



ENGINEERING DISCOVERY DAYS

2017 EVENT PROGRAM

EXHIBITS SORTED BY PROGRAM

○ - Letter in circle represents location on Map

AERONAUTICS & ASTRONAUTICS

- ① **Aircraft Icing** - Investigate the impact of ice on wing performance using 3D printed models. *Friday only.*
- ⑤ **Computational Plasma Dynamics Lab** - Learn how computers are used to help solve real world problems in plasma physics.
- ⑦ **Design Build Fly @ UW** - Learn how RC planes are designed and built for the AIAA competition. *Friday only.*
- ⑤ **Drones & Unmanned Aerial Systems** - Examine and interact with unmanned aerial systems (drones), including simulation, hardware, and flight simulators. *Friday only.*

- ⑤ **Fusion Z-Pinch Experiment (FuZE)** - Learn about compressing million degree Fahrenheit gas to achieve nuclear fusion conditions. See a live demonstration of the power of magnetic fields.
- ⑦ **Future of Composite Structures** - We show various prototypes of fiber reinforced composite structures. *Friday only.*
- ⑤ **Ram Accelerator Impulsive Space Launcher** - The ram accelerator apparatus flies jet engines through a tube to reach hypersonic velocities. Tours every 1/2 hour.
- ⑤ **Rotating Detonation Engine** - We are developing an advanced rocket engine that utilizes rotating detonation waves to pressurize the combustion chamber.

- ④ **Swimming with the Robofish** - Understand the basics of swimming locomotion and see the UW robofish swim autonomously in the outdoor pool.
- ⑤ **The HIT-SI3 Plasma Physics Experiment** - Learn about a unique magnetic confinement experiment for fusion energy.
- ⑦ **Water Bottle Rockets** - Discover the basics of rocketry. Design, build and launch a water bottle rocket!
- ⑤ **ZaP Flow Z-Pinch** - From lightning, to the stars, to rocket propulsion: learn about plasma, the state of matter that makes up 99% of our visible universe! Exhibit includes a laboratory tour and demonstration.

BIOENGINEERING

All exhibits will be on Rainier Vista ⑦ on Friday & Foege Hall ④ on Saturday.

BioE Pop-up Exhibits - Learn about microfluidic devices, their healthcare applications, and current UW microfluidics research. *Friday only.*

Bioengineers Without Borders - Hear how bioengineering students are applying engineering and science to solve global health problems. Projects include an anesthesia device, accessible prosthetics, a hydration monitor and more! *Saturday only.*

BMES Strawberry DNA - Join UW's Biomedical Engineering Society to extract DNA from your favorite berry!

Body in a Bag - A hands-on look at some of the awesome innovations bioengineers have developed to solve challenging biomedical problems! Come ready to ask plenty of questions.

Build a Prosthetic - Build a model prosthetic device and learn about the factors that bioengineers consider when designing prosthetics for humans and animals.

Discovering DNA - Ever wonder how DNA comes about and where it goes? We discuss the exciting uses of DNA once it's extracted - from sequencing, to fluorescent marking, to genome editing. All ages welcome!

DNA Detectives - Come explore the mysterious world of DNA and learn how the Lutz Lab uses biology to detect infectious disease!

Enzymes De-livered - Enzymes are proteins in the body that start and speed up chemical reactions. Join us for a hands-on activity demonstrating how the liver uses an enzyme to break down hydrogen peroxide! *Friday only.*

Huskies ADAPT (Adaptive Design and Play Technologies) - Toys are important for how a child learns and plays. Many toys are inaccessible to children with disabilities. We adapt them with a headphone jack to make them accessible for everyone!

Ooey Goey Science of Drug Delivery - Learn how to make alginate beads and explore the uses of drug delivery! *Friday only.*

Paper Microfluidics - Join the Yager lab to learn how we use paper to bring the clinical laboratory to people wherever they are. You can even use your cell phone to read your results!

Playing with Ultrasound - Learn how ultrasound waves let you see inside your body! We will use an ultrasound machine to see the pulsating blood vessels under our skin. *Saturday only.*

Regenerating the Heart - Learn about the heart and how we are working to help rebuild it through a video, fun activity and competition!

UW iGEM Team - iGEM is an undergraduate competitive team that performs independent research in synthetic biology. Our exhibit will feature hands-on DNA extraction and other activities related to genetic engineering.

CHEMICAL ENGINEERING

All exhibits will be at Benson Hall ④

Chemical Wizardry - Have fun writing secret messages with invisible ink and learn about the chemistry behind this and its potential applications.

