



ENGINEERING DISCOVERY DAYS

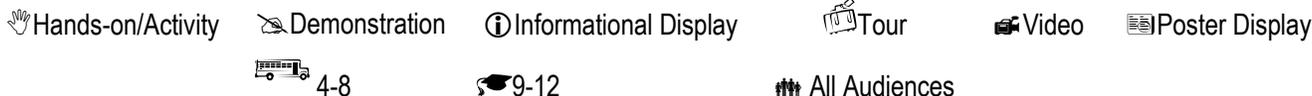
**Friday, April 26, 2013 9am- 2pm &
Saturday, April 27, 2013 10am- 2pm**

Engineer *YOUR* Life!

The UW College of Engineering is more than just a national leader in educating engineers for the 21st century. We're a diverse community of innovators, passionate about collaboration, teaching, and learning – a community dedicated to mentoring the next generation of researchers, entrepreneurs, and corporate and civic leaders.



Following is a **Program of Exhibits** and attractions that form this year's Engineering Discovery Days. The enclosed map is a guide to the various exhibits. The number listed next to each exhibit corresponds with the number on the enclosed map. The icons next to each exhibit correspond to the table below identifying the 'type' of exhibit.



Aeronautics and Astronautics

Autonomous Control of Fish RobotsAERB Lawn (12)
Demonstration of autonomous operation of underwater vehicles that move using fins rather than propellers.

Ram Accelerator Direct Space Launcher
.....AERB 012 (12)
The fastest ramjet engines in the world are flown in the ram accelerator laboratory for studying ways to launch payloads directly into space!

Unmanned Aerial Systems and Drones
.....AERB 139 (12)
Come learn about advances in unmanned aerial systems and drone technologies and fly flight simulators. (Fri. Only)

ZaP Flow Z-Pinch Experiment.....AERB 030 (12)
Come view our plasma physics experiment that investigates the use of flows to stabilize an otherwise unstable plasma configuration. The experiment is explored for use in fusion energy and space propulsion.

Steady Inductive Helicity Injected Torus (HIT-SI)
..... AERB 4th Floor (12)
Come investigate helicity injection current drive in magnetized toroidal plasmas of interest in controlled nuclear fusion.

Wing-Tip Vortex VisualizationGuggenheim 114 (13)
Come visualize the wing-tip vortex seen at the end of the wing of an airplane.

Bioengineering

All Exhibits will be on Rainier Vista (10) on Friday 4/26 and the Foege Building (17) on Saturday 4/27.

Synthetic Biology
Come learn how cells can be used to make medicine and biofuels. (Fri. Only)

Point-of-Care Diagnostics for Global Health
Explore simple, inexpensive devices for use in point-of-care diagnostics, which can be used for global health applications.

Nanomedicine: Preventing Disease with Super Small Particles
Come learn about making nanoparticles and nanofibers for the controlled release of medicine for HIV prevention applications.

Body in a Bag
Come view implants and biomaterials. (Fri. Only)

Engineering a Micro Environment for Heart Cells
Learn how fabrication of nanoscale (10^{-9}) structures can provide alignment and organization to cells, specifically for building heart tissues. (Sat. only)

Exploring the Small World of Cells with Microdevices
Come and learn about miniature technologies that allow us to see and control the small world of cells.

DNA Extraction from Fruit
Come extract DNA from fruits such as strawberries and kiwis so you can see, touch, and take home some DNA!

Giachelli Lab.....Rainier Vista (10)
Come learn about the pathways that lead to abnormal calcification in the body and what strategies have been developed to treat it.

Center for Nanotechnology

Nanotechnology/Molecular Engineering
.....Paul G. Allen Center for CSE- Atrium (8)
Come see nano-relevant demonstrations.

Nano Science...Paul G. Allen Center for CSE- Atrium (8)
Come view interactive displays of nano and molecular science.

Center for Sensorimotor Neural Engineering

Sensorimotor Neural Engineering.....Rainier Vista (10)
Come explore Sensorimotor Neural Engineering through a variety of hands-on objects to touch and feel. (Fri. Only)

Chemical Engineering

Chemistry to Dye For.....Drumheller Fountain (11)
Visitors will learn about the chemistry of dyes, how they produce colors, and how they are used. Visitors will have the chance to dye wool with common kitchen materials.

Silly Science..... Benson Hall (16)
Polymers and plastics are everywhere. Learn more about them and take a crack at making your own "Silly Putty."

