ENGINEERING DISCOVERY DAYS

2018 EVENT PROGRAM

Exhibits sorted by program

Ⓛ - *Letter in circle represents location on Map*

Aeronautics & Astronautics

Ⓙ **Aircraft Icing** - Learn about wind tunnel testing of 3D printed models and the influence of ice on wing performance.

Ⓓ **Autonomous Fish Robots** - Demonstration of autonomous underwater vehicles with design motivated by biological capabilities.

Ⓔ **Computational Plasma Physics Group** Live demos of model development and implementation of a computational framework related to the fields of plasma physics and fusion science. *AERB 228*

Ⓓ **Drones & Unmanned Aerial Systems** Examine and interact with unmanned aerial systems (drones), including simulation, hardware and flight simulators.

Ⓔ **HIT-SI3 Plasma Physics Experiment** Learn about a unique magnetic confinement experiment for fusion energy. *AERB 401*

Ⓠ **Kirsten Wind Tunnel** - See the test section and walk the tunnel flow circuit. Wind tunnel tours every half hour. *Space is limited.*

Ⓔ **Ram Accelerator Mass Driver** - Learn about alternative space launch technology in the world's fastest ramjet engine facility. Tours every half hour. *AERB 012*

Ⓔ **Rotating Detonation Engine** - See the RDE, rocket thrust enhancer experiments, and shockwave reactor project, hosted by the High Enthalpy Laboratory. *AERB 217*

Ⓙ **SARP Sounding Rockets** - The Society for Advanced Rocket Propulsion is designing, building and launching a rocket to 30,000 feet! See our hardware and learn how rockets fly.

Ⓔ **The ZaP and FuZE Plasma Experiments** - We harness the power of the stars to create energy on earth. Tour the experiments and see how magnetic force can crush a soda can! *AERB 036*

Ⓙ **Water Bottle Rocket Launching** - Join UW's rocket scientists to launch your very own water bottle rocket!

Bioengineering

All exhibits will be on Rainier Vista Ⓙ unless otherwise noted

Bioengineering Ultrasound - Learn how ultrasounds work and look inside your own arm with an ultrasound machine! *Foege North Lobby on Friday. Space is limited.*

Ⓠ **Bioengineering 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! *Friday only. Space is limited.*

Body in a Bag - A hands-on look at some of the awesome innovations bioengineers have developed to solve challenging biomedical problems. *Foege North Lobby on Friday. Space is limited.*

Build a Prosthetic - Learn about the design principles of different types of prosthetics used in everyday life, and build your own from craft supplies.

Denatured Biotechnology Puzzles - Solve puzzles and learn about medical engineering advancements and latest technologies.

DNA Detectives - Explore how drugs can detect mistakes in our DNA.

Engineering Global Health - Learn about low-cost, sustainable medical technologies that UW students are working on!

Genetically Engineered Slime - Our exhibit aims to teach students how scientists are becoming increasingly able to modify DNA for medical and biotechnology purposes.

UW iGEM - Talk about synthetic biology with UW's iGEM team! Try extracting DNA, ask us about genetic engineering and learn about the project we'll be presenting at the annual international competition.

Chemical Engineering

All exhibits will be at Benson Hall Ⓝ

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

Cloud in a Bottle - Create your own cloud in a bottle and explore phase transitions of liquids.

Cooler than Ice - What happens when you freeze a racquetball with liquid nitrogen? Join ACES to find out what happens to material properties at very low temperatures.

ECS Enginearrings - With electrochemistry, we turn grey titanium earrings into beautiful, colorful jewelry!

Instant Snow from Super-Absorbent Polymers - In this hands-on exhibit, visitors will explore how super-absorbent polymers create synthetic snow!

Polymer Water - See nontoxic calcium alginate "worms" form from crosslinking of the polymer when a 2% solution of sodium alginate is poured into a 1% solution of calcium chloride.

Shape Memory Alloys - Shape memory alloys bend like normal wires but they "remember" their old shape when they are heated up. Learn about the atomic arrangement that causes this property and how it is used!