Cloud in a Bottle - Learn about phase changes and see a cloud form right in front of your eyes!

Cooler than Ice - What happens when a racquetball is frozen solid by liquid nitrogen? Join ACES in our mission to find out how really low temperatures affect material properties!

Ensuring a Sustainable Supply of Seafood with Human Food Waste - Senior engineering project in which our team designed and implemented a process to convert human food waste into sustainable fish feed for hatcheries and aquaculture.

Hydrogen from Water - This demo will show how water electrolysis, the use of electricity to split water into hydrogen and oxygen, works and its potential use as a source for renewable fuels.

Making Molecules from Bugs - Come see how we engineer microbes to solve the world's biggest problems.

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(Chemical Engineering cont.)

Paper Plate Ferrofluids - Printer ink and oil aren't magnetic on their own, but what happens when you mix them? Come to this exhibit to play with magnets and ink - you'll even get to take home your own magnetic masterpiece.

The Power of Polymers - Have fun playing with polymers and learn how they can absorb hundreds of times their weight in water to create fake snow!

Walk on Water - Come "walk on water" and explore the mysteries of non-Newtonian fluid behavior.

CIVIL & ENVIRONMENTAL ENGINEERING

L Beyond Red Light, Green Light - Have you ever wondered how traffic lights are controlled? Come see a demonstration and learn how engineers work to solve traffic problems! *Friday only.*

K Engineering Plants to Fight Pollution - Learn about using genetically modified plants to degrade pollutants from military live fire training ranges, home air and greenhouse gases.

K Fantastic Modes and Where to Find Them - Games and puzzles allow students to consider the tradeoffs of time, money and emissions that occur when deciding how best to transport people and goods through a city.

L Industrial X-ray Scanner - Engineers and scientists use x-rays to inspect the insides of specimens without destroying them. Learn the science behind this machine and scan some of your stuff!

K Lock Exchange - Investigate the interactions between fresh and salt water using a small tank, salt and food colors. *Friday only.*

K Make It and Shake It: Your Buildings, Our Earthquakes - Design and construct your own building, then test its earthquake resistance on our shake table. Can your building survive Seattle's Big One?

K Mountain Hydrology Research Group - This exhibit will explore the water resources and electromagnetic properties of snowpack common in mountainous areas.

K Pacific Northwest Transportation Consortium - Transportation engineering, science and technology. *Friday only.*

L Protecting Structures with Base Isolation - Base isolation may help significantly lower forces in buildings during earthquakes. We will demonstrate structural response with and without isolation. *Saturday only.*

K SASWE Research Group - Learn about the application of satellites in hydrology to better manage water. *Saturday only.*

K Tsunami Generation and Impact on Coastal Infrastructure - See a hands-on demonstration of how a tsunami is generated offshore through ground motions on the ocean floor and how these waves propagate and influence coastal communities.

L Water in Distant Lands - Water is a scarce resource. See how engineers meet water challenges in different environments around the world.

K Watershed Dynamics - We will exhibit a model of a watershed and demonstrate how rain enters streams. Come find out how plants, soil and glaciers play a role in this dynamic! *Friday only.*

K Wetland Chemistry and Greenhouse Gases - Wetlands are important and unique habitats for plants and animals, but their waterlogged soils are also home to bacteria that produce lots of greenhouse gases! *Friday only.*

K What's in Your Drinking Water? - Students will learn how drinking water is treated and why it is important. Test tap water for chlorine and treat a small sample of raw water. *Friday only.*

COMPUTER SCIENCE & ENGINEERING

All exhibits will be in the CSE Atrium **H**

Chat with a CSE Peer Advisor - Talk with CSE peer advisors about our undergraduate program! Our peer advisors are CSE seniors who can talk about courses, internships, research, and our community.

DawgBytes: A taste of CSE - Come play some games and activities and in the process learn about becoming a computer scientist.

The Allen Center from the Ground Up (and Down!) - CSE student tour guides show you what makes this world-class facility for computing education unique. *Saturday only.*

The UbiComp Lab - Computer science doesn't only happen on big, bulky desktop computers. Come see how the UbiComp lab uses smartphones and sensors to solve problems. *Saturday only.*

ELECTRICAL ENGINEERING

G 50 Shades of Green: Environmental Impacts of Electric Cars - Are electric cars green everywhere they go? Or are they more eco-friendly in some states than others? Join us as we explore fifty shades of green among electric cars in the United States. *Saturday only.*

G Crowd Sensing - Learn about a platform for estimating the air quality in an urban environment. *Saturday only.*

G Exploring Nanoscience and Molecular Engineering - Learn about work done at the MolES Institute, Washington Nanofabrication Facility, and the Molecular Analysis Facility.