Biodiesel Cooperative..... Benson Hall (16)
The Biodiesel Cooperative is a student-run organization that seeks to increase campus sustainability by converting used cooking oil from Housing and Food Services into biodiesel for use by campus operations.

❖❖❖ Cooler than Ice *Benson Hall (16)*
Come check out the science of cold! Ever hear a spoon sing? Wanna see a film canister blow its top? How about inflating a balloon with a solid? Come see it all and learn the science behind these wonders at the dry Ice exhibit.

Civil and Environmental Engineering

❖❖❖ ① How Traffic Signals Work *More Hall 101(5)*
Demonstration on how traffic signals work.

❖❖❖ Measuring Snow in Mountains *Rainier Vista (10)*
Our drinking water comes from the melting snowpack every spring. Join us to see how and why we measure snow in the mountains! (Fri. Only)

❖❖❖ Environmental Fluid Mechanics *Rainier Vista (10)*
Come see demonstrations of how fluid mechanics and the environment exchange fresh and salt water at the coasts. (Fri. Only)

❖❖❖ Photochemical Activation of Free Chlorine *Rainier Vista (10)*
Come learn how the production of ozone by sunlight disinfects chlorine resistant pathogens. (Fri. Only)

❖❖❖ Simulating Traffic *More Hall 101 (5)*
Come see a demonstration of traffic simulation software. (Fri. Only)

Computer Science and Engineering

All exhibits are held in the Paul G. Allen Center Atrium for Computer Science and Engineering (8)

❖❖❖ AccessComputing
Learn about technology that can increase the participation of people with disabilities in computing careers and hear about activities for students.

❖❖❖ AccessSTEM
This hands-on display showcases accessible science equipment and offers information about how students with disabilities can fully engage in science, technology, engineering, and mathematics.

❖❖❖ Animation Program Demonstrations
See the latest innovative animated short films from the CSE classrooms and workshops.

❖❖❖ Center for Game Science
Play game demos from the innovative Center for Game Science that focus on solving hard problems facing humanity in a game-based environment.

❖❖❖ 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. From the basement labs to the sweeping views of Lake Washington, it isn't all just clicks and mortar! Tours run every 1/2 hour from 10am -1:30pm. (Sat. Only)

Sensor Systems Laboratory

❖❖❖ Wireless Power and Personal Robotics
Come and explore electricity over thin air, energy harvesting sensors, and the next generation of personal robots.

❖❖❖ 3D Scanning with Kinetics
Become a 3D model! See live demos of people being scanned with a Kinetic camera to create 3D models.

❖❖❖ DawgBytes: A Taste of CSE
Computer science comes alive through robot programming and puzzle solving.

❖❖❖ MobileAccessibility
Come see the bridge to the world for blind, low-vision, and deaf-blind people. Read graphs and diagrams using only your fingers on the smartphone camera. Input text and digits without seeing the smartphone screen.

Electrical Engineering

❖❖❖ Wireless Power and Personal Robotics *Paul G. Allen Center for CSE- Atrium (8)*
Come and explore electricity over thin air, energy harvesting sensors, and the next generation of personal robots.

❖❖❖ MobileASL *Paul G. Allen Center for CSE- Atrium (8)*
Come explore MobileASL -our video cell phones for people who are deaf. (Fri. Only)

❖❖❖ Vid2Speech *Paul G. Allen Center for CSE- Atrium (8)*
Come and explore Vid2Speech, which uses video to help kids, who are autistic and nonverbal, communicate. (Fri. Only)

❖❖❖ The Glowing Pickle *EEB 159 (9)*
What happens to a pickle when you plug it into a wall outlet? Don't try it at home ... but come watch what happens! (Fri. Only)

❖❖❖ Racing With Light *EEB 2nd Floor Atrium (9)*
Explore interesting phenomena with light and race solar cell powered toy cars! (Fri. only)

❖❖❖ High Voltage Arcs and Sparks *Paul G. Allen Center for CSE- Atrium (8)*
Electrostatic and high frequency high voltage generators will be demonstrated, including a Jacob's ladder, Thompson coil, Van de Graaf, and Tesla coil.

❖❖❖ Electro-Fun *EEB 2nd Floor Atrium (9)*
Test your steady hands with our electric circuit games or go fishing with our electromagnetic fishing poles! Or build a magnetic motor to spin your copper wire creations! (Fri. Only)

❖❖❖ Dietary Data Recording System *EEB 2nd Floor Atrium (9)*
Come see the SEAL's Dietary Data Recording System (DDRS) demonstration. DDRS uses a projected laser grid and a smartphone camera to compute the volume of objects.