Splitting Water - We will split water into hydrogen and oxygen using electricity to show how electricity from renewable sources can be stored for later use.

Walk on Water - Do you want to "walk on water"? Try it out at our exhibit while exploring the mysteries of non-Newtonian fluid behavior.

Civil & Environmental Engineering

Ⓛ **Beyond Red Light, Green Light** - Learn the inside details of traffic signals and other tools that make our transportation system function. *More 101*

Ⓓ **Build-a-Bridge with ASCE UW** - Build your own bridge out of spaghetti and marshmallows with the American Society of Civil Engineers!

Ⓚ **Citizen Science: Resource Matching for Disaster Scenarios** - What would you do if you suddenly couldn't use vehicles, cell phones or the internet? Participants will find innovative and creative solutions for matching needs and resources in disaster situations.

Ⓓ **Engineering a Safe Water Supply** - Explore a mini-scale water treatment system and develop your own. *Friday only.*

Ⓚ **Engineering Plants to Fight Pollution** Genetically modified plants help to degrade pollutants from live fire military training ranges, home air and greenhouse gases.

Ⓘ **Engineers Without Borders** - Learn about our work in Nicaragua and Guatemala.

Ⓚ **Exploring Earthquakes, Microbes and Quicksand!** - Learn about the effects of earthquakes on geosystems, how bacteria can prevent damage, and explore quicksand!

Ⓚ **Fantastic Modes and Where to Find Them** Using hands-on games, we explore how different modes of transportation work and what we can do to improve them.

Ⓘ **Fun in the Sun** - Hey kiddos! Let's have some fun in the sun as we explore how the sun's energy can charge our phones!

Ⓚ **GCIL: India** - Try a mobile water test, one possible solution to improve water quality around the globe. GCIL: India designs and implements solutions to global grand challenges.

Ⓛ **Industrial X-Ray Scanner** - Engineers and scientists use x-rays to inspect the insides of objects. Learn the science behind x-ray vision. Bring in your interesting objects - we may use them as demos! *More 031*

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

Ⓚ **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?

Ⓚ **Measuring Snow in the Mountains** - Visitors can measure two important snow properties: temperature and snow water equivalent.

Ⓓ **Natural Hazards Reconnaissance Facility** Known as the "RAPID" facility, it provides investigators with the equipment, software, and support services needed to collect, process and analyze perishable materials.

Ⓓ **No Dumping! Drains to River** - Explore water's journey through human environments and learn how engineers are working to keep this precious resource clean.

Ⓚ **Pacific Northwest Transportation Consortium (PacTrans)** - Students will have hands-on activities playing "Rush Hour" which will involve critical thinking and problem solving.

Ⓙ **SASWE Research Group** - Explore how we monitor water from space. *Friday only.*

Ⓚ **Tsunami Loading of Coastal Structures** Produce waves in our wave tank to see the impact on structures and learn how waves form, develop and impact the coast.

Ⓚ **UW Concrete Canoe** - We design, build and race a canoe made out of concrete. Come find out how we can make concrete float!

Ⓛ **Water in Distant Lands** - Water is a scarce resource. See how engineers meet water challenges in different environments around the world. *More 110*

Computer Science & Engineering

All exhibits will be in the CSE Atrium Ⓗ

Allen School Ambassadors - Learn about computer science and play with some of our Edison robots!

Center for Game Science - Educational Video Games - The Center for Game Science creates games that solve problems. Check out some fun video games that help teach math!

Human-Centered Robotics - Ever wondered if robots could do your chores? See some of the coolest robots from UW's Human-Centered Robotics Lab!

Robotic Hand with CSE SAC - Make your own customized robotic hand using ordinary objects like straws and string!

The Animation Capstone - This multi-disciplinary program teaches students the 3D film production pipeline in an environment that illustrates the animation industry.