G Fashioning Jewelry from Electronic Waste - Missing a pair of earrings? Looking for a brand new look for school? Need a Mother's Day gift? In this workshop, we'll repurpose electronic waste into custom designed, homemade earrings. *Friday only. Tickets required - pick up at the EE Welcome Table in the CSE building, room AE100.*

G Racing with Light - Join us in learning how light plays an important role in our daily lives, from solar powered cars to holograms. Light can be used to power our devices, to see very small objects, or to color the world!

L RoboMasters at UW - Come see our fighting robots!

H Sensor Systems Lab - See a demonstration of wireless power transfer, wireless sensing, and personal robotics.

G The Glowing Pickle - What happens to an ordinary pickle when you plug it in to an ordinary wall outlet? Don't try it at home, but we invite you to watch what happens when we try it! *Tickets required - pick up at the EE Welcome Table in the CSE building, room AE100.*

H Video Games for Dynamic Human/Machine Interaction - People are interfacing with intelligent, robotic systems at an ever-increasing rate. Come test out a video game that will help us understand the dynamics behind human control of these systems.

HUMAN CENTERED DESIGN & ENGINEERING

I Design Thinking Workshop - A hands-on workshop in designing and prototyping mobile applications. *Tickets required and may be picked up at the exhibit table.*

I Sketches to Interactive Prototypes - Learn how to design mobile apps using simple drawings. Watch HCDE students take your sketches and turn them into interactive prototypes.

INDUSTRIAL & SYSTEMS ENGINEERING

All exhibits will be on Rainier Vista ① on Friday, April 21 only.

Accuracy vs. Precision - Learn the difference between accuracy and precision in scientific measurement by playing a dart game.

Getting Lean - Learn about efficient manufacturing in our toy building activity.

How Sweet It Is - Learn about probability and statistics with M&Ms.

Word Color - Say the color of the listed words and see how different designs affect human performance.

MATERIALS SCIENCE & ENGINEERING

④ **Fun with Ceramics - Slip-Casting** - Slip-casting is a common technique for making ceramics in materials science and art. MSE will demonstrate the method and visitors are encouraged to participate. *Friday only.*

④ **Functional Materials** - Functional materials are engineered to perform specific tasks such as converting mechanical energy to electrical. Come and learn more about this group of special materials. *Friday only.*

④ **Materials for Energy** - Materials scientists look for materials that can store and deliver energy. See how solar cells, batteries, fuel cells and other materials are used in energy.

④ **Materials Hot and Cold** - See the effects of very hot and very cold temperatures on materials from a space shuttle tile to racquet balls to marshmallows. *Friday only.*

④ **Materials in Medicine** - Come see how nanoparticles are made and learn how they are used to treat diseases!

④ **Materials in Optics** - Lasers and Jell-O!

④ **Materials Miscellany** - What do magnets, Jell-O, lasers, and bubbles have in common? They're all materials! Stop by and see the wide range of applications a materials scientist engages in.

④ **Materials of Music** - Play instruments, hear sound and learn how materials can change music. *Friday only.*

④ **Materials Science - In Chocolate!** - Did you know that chocolate demonstrates up to 10 different materials fundamentals? That's right, chocolate is a material.

④ **Microscopy in Materials** - Microscopes are a common tool in biology, chemistry, physics and most other sciences. Come learn about how it works and the unique ways materials engineers use it.

④ **Scanning Electron Microscopy** - The scanning electron microscope is one of the most important tools for a materials scientist. This instrument will be demonstrated on Saturday once per hour. *Saturday only.*

④ **SAMPE UW Student Chapter** - Learn about the benefits of composite materials! See various types of composites, learn about how they are made, and compare beams made of metal, plastic and carbon fiber.

MECHANICAL ENGINEERING

④ **3D Printing Club** - aka Washington Open Object Fabricators (WOOF), will be showing what 3D printers are and how they are used in engineering. *Friday only.*

④ **Center for Limb Loss and Mobility (CLIMB)** - Come see how science and engineering are helping us restore mobility to those suffering from disease or injury. *Friday only.*

④ **CNT-Paper Composite Wearable Sensors** - Wearable sensors developed by CNT-paper composites will be shown, including pulse sensors, pressure sensors, and eye movement sensors. *Friday only.*

④ **Dynamics and Vibrations** - Interesting vibration phenomena are shown, such as resonance and vibration mode patterns.