❖❖❖ Waste to Watts: Making Microbial Fuel Cells *EEB 2nd Floor Atrium (9)*
Explore the power of microbes and make your own microbial fuel cell.

 **One of These Batteries is not like the Other***EEB 159 (9)*
What makes a battery good? Bad? Is a potato any better or worse than an ordinary AA battery? Come find out! (Sat. Only)

Human Centered Design and Engineering

 **Max Five: Bioinformatics Gaming**.....*Sieg Hall (14)*
Come test an interactive game, which is currently a research project by an HCDE PhD student. (Sat. Only)

 **Language Partner Online**.....*Sieg Hall 210 (14)*
Experience the interactive Japanese conversation practice software that the Technical Japanese Program developed.

 **Design Your Own App***Drumheller Fountain (11)*
Come experiment with the creative aspect of design and technology by designing your own mobile app on iPads. (Fri. Only)

Industrial and Systems Engineering

All exhibits for Industrial and Systems Engineering will only be held on Friday, April 26.

 **How Sweet It Is**.....*Rainier Vista (10)*
Learn about probability and statistics with M&Ms. How many red ones are in your sample?

 **High-Stakes Routing for Humanitarian Relief***Rainier Vista (10)*
Delivering critical supplies is an important function of the humanitarian relief mission. Can you determine the shortest route to deliver emergency services?

 **Driven to Distraction**.....*MEB G32D (3)*
Check out an instrumented car that helps researchers at the UW understand why we drive the way we do and why some drivers get more distracted than others.

 **The Learning Curve Maze Challenge**.....*Rainier Vista (10)*
Explore the concepts of the learning curve by completing a human-sized maze at high speed that will demonstrate how your performance improves with experience.

Materials Science and Engineering

 **MSE Welcome Table**..... *Roberts Entrance (6)*
Come and visit our Information table to receive more information on MSE. And get a pocket periodic table!

 **Electron Microscopy**..... *Roberts EMC (1st Floor) (6)*
Come learn about the principles and applications of scanning electron microscopy. (Fri. Only)

 **Optical Properties of Composite Materials** *Mueller Hall 168 (7)*
Come explore the optical properties of materials.

 **Slip Casting***Mueller Courtyard (7)*
Slip casting, a common technique for making ceramics, will be demonstrated in this exhibit. Visitors are encouraged to participate.

 **Organic Electronic and Photonic Materials** ... *Rainier Vista (10)*
Come learn about organic photonic and electronic materials! Make multicolored "Silly Putty!"

 **GEMSEC** *Rainier Vista (10)*
Materials science inspired by nature.

 **The Effects of Hot & Cold on Materials** *Rainier Vista (10)*
See the effects of very hot and very cold on materials from space shuttle tiles to racquet balls to marshmallows.

 **The Material Science of Music** *Rainier Vista (10)*
Musical instruments are made from a wide range of materials that include bio-materials, metal alloys, and polymers.

 **Opportunities in Undergraduate Education***Mueller Hall 154 (7)*
Get a feel for what it would be like to learn and work as a materials science engineer from other students. (Sat. Only)

 **Composite Materials** *Mueller Courtyard (7)*
Learn about composite materials and how you use them every day.

 **Solar Powered Cars** *Mueller Courtyard (7)*
Come play/experiment with solar-powered cars and learn about the basics of photovoltaic devices and solar energy.

 **Ceramic Waterworks** *Mueller Courtyard (7)*
Come examine how ceramic filtration technologies work to separate colored sand via filtration.

 **The Wonder of Nano Materials***Mueller Hall 170 (7)*
Find out about nano materials through scale models, optical imaging and demonstrations of phase transition.

Mechanical Engineering

 **Tip Sensor for Biomedical Devices***AERB 3rd Floor (12)*
Tip sensors are demonstrated to concentrate bacteria and DNA. (Fri. Only)

 **Fabulous Fun with Fused Filament Fabrication** *MEB 252 (3)*
Come view a demonstration of Big Red, our large 3D printer as well as smaller desktop printers.

 **Mechanical Testing Lab** *MEB 127 (3)*
Learn how engineers test materials and structures using big machines, little sensors, light waves, and more.

 **Marine Renewable Energy***MEB G32A-1 (3)*
Come view laboratory and field experiments related to marine renewable energy, including a micropower hydrokinetic turbine and stereo-optical camera system. (Fri. Only)

 **Solar Collector** *MEB Front Courtyard (3)*
Student-built devices for harvesting energy from the sun.

 **Mechanical Engineering Student Machine Shop**
..... *EGA 116 Instructional Shops (4)*
See the full service machine shop students use to manufacture parts for their projects.

