New this year is a regular Monday evening dinner for CS majors in the dining hall. These get-togethers provide opportunities for students to connect and they help to bridge the gap between CS majors of different academic years who rarely are in classes together. Juniors and seniors have been taking advantage of these dinners to informally mentor and advise underclassmen, with whom they have much in common. Another goal for helping to forge these relationships is for graduates of the program to come back to Cedarville and recruit underclassmen friends for jobs and internship opportunities at their companies.

The most unique get-together we have organized was the Saturday afternoon outing to the largest aircraft museum in the world, the

National Museum of the United States Air Force. Dr. David Gallagher, Professor of Computer Science and a former Air Force pilot and the CS program's founding professor, led the group on a tour of this impressive museum. The students were blessed to hear descriptions of planes from a person who has also flown some of them, and by this unique opportunity to get a glimpse of Dr. G's life before Cedarville.

On a Thursday evening in October the ACM sponsored a very popular talk titled "A Gentle Introduction to Quantum Key Distribution," by Dr. Michael Grimaila of the Center for Cyberspace Research at the Air Force Institute of Technology. Grimaila delivered his presentation in a down-to-earth and light-hearted manner, which made the complex subject matter of quantum mechanics and cryptography accessible to his audience. One student wrote afterward, "Attending [this] talk refreshed my love for science and knowledge."

ENGINEERING AND COMPUTER SCIENCE LABS RECEIVE UPGRADES

Students studying engineering and computer science at Cedarville University are the beneficiaries of valuable upgrades, thanks to the recent completion of a \$5 million renovation to its laboratories.

The renovation included four rooms located in the Engineering and Science Center (ENS). These rooms were previously used as biology and chemistry labs and a preparatory room. Students now not only have the recently completed, state-of-the-art science facility, but also several relocated biology labs in the ENS.

"We were able to take what were outdated labs and design them in such a way that it could better accommodate our students' projects," said Robert Chasnov, Dean of the School of Engineering and Computer Science. "The project will be beneficial to a number of different academic programs, including engineering and computer science, as they continue to grow."

Two of the rooms were combined to become the mechanical engineering

senior design computational lab. This new lab can accommodate 49 senior design students, compared to the maximum of 20 in the previous lab.



Another room, which previously served as a preparatory room, was reconfigured to house the Roboboat project lab. Cedarville's Roboboat team has won several awards in the past five years at the annual International Roboboat Competition, where teams from around the globe build autonomous boats controlled by onboard computers. Most recently, the team won the "Biggest Bang for Your Buck" award, which was given to the best boat created on a smaller budget.

The fourth room was recreated into a biomedical engineering lab. Students who minor in biomedical engineering will have an improved space and machinery necessary to create rehabilitation and biomedical signals and systems. Bridging between the human body and the world of mechanical and electrical engineering has become that much easier for Cedarville students.

In addition to the extensive makeover of ENS labs, a cyber security lab will be created during summer 2016 for computer science students who partake in the newest addition to Cedarville's curriculum — a cyber security track — which will begin in fall 2016. The lab will allow students to learn how to best defend computer equipment and networks from cyberattacks.

SHELL ECO-MARATHON TEAM REPORT

Cedarville engineering and computer science students entered three high efficiency cars in the Shell Eco-marathon Americas competition in April 2015, held for the first time in Detroit, Michigan. The new track in Detroit was a 0.9-mile loop around the city blocks in front of COBO Hall and along the Detroit River. In September Shell invited Cedarville to bring Urbie to the Meeting of The Minds Conference, held in Detroit, and participate in several workshops featuring energy-efficient cars. In January Shell invited Urbie to the North American International Auto Show (the Detroit Auto Show), where they participated in 18 media interviews. During the preview days, Penske stock car drivers Joey Logano (2015 Daytona 500 champ) and Brad Keselowski (2012 Sprint Cup Champ) drove Shell's urban concept media car and Urbie in a pseudo race on an indoor track, promoting the move of the Shell Eco-marathon to Detroit for 2015.



Cedarville engineering students accompanied by Dr. Zavodney stand for a photo with stock car drivers Joey Logano (left in center) and Brad Keselowski (right in center) behind Urbie at the North American International Auto Show in Detroit.