④ **Fun with Impact-Resistant Liquid** - Come learn how grains flow and jam in Oobleck.

④ **Husky Robotics Team: Building a Mars Rover** - We compete in the University Rover Challenge to build a mock Mars rover that could assist colonists on the Martian surface.

④ **Lightweight and Flexible Nano-sensors** - Two kinds of wearable sensors are demonstrated to measure pressure and gas molecules. *Friday only.*

④ **Making Patterns in Squishy Materials** - Come explore the formation of interesting patterns (like wrinkles, creases, and folds) in everyday objects!

④ **Mechanical Test Lab** - Learn how engineers test materials and structures using big machines, little sensors, light waves and more. Breaking stuff is fun!

④ **Northwest National Marine Renewable Energy Center** - Interested in learning more about how we can harness the power of the seas? Come see the latest developments in wave energy, current turbines and environmental instrumentation.

④ **SWCNTs Gas Sensor** - Our lab demonstrates a gas sensor used by single wall carbon nanotube (SWCNTs). *Friday only.*

④ **The Little Cell That Could Tug** - Cells are the basic building blocks of our body, but part of their job is to crawl, pull and tug. Come learn how strong cells are and how we measure their nanoscale forces with cantilevers. *Friday only.*

④ **UW ASME** - We will have 3D printed objects, toothbrush robots, popsicle catapults and more!

④ **UW EcoCAR** - We are a student organization competing in an advanced vehicle technology competition. UW EcoCAR students are converting a Chevrolet Camaro into a hybrid vehicle.

④ **UW Human Powered Submarine** - Every year, our team of 50 engineering students designs and builds a submarine that is entirely human powered. We race our sub against other university teams from around the world.

④ **UWashington Formula Motorsports** - The UW Formula team builds electric and combustion-powered racecars from the ground up! These cars are fast and very lightweight, made from materials such as carbon fiber and aluminum. *Saturday only.*

④ **UWashington Hyperloop** - UWashington Hyperloop is a team dedicated to creating the hyperloop, a self-sustaining, 300 mph form of transportation. UWHL placed 6th in the world and 4th in the US at SpaceX's competition. *Saturday only.*

STUDENT GROUPS

④ **Edible Engineering: Five-Minute Ice Cream** - There are many recipes out there for making your own ice cream at home, but did you know that you can make your own ice cream in five minutes using two Ziploc bags? Come find out how!

④ **Enginearrings** - Learn how electrochemistry creates thin titanium dioxide films on titanium, why the transparent films look colorful, and walk away with a unique pair of titanium earrings. *Friday only.*

④ **Engineers Without Borders** - Explore ways to work around obstacles with our marble wall and learn about EWB's current projects.

④ **SARP Sounding Rockets** - The Society for Advanced Rocket Propulsion is designing, building and launching a rocket to 30,000 feet! Come see our hardware and learn more about what makes rockets fly.

④ **Satellite Team** - The Satellite Team is developing the UW's first satellite which will be launched in 2018. Come learn about our team's progress and the challenges of developing a spacecraft. *Saturday only.*

④ **SWE Presents Engineers Toy Shoppe** - Join SWE as we teach you about real-world applications of engineering, how to think like engineers, build prototypes of accessible engineering products, and most importantly how YOU can make an impact!