Electrical Engineering

Ⓖ **100 Years of Wireless** - Listen to a working radio made 97 years ago! Learn about wireless communication from UW student engineers. *2nd floor Atrium*

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

Ⓙ **Light in Action** - Learn about the important role light plays in our daily lives, from powering our devices to coloring the world!

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

Ⓗ **Understanding Human/Machine Interaction Through Video Games** - One small step in a video game, one large step towards dynamic human/machine interaction.

Ⓗ **Walking Robots** - Is walking no more than falling? Come see a walking robot powered by gravity.

Ⓙ **Yeast Balloons** - Learn how to blow up a balloon without using your mouth! Relax while yeast blows up your balloon, using the same process used to make bread!

Human Centered Design & Engineering

Ⓓ **Human Centered Design Prototyping Challenge** - Go behind the scenes of making apps and test out your design skills. Complete mobile app design challenges to see sketches transform into interactive prototypes with Marvel prototyping software.

Ⓓ **Insights for Your Health from Data** - Phones and other devices track data about what you do and where you go. Learn how people use these data to understand and improve their health and wellbeing.

Ⓓ **Project EMAR: A Social Robot** - We are using human centered design to develop a social robot to measure and reduce stress in teens.

Ⓟ **UCD Charrette: A Hands-On Introduction to User Centered Design** - In this workshop, students will work in small groups, guided through the design process for an app: brainstorming user needs, developing use-case scenarios, and creating interaction designs for an application. *Friday only – 9:30 & 10:30am. Tickets available at other HCDE tables.*

Industrial & Systems Engineering

All exhibits will be on Rainier Vista (J)

Accuracy vs. Precision - Learn about scientific measurements with a dart game.

Getting Lean - Learn about efficient manufacturing in our toy airplane, motorcycle, helicopter, train and dune buggy 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

(M) **Captain Materials!** - Learn about materials that will one day make us all superheroes!

(M) **Composites** - Compare the strength of composites with other materials.

(M) **Functional Materials** - Functional materials are engineered to perform specific tasks such as converting mechanical energy to electrical. Learn more about this group of special materials.

(M) **Hot and Cold** - See the effects of very hot and cold temperatures on materials like space shuttle tiles, racquetballs and marshmallows.

(J) **Materials of Food** - Chocolate demonstrates up to 10 different materials fundamentals. That's right, chocolate is a material!

(J) **Materials of Music** - Learn about the advanced composite, metallic, natural and synthetic materials used in modern musical instruments including the piano, violin, cello, acoustic guitar and electric guitar.

(M) **Microscopy in Materials Science** Microscopes are a common tool in biology, chemistry, physics and other sciences. Learn how they work and the ways materials engineers use them.

(M) **Nanomaterials for Medicine** - See how nanoparticles are made and learn how they are used to treat diseases!

(I) **Racing with the Sun** - Join the Clean Energy Institute to see model solar cars, solar cells and a racetrack. Meet scientists discovering new materials for solar cells and batteries.

(M) **Welcome Table** - Find more information about our department and receive a periodic table and a special gift from the students in MSE.

Mechanical Engineering

(H) **Ability & Innovation Lab** - Use the electrical activity of your muscles to control a remote-control car and race your friends!

(I) **ASME@UW** - Explore 3D printing and build mini trebuchets, bristlebots and plastic ping-pong ball launchers.

(E) **Carbon Nanotube-based Wearable Sensors** - See a demonstration of wearable chemical and physical sensors made of carbon nanotubes embedded in tissue paper or a plastic film. *AERB 318*

(F) **Feel the Power: How Body and Mind Feel the World** - Do you know your five senses? Touch is one of them, but how does it work? We'll show you how your body and brain work together to feel the world around you! *MEB 1st floor lobby*

(F) **Fun with Vibrations** - Conduct fun experiments that show phenomena such as resonance. *MEB 114*

(I) **Human Powered Submarine** - Our team designs, builds, and tests a submarine operated by a scuba diver in preparation for the European International Submarine Races in July 2018.