 **Fun With Flames** *MEB G32 (3)*
Come see how engineers study flames and fuels by making them move, pop, and dance. The demonstration will take place every half hour on both days.

 **Human Powered Submarine**
..... *MEB Front Courtyard (3)*
Come see our working human-powered submarine, as prepared for competition.

 **Fun With Waves**
..... *MEB 127 (3)*
Come and explore advanced materials and structures with novel material properties.

 **Energy Efficient Coatings**
..... *Fluke Hall 239 (15)*
Take a lab tour and see the synthesis and characterizations of nanometer thick coatings that can help us save energy.

 **Atomic Force Microscopy** *MEB B012 (3)*
Meet the atoms using atomic force microscopes.

 **Solhiem Additive Manufacturing Lab** *MEB G41/42 (3)*
Come see demonstrations of various types of 3D printing technologies.

 **Modern Optics** *Engineering Annex 101-6 (4)*
Come see demonstrations on the applications of modern optics in mechanical engineering.

 **PZT Thin-Film Micro-Actuators and Sensors** *MEB 114 (3)*
Sometimes the smallest things can make big impacts. Come and find out how we use special materials to make tiny little devices for implantable hearing aids!

 **Microcellular and Nanocellular Polymers/Plastics**
..... *MEB 129 (3)*
Learn about polymer foams of micro and nano sized bubbles. See live demonstrations of the processing steps.

 **The Little Cell That Could Tug** *AERB 317 (12)*
Cells are the basic building blocks of our body, but part of their job is to crawl, pull, and tug. Come learn about how strong cells can be and how we measure their nanoscale forces and build your own cell hand puppet! (Fri. Only)

Engineering Library

 **The Ethical Engineer**
..... *Engineering Library 1st floor (2)*
Come examine the ethical issues facing engineers in areas such as bioengineering, environmental engineering, nanotechnology, and synthetic biology.

Student Programs, Societies, & Community Organizations

Disabilities, Opportunities, Internetworking, and Technology (DO-IT)
 **AccessSTEM & AccessComputing**
..... *Paul G. Allen Center for CSE- Atrium (8)*
Come and see assistive technology, accessible science equipment, STEM mentors, etc.

Promoting Equity in Engineering Relationships (PEERs)
 **Who can be an engineer?** *Rainier Vista (10)*
An interactive display and activity showcasing diversity in engineering. (Sat. Only)

Emerging Leaders in Engineering (ELE)
 **Student Competition** *Drumheller Fountain (11)*
ELE Scholars are hosting a student competition. Come pick up a ballot and vote for your favorite exhibit at our booth. *Student competition participants can be viewed on the next page.* (Fri. Only)

Engineering Ambassadors
 **Engineering Ambassadors Information Session**
..... *Rainier Vista (10)*
We are student representatives for the College of Engineering who give a variety of outreach presentations to schools (K-12) throughout the state. Come drop by and see what the UW Engineering Ambassadors can offer your school!

Physics
 **ATLAS Interactive Event Display** ... *Rainier Vista (10)*
Come explore the digital reconstruction of particle collisions in the ATLAS detector.

Phi Sigma Rho Engineering Sorority
 **GAK is WHACK! What is it?** *Mueller Courtyard (7)*
Is it a solid? Is it a liquid? Come explore the properties of polymers.

Student exhibitors will be competing for several awards. Alumni judges will decide who wins “Just for the Fun of It,” “Engineering Excellence” and “Community Involvement” awards. All visitors – **YOU** – can vote in the “People’s Choice” category. Please visit the Emerging Leaders in Engineering (13) booth to receive a ballot to vote for your favorite exhibit.

Student Exhibit Competition

- Hands-on/Activity
 Demonstration
 Informational Display
 Tour
 Video
 Poster Display
- 4-8
 9-12
 All Audiences

UW iGEM

International Genetically Engineering Machine*Rainier Vista (10)*
 Come learn about synthetic biology with UW iGEM.

Engineers Without Borders*Rainier Vista (10)*
 Come join Engineers Without Borders students and learn about the techniques used to create solutions in developing communities!

UW AIAA

Water Rockets!*Rainier Vista (10)*
 Come learn about the department of Aeronautics and Astronautics and launch water rockets!