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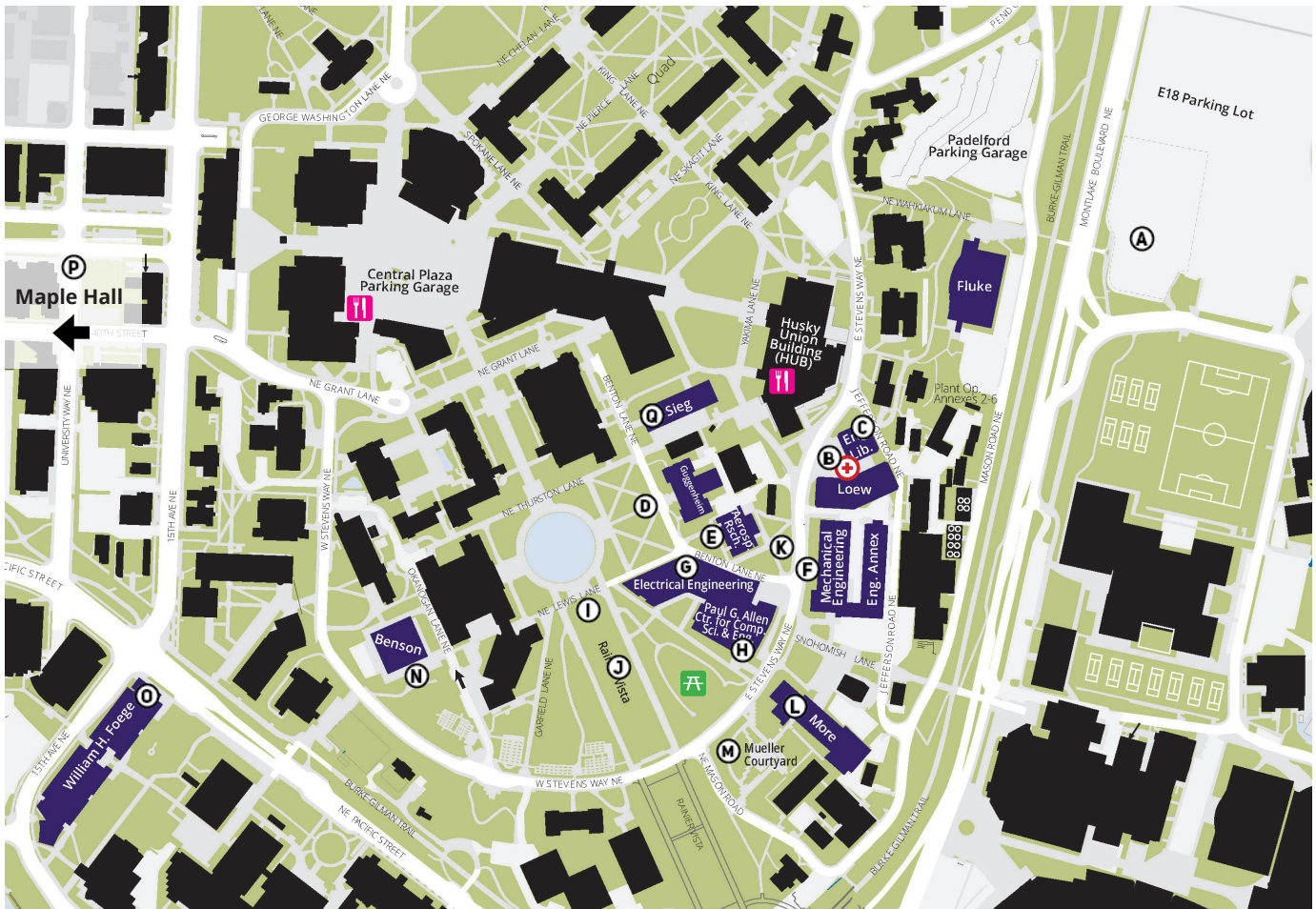
OTHER

- ① **Biogas Powered Food Cart Experience** - Learn about the process of biogas production and see plans for our biogas powered food cart. *Saturday only.*
- ② **Bioresource Science & Engineering** - Learn about the sustainable production of fuels, chemicals, and products from biomass. Make your own paper from different kinds of materials and test your paper's properties.

- ③ **Catapults and Codes: STEM in Antiquity** - Travel back in time to the world of the ancient Romans to make your own catapult and learn how people used to send secret messages.
- ④ **Engineering Batman** - If Batman was real, explore the science and engineering behind many of Batman's tools. From the Batsuit to the Batmobile, learn about the innovative technologies used by the Caped Crusader.

- ⑤ **Making STEM Accessible** - Learn how we promote science and engineering to people with disabilities and try our cool and accessible science equipment! *Friday only.*
- ⑥ **Racing with the Sun** - Build a solar car and race them on a track. Find out what new solar technology is emerging from UW research.
- ⑦ **Wide World of Sound** - Come see demonstrations related to underwater sounds, speech simulation in various environments and ultrasound. *Friday only.*

2017 ENGINEERING DISCOVERY DAYS MAP



KEY:

- Engineering Building
- ⊕ Non-emergency Medical
- ⌘ Picnic Area
- ⌘ Food Option

- A.** E18 Welcome Tent
- B.** Loew Hall Welcome Tent (Information, Lost Children)
- C.** Engineering Library
- D.** Guggenheim Hall and Lawn
- E.** Aerospace & Engineering Research
- F.** Mechanical Engineering Building
- G.** Electrical Engineering Building
- H.** Computer Science & Engineering Atrium

- I.** Drumheller Fountain Tent
- J.** Rainier Vista Tent
- K.** AERB Lawn Tent
- L.** More Hall
- M.** Mueller Hall and Mueller Courtyard
- N.** Benson Hall and Patio
- O.** Foege Hall
- P.** Maple Hall
- Q.** Sieg Hall

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