CEDARVILLE UNIVERSITY'S CHAPTER OF THE ASME

Cedarville University's chapter of the American Society of Mechanical Engineers (ASME) strives to provide social and professional experiences for Cedarville's engineering students. During the last year, the chapter has participated in an impromptu design competition, a ski trip, and a hot chocolate and cookie night for freshmen engineers, which have allowed Cedarville students to have fun interacting with their peers at Cedarville and other local colleges.

The chapter also hosted presentations focused on jobs and missions opportunities in engineering. Speakers included engineers from SonSet Solutions

(formerly HCJB), Serving in Mission (SIM), NASA, Wright-Patterson Air Force Base, and Wright State University. Cedarville's ASME members also served others including elementary students at Perrin Woods Elementary School, by assisting the Society of Women Engineers with its water bottle rocket outreach, and partnering with the Society of Engineers Aiding Missions activities.

New this year, ASME collaborated with the other engineering organizations to present E-Sphere, an engineering ball. In a beautified Alford Auditorium, approximately 125 current engineering students and invitees from all years mingled over dinner,

participated in swing dancing, and laughed at humorous stories presented by their professors. This event also raised money for the Society of Engineers Aiding Missions.



CEDARVILLE UNIVERSITY'S CHAPTER OF THE SAE

Community would be the one word to describe the activities of the student chapter of the Society of Automotive Engineers (SAE). Cedarville University's chapter president, John Hopkins, represented the Dayton professional chapter of SAE community by attending the national Section Officers Leadership School (SOLS) in Detroit this year.

Each year, students in SAE help out with Boonshoft Family Night, a community outreach sponsored by the Dayton Chapter of SAE. Boonshoft is a local applied science and technology museum in the city of Dayton. Every year SAE rents out the museum and invites families to come for an evening of fun,



interactive science activities, including building a toy glider. Cedarville students handed out pizza, pop, and cookies, to the guests and helped the kids build gliders while giving impromptu lessons on flight dynamics. The Cedarville's students

have more fun at this event than the kids they are entertaining!

In January, a contingent of SAE student members joined the community of tire-squealers, grease monkeys, motor heads, and automotive aficionados at the North American International Auto Show. This is the world's premiere auto show, a venue often associated with unveiling the latest and greatest cars from the major car manufacturers in the world. A good time was had by all.

ROBOTICS TEAM WINS THIRD-STRAIGHT ASEE COMPETITION



A team of freshmen and sophomore engineering students from Cedarville University completed a three-peat in the 2015 Autonomous Robotics Competition at the American Society of Engineering Education (ASEE) Conference in Seattle.

Cedarville's robot, named Hermit, earned 291.51 points to finish well ahead of second-place Monroe Community College, which recorded 226.63 points. The championship is the third straight for Cedarville,

which won the competition in Atlanta in 2013 and Indianapolis in 2014.

The competition requires teams to build and program a robot to complete a specific task. Teams were awarded points based on their robot's performance as well as a poster presentation, which describes the details of their project.

This year, robots were required to collect and sort various colors of wooden, fish-shaped cutouts—a tribute to Seattle's world-famous Pike Place Fish Market — into four different bins located around the competition area.

"This year was the most challenging competition yet," said Dr. Clinton Kohl, Ph.D., Professor of Computer Engineering and the team's faculty adviser. "Only two of the 15 teams at the competition fully completed the task and even though we won the title, our robot fully succeeded on just one of the four attempts that each team was given."

Cedarville's team earned points on its first and fourth attempts and nearly scored in the second and third rounds as well.

"God was very gracious to us, and the students worked extremely hard to overcome some last-minute failures that included a broken sensor board and a failed power connection," said Kohl. "The students were able to troubleshoot the issues and come up with solutions to get the robot working correctly."

During the competition, Cedarville earned the highest testing score (185.55) and finished second in the exhibit score (105.96).

"Our success in the competition is a great recruitment tool for the engineering program," said Kohl. "A lot of prospective students participate in these competitions in high school, so for them to get a chance to do this as a freshman or sophomore at Cedarville is very special."



251 N. Main St.
Cedarville, OH 45314



School of
Engineering and Computer Science
937-766-7680
cedarville.edu/engineering
engineering@cedarville.edu

Admissions
1-800-CEDARVILLE (233-2784)
cedarville.edu/admissions
admiss@cedarville.edu