(J) **Husky Robotics** - We compete in the University Rover Challenge, designing and building a rover to assist a future colony on Mars. The rover has a complex arm and is able to navigate autonomously.

(G) **HuskyADAPT** - HuskyADAPT is committed to creating an inclusive community focused on accessible design and play technology. Interact with adapted toys, cars and accessible designs. *2nd floor Atrium*

(K) **Hyperloop** - The UW's Hyperloop team designs and builds a Hyperloop pod prototype as part of the SpaceX-sponsored Hyperloop Competition.

(F) **Marine Renewable Energy** - Explore marine renewable energy with 3D-printed wave energy converters, laboratory-scale turbines, and videos from marine energy sites. *MEB G021*

(F) **Mechanical Test Lab** - Learn how engineers test materials and structures using big machines, little sensors, light waves, and more. Breaking stuff is fun! *MEB 127*

(J) **Robotic Flying Insects**- Tiny robots are very challenging to design and build. We will explain how we make and control honeybee sized flying robots.

(G) **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. *2nd floor Atrium*

(K) **UW EcoCar -** We are team of 60 students competing in an advanced vehicle technology competition to convert a Chevrolet Camaro into a hybrid vehicle. *Tours in Engineering Annex 101-1.*

(K) **UWashington Formula Motorsports** - Come and see our car and learn about what we do.

(F) **WOOF3D: Think, Print, Play** - Visit WOOF3D to learn how 3D printers work and how they're being applied to art, biology and engineering. *MEB G040*

(K) **Wrinkles in Soft Materials** - Join us for experiments on wrinkling, folding and creasing in soft materials!

Student Groups

(J) **Advanced Robotics UW** - Meet our squad of next generation robots and drive a robot.

(K) **Design Build Fly @ UW** - DBF focuses on designing and building remote controlled planes to compete at the AIAA competition.

(J) **Ice Cream in a Bag** - Learn the science behind making ice cream in a bag!

(J) **Rubbing Up Against Static Electricity** Generate static electricity by rubbing or "charging" a balloon and observe the effects of static electricity on different types of matter.

(J) **Slime and Straw Rockets with Tau Beta Pi** Discover how engineers use unique material and structural properties for applications from medicine to flight! Create your own slime and straw rockets.

(I) **SWE Goos Big or Goos Home** - Have the slime of your life, once and for oil! Make magnetic slime and understand the impacts of oil spills on animals and the environment.

(J) **Unbreakable Ice?** - The combination of materials to form composites can improve the durability and strength of objects. Come and destroy some composite ice materials to learn firsthand!

(D) **Underwater Robotics** - See underwater robots (ROVs) built by a student group, and operate one in an aboveground pool!

(cont. on back)

Other

Ⓗ **Accessible STEM for All!** - Visit our booth to see how STEM and computing is accessible to all students, including those who have disabilities. We have accessible science tools, and you can even make your name in Braille!

Ⓘ **Amazing Molecules** - The Molecular Engineering Materials Center (MEM-C) will share amazing properties of materials that are just one atom thick.

Ⓙ **Bioresource Science and Engineering** Make paper from different materials and learn how to apply science and engineering to the sustainable production of fuels, chemicals, and products from biomass.

Ⓕ **Boeing Advanced Research Center** - See how humans and robots will collaborate on manufacturing future airplanes with BARC@UW. *MEB G046*