Tau Beta Pi (The Fun Side of) Projectile Motion*Rainier Vista (10)*
 Our exhibit will demonstrate (the fun side of) projectile motion. We will have a physics demo of a monkey falling out of a tree and a water balloon launch.

UW ASME

Penny's on Foil*Drumheller Fountain (11)*
 How many pennies can your boat (a 12 in. by 12 in. piece of foil) hold before sinking? This fun design challenge teaches students and adults about the bouncy forces.

UW Formula SAE Motorsports Racing with the UW*Outside of MEB (3)*
 Engineering students design and build two formula-style racecars. We compete against other universities from around the World. Come check out our newest race car as well as some student-designed and student-built parts from previous years.

UW Robotics Team*Rainier Vista (10)*
 Come see our quadcopter and explore opportunities for elementary through high school students to get involved building robots.

UW Concrete Canoe Team*Rainier Vista (10)*
 Every year we make a concrete canoe to compete in competitions. Come see our display and participate in hands-on activities that demonstrate the science behind making our concrete canoe.

UW Human Powered Submarine Team*Rainier Vista (10)*
 Come see our past and current submarines, submarine trainer, and a poster showcasing each design team's work.





Scavenger Hunt 2013

Use this Scavenger Hunt to explore Engineering Discovery Days and record what you learn! You do not need to follow the order – in fact, if everyone did, we would have a huge traffic jam! If a particular exhibit seems crowded, just move on and return later. Use your map to find the exhibits and be sure to answer at least TWO questions for both sections. Note that there are many more exhibits than represented in this scavenger hunt. Enjoy exploring all exhibits at Engineering Discovery Days. HAVE FUN!

Student Exhibit Competition

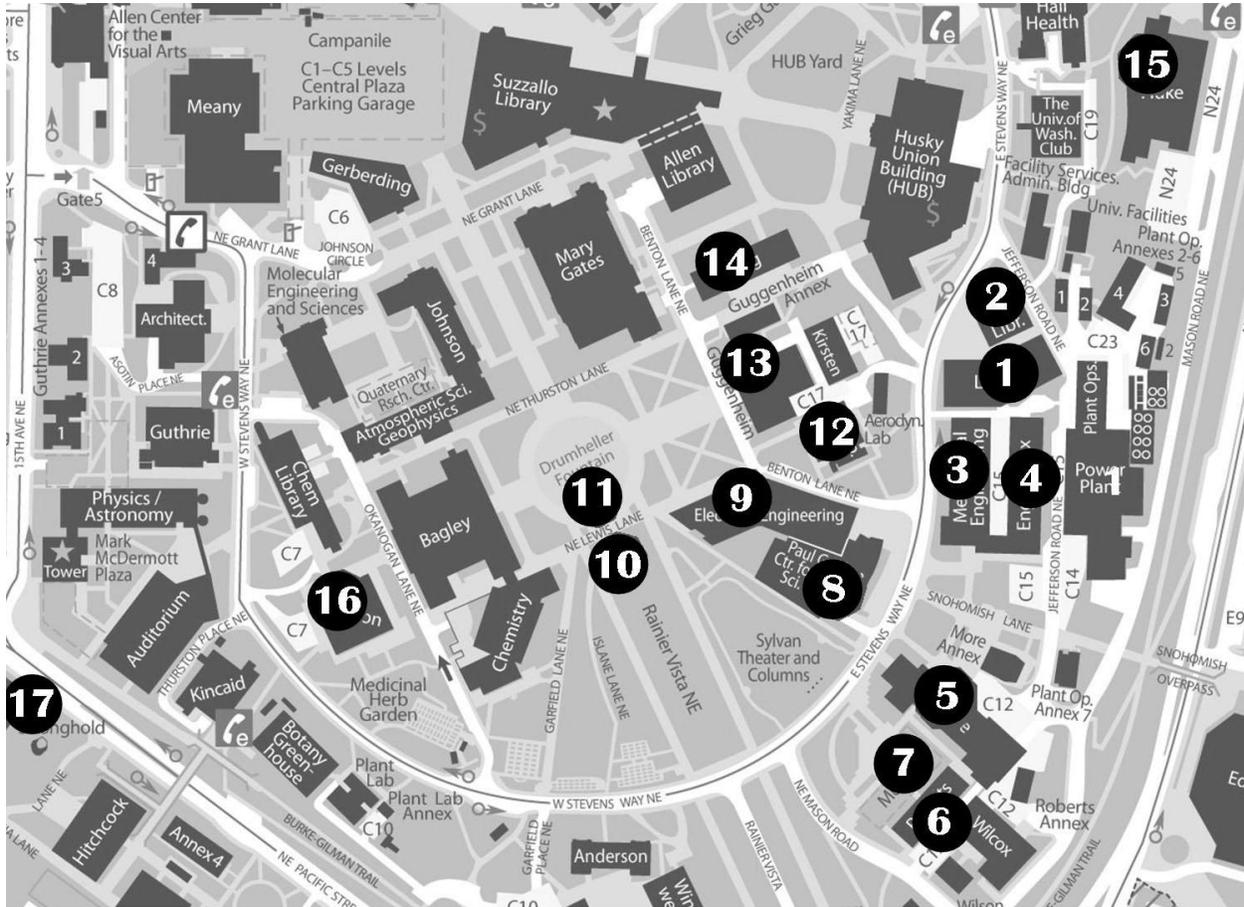
- 1) Is pure oxygen safe to breath at 50 feet below water?.....UW Human Powered Submarine *Drumheller Fountain* (11)
- 2) What is the Formula SAE car made out of?.....Formula SAE Motorsports *Outside of MEB* (3)
- 3) What is the average density of concrete?.....UW Concrete Canoe Team *Rainier Vista* (10)

