OVERVIEW OF CAMP

The UA Engineering Academic Affairs team is excited to offer a new Summer Engineering Academy camp in 2019 - “Women in Engineering.” This program is designed for high-school aged women who are interested in Engineering; or more broadly, STEM fields. Our goal is to inspire young women to continue exploring their passion for STEM through discussions, presentations, and activities that empower their intellectual interest while also showcasing leaders in industry, academia, and our community to create connections and bonds. Featured activities:

1. Design Project (16 total hours during the week)
2. Workshops (16 total hours, in two hour slots)
3. Women in Engineering Panel

PROJECT DESCRIPTIONS

The WIE design project will focus on 1) understanding local water resources; 2) learning about various environmental engineering approaches that enhance local water sustainability; and 3) applying the engineering knowledge gained through the installation of passive rainwater harvesting features at a local non-profit. Attendees will spend time throughout the week developing and creating their design.

WORKSHOP DESCRIPTIONS

Students will choose one of two offered workshops per session. You will be sent a form to request which workshop you would prefer to attend. You will be placed in a workshop on a first come, first serve basis according to capacity set forth by the presenters. Please note that exact content is subject to change as faculty and partners work to finalize curriculum.

Workshop Session 1

- **Learn to Develop and Education or Career Roadmap** – Sharon O’Neal, Raytheon (retired), UA professor in Engineering Management
  - In this workshop, students will learn the importance of thinking strategically about how to achieve their educational and career goals and objectives. They will learn how to create a "roadmap" that can help them to identify the interim and key milestones that will enable them to efficiently and effectively achieve their end goals. They will also learn to identify any potential roadblocks or barriers that could present challenges along the way, and how to mitigate or overcome these challenges.

- **Mining and Sustainability - Building a USB Solar Charger** – Laura Jones, Product Safety and Compliance Coordinator; Yun Wang, Engineering Manager – Electric Drive Large Mining Trucks; Annette Gaynes, Engineering Project Team Lead – Quality.
SUMMER ENGINEERING ACADEMY
Overview | Office of Academic Affairs

- Employees from Caterpillar’s Surface Mining & Technology Division will present their career paths and how mining has a large impact in furthering sustainable technologies. They will guide you through a project designing and building your own USB Solar Charger, discussing the variety of skills needed by our teams to serve our customers as they work towards a more sustainable world.

Workshop Session 2

- **Environmental Observation with Drones** – Kamel Didan, Professor, Biosystems Engineering
  - In this hands-on session, students will build a drone, use miniature sensors and cameras, and analyze images.
- **Create a Microscope out of Paper** – Erika Eggers, Associate Professor Physiology and Biomedical Engineering, BIOS; Rebecca Vanderpool, Assistant Professor, Medicine and Biomedical Engineering; Judy Su, Assistant Professor, Biomedical Engineering and Optical Sciences, BIOS
  - This workshop will focus on creation of a foldscope - an ultra-affordable, paper microscope that is portable, durable, and gives optical quality similar to conventional research microscopes. After assembling the foldscope, students will use them to look at and prepare slides of biological interest.

Workshop Session 3

- **Making Copper** – Molly Radwany, Coordinator for Educational Outreach; Rosa Maria Rojas, Assistant Professor of Practice in Mining Engineering; Stefanie Orihuela
  - This 2-hour activity will help students understand how mining transforms the earth’s raw resources into the materials that underpin all modern technology. Students will begin with a supply of raw copper ores from a local mine. Over the course of the workshop, they will extract the copper from the rock, purify it, and use an electrowinning cell to plate pure copper, ready for use in cell phones, computers, wiring, plumbing pipes, and more.
- **Recycling Irrigation Water** – Lisa A. Jones, Bayer Crop Sciences
  - This session will focus on fundamentals of water flow, as well as ways to recycle and treat water.

Workshop Session 4

- **Water Treatment Design Challenge** – Kerrie Hickenbottom, Professor, Environmental Engineering
  - This session will focus on environmental engineering, water quality and treatment, and human and environmental health.
- **Want to Arduino?** – Lourie Bryan, IBM, Society of Women Engineers, Tucson
  - In this workshop, students will learn basic principles of electronics and combine software and hardware engineering to create usable products. They will work in squads to organize, develop, test and release one or more products. Each squad will use a circuit board with
SUMMER ENGINEERING ACADEMY
Overview | Office of Academic Affairs

various components such as resistors, LED lights, switches, buzzers and a set of instructions to do a series of projects. **Workshop Session 5**

- **Test Your Metal!** – Liz Cameron, Co-Owner of Desert Metal Craft; Rich Greenwood, Co-Owner of Desert Metal Craft and contestant on History Channel’s “Forged in Fire” series in 2015; Pete Brown, Director of Marketing at Desert Metal Craft
  - Students will forge a decorative item for their room/home/new dorm and learn about some of the basic metallurgy around the ancient art of blacksmithing!
- **Caterpillar Tucson Proving Ground Tour** – Nitin Patel, Mechanical Engineer, Caterpillar
  - This experiential workshop includes a tour of the company Proving Ground and presentation of autonomy and how Caterpillar does product development.

**Workshop Session 6**

- **Big Dreams Require Big Plans! Building Construction Projects and an Engineering Career** - Dean Papajohn, UA Professor in Civil Engineering; Amy White, Sundt Construction; Amanda Wittenborn, KE&G Construction
  - In this session, teams will be tasked with estimating the time and labor costs to build a K’Nex bridge; and then building that bridge and monitoring progress. Participants will be guided through principles of project management. Additionally, students will have a chance to meet and talk with women engineers working in construction.
- **D.I.Y. Optics** - Emily Finan, Graduate Research Assistant; Hillary Matthis, Instructional Laboratory Manager in Optical Sciences
  - From smartphones to the internet, telescopes to virtual reality, optical sciences and the science of light powers the technology of the future. In this workshop, students will learn about research at the College of Optical Sciences and how light is "bent" with reflection, refraction, and diffraction. Students will have the opportunity to experiment with optical equipment such as lasers and cameras. We will also teach them how to transform household objects into their very own optical instruments.

**Workshop Session 7**

- **Agile Project Development** - Angela Pholphiboun, Engineer at IBM
  - This workshop will focus on Agile Process and Scrum Methodology, followed by a hands-on exercise to put scrum into action.
- **‘Mater Mover** - Mike Mason, Biosystems Senior Engineer; Stephen Poe, Professor, Biosystems Engineering; Kitt Farrell-Poe, Department Head, Biosystems Engineering
  - Learn how to move a tomato using an air powered water balloon/tomato cannon. Using a water-filled balloon to simulate a tomato, you will launch the balloons to land on a target keeping the balloon intact. Once you achieve success with a water balloon, you will test your final set-up using an actual tomato.