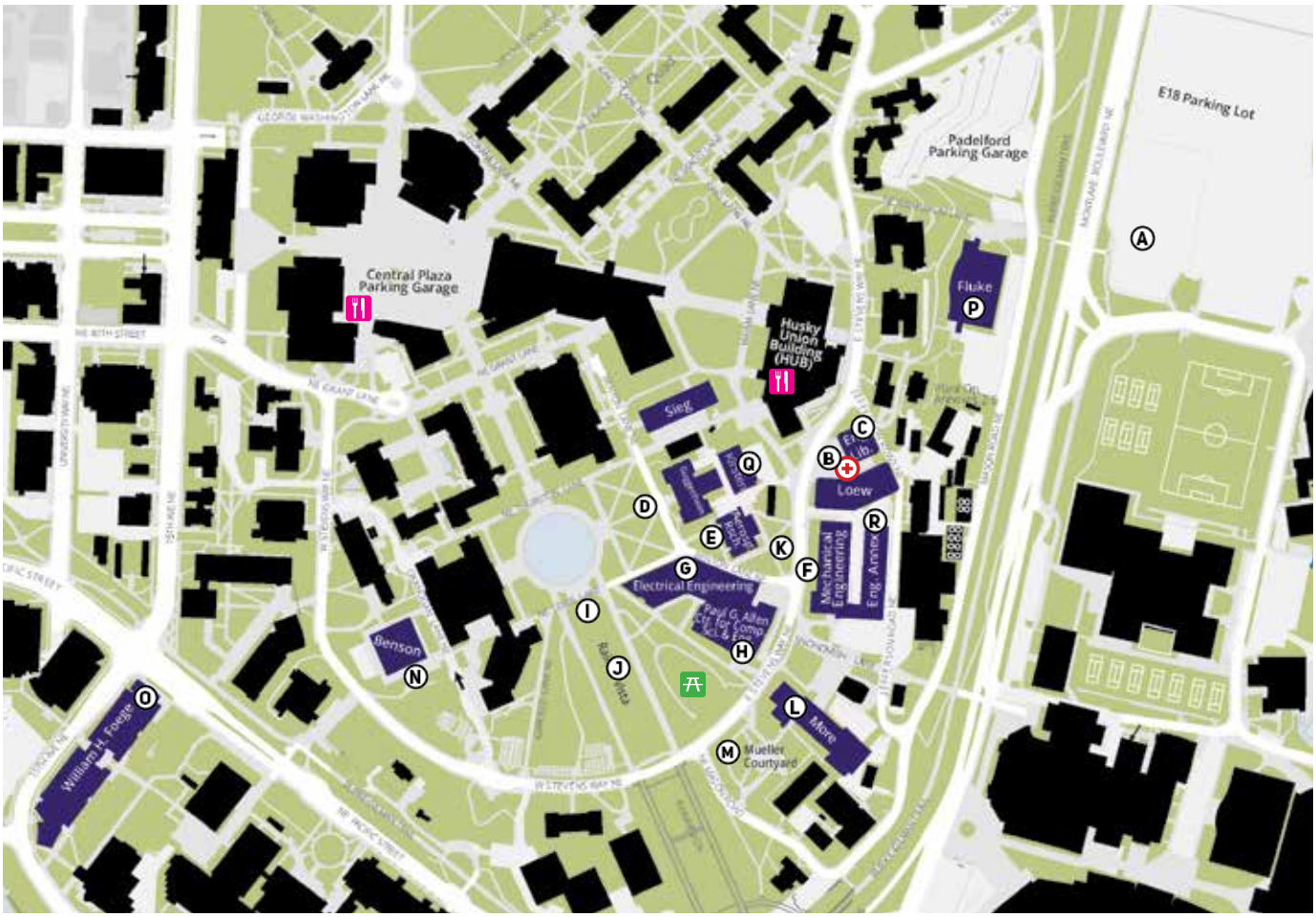
Ⓒ **Kids are Inventors Too!** - Learn about five American kids who invented and patented their own inventions, and learn how you can be an inventor too!

Ⓗ **Robots, Muscles and Brains!** - Some people without hands use robot grippers instead. Can you train your brain and muscles to control a robot? Try controlling a robot with your muscles!

Ⓘ **Smashing Protons** - Play computer games that simulate LHC collisions and recreate the Big Bang conditions. Learn elementary particle physics through board games.

Ⓖ **Washington Nanofabrication Facility / NanoEngineered Systems Institute** - See how the nanoelectronics that make your phones and computers work are made. *2nd floor Atrium*

2018 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 Lawn and Tent
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. Fluke Hall
Q. Kirsten Wind Tunnel
R. Engineering Annex

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