Department/Program Exhibits

- 4) Polymers are made out of long strands of _____?.....Phi Sigma Rho Engineering Society *Mueller Courtyard* (7)
- 5) What is the name of the snail shell-like part in the inner ear that allows people to hear?.....PZT Thin-Film Micro-Actuators & Sensors *MEB 114* (2)
- 6) How tall are you in nano meters?.....Center for Nanotechnology *Paul G. Allen Center Atrium* (8)
- 7) What vegetables make great dyes?.....AICHe *Drumheller Fountain* (11)
- 8) How does a traffic signal know when a car is stopped and waiting for a green light?.....PacTrans STAR Lab *More Hall 101* (5)
- 9) How much does it cost to send a 100 pound child into orbit using the space shuttle?
.....Aeronautics and Astronautics *AERB 012* (12)
- 10) What color Jello would absorb the light from a blue laser?.....Materials Science & Engineering *Mueller Hall 168* (7)
- 11) Where can you learn about routing of emergency supplies?.....Industrial & Systems Engineering *Rainier Vista* (10)
- 12) If you stretched out a single strand of DNA, how long would it be?...Bioengineering (BMES) *Rainier Vista (Fri. Only)* (10)
- 13) What three things do you need to have fire?.....Mechanical Engineering *MEB G32* (3)
- 14) Which is the better battery: A Potato, A Lemon, a AA Battery, or a Car Battery?.....Distributed Microsystems Lab *EEB 159* (9)
- 15) Can you find a man in a "bunny suit"?.....NINN *Paul G. Allen Center Atrium* (8)

ENGINEERING DISCOVERY DAYS

Map of Exhibits and Buildings



**Welcome Tent/Programs/Information/
Lost Children/Non-emergency Medical
Needs*:**

1- Loew Hall

Aeronautics & Astronautics:

12- Aerospace & Engineering Research
Building (AERB)
13- Guggenheim Hall

Bioengineering:

10- Rainier Vista
17- William H. Foege Bioengineering
Building

**Center for Nanotechnology/Center for
Sensorimotor Neural Engineering**

8- Paul G. Allen Center for CSE
10- Rainier Vista

Chemical Engineering

16- Benson Hall
11- Drumheller Fountain

Civil & Environmental Engineering:

5- More Hall
10- Rainier Vista

Computer Science & Engineering:

8- Paul G. Allen Center for CSE

Electrical Engineering:

8- Paul G. Allen Center for CSE
9- Electrical Engineering Building

Human Centered Design & Engineering:

14- Sieg Hall
11- Drumheller Fountain

Industrial & Systems Engineering:

10- Rainier Vista
3- Mechanical Engineering Building

Materials Science & Engineering:

6- Roberts Hall
7- Mueller Hall
10- Rainier Vista

Mechanical Engineering:

12- Aerospace & Engineering Research
Building (AERB)
3- Mechanical Engineering Building
4- Engineering Annex
15- Fluke Hall

Engineering Library:

2- Engineering Library

**Student Programs, Societies &
Community Organizations:**

8- Paul G. Allen Center for CSE
10- Rainier Vista
11- Drumheller Fountain
7- Mueller Hall

Student Competition:

10- Rainier Vista
11- Drumheller Fountain
3- Mechanical Engineering Building

*Call 911 for Emergency Medical Needs