WILSON STUDENTS HEAD TO PRESTIGIOUS SUMMER APPRENTICESHIPS IN SCIENCE AND ENGINEERING INTERNSHIPS (2012)

Student: **Goshina Meman** (incoming junior, parents – Saad and Kosrat Meman)
Mentor: Dr. David Sahn, Oregon Health & Science University
Internship: **Modeling Blood Flow and Function in Diseased Hearts**. The Cardiac Fluid Dynamics and Imaging Lab in Pediatric Cardiology at OHSU offers a wide variety of research and clinical experiences. The mentor's research group works with echocardiography and ultrasound imaging technology to study cardiac fluid dynamics and mechanical actions of the heart. The Director of the Lab (the mentor) is part of a clinical group that sees patients with all forms of congenital heart disease. The patient population ranges from the pre-born to age 21. Goshina will design and build heart models (using rubber valves, pumps, tubing, etc.) designed to mimic cardiac disease and scan it using clinical ultrasound scanners capable of Doppler flow mapping and tracking methods for analyzing heart muscle mechanics. The ultimate goal of this research is to improve cardiac diagnosis. Tasks will include literature reviews, scanning, modeling, evaluating statistics, and digital image manipulation.

Student: **Raichle Dunkeld** (incoming junior, parents – Lisa Broten and Gordon Dunkeld)
Mentor: Dr. Paul Tratnyek, Center for Coastal Margin Observation & Prediction (CMOP)
Internship: **Environmental Fate and Effects of Contaminants**. Raichle will participate in research on the fate and effects of contaminants in the environment. In surface water and groundwater, contaminants undergo transformations that transform them into more or less harmful products. Understanding these processes is one of the major challenges in environmental science and engineering. Raichle will participate in laboratory studies of these processes, and possibly field work or computer modeling. Methods that will be used may include spectroscopy, cytometry, chromatography, and microscopy. Eventually, the results should contribute to the scientific basis for regulation and remediation of environmental contamination. Additional information on the mentor's research group can be found at: www.ebs.ogi.edu/tratnyek.

Student: **Clark Hollenberg** (incoming senior, parents – Molly Kellogg and Stan Hollenberg)
Mentor: Dr. Andrew Rice, Portland State University
Internship: **Research on Greenhouse Gases**. Future forecasting of the Earth's climate relies heavily on our ability to predict concentrations of atmospheric trace gases. Research focuses on using measurements of greenhouse gases and their naturally occurring stable isotopes to better understand their sources and sinks. Current research projects include: measuring elevated levels of carbon dioxide in ambient air in Portland; investigating long term trends in atmospheric methane using a rare air archive; studying methane and nitrous oxide emissions from plants; understanding emissions of methyl halides from wetland ecosystems. Interns will learn about how greenhouse gases impact Earth's climate and have the opportunity to apply their knowledge towards a current research question. Clark will be involved in both field sample collection and laboratory analyses. Field experiments may include working in the Portland State University greenhouse taking air and water samples from controlled experiments with plants or collecting air samples in Portland locations. Laboratory measurements will include measuring trace gas concentrations on gas chromatograph and infrared gas analyzers. Clark will also analyze data to determine trends in concentrations in space and time using mathematical and computational techniques. Interns are expected to have completed at least two science courses at the high school level (chemistry, physics, biology). Additional information can be discovered at: www.web.pdx.edu/~arice/research.php.

Student: **Philip Blatt** (incoming senior, parents – Janine and John Blatt)
Mentor: Dr. Mark Weislogel, Portland State University
Internship: **Micro-Gravity Fluids Research**. Portland State University's Mechanical and Materials Engineering Department is currently developing methods to compute, fabricate, and demonstrate macro-scale capillary flows and phenomena in the brief low-gravity environment of a drop tower, newly constructed on the PSU campus. The experiments are conducted in part to support ongoing joint NASA and PSU space experiments currently on board the International Space Station. In these tests the experimental data require data reduction via image analysis software written by NASA engineers. Philip will assist with NASA-related experiments that concern the behavior of large-scale capillary flows that occur only in the low-gravity environment of space and are critical to life support systems and fuels storage. Applicants with some or all of the following experience are preferred: solid modeling, test fixture design and assembly, team project experience, experience with video photography, digitization, image analysis, web programming, and animation software.

Student: **David Anuta** (incoming sophomore, parents – Karen Russell and Karl Anuta)
Mentor: Mr. Anant Adke, Mentor Graphics Corporation
Internship: **Software Development and Testing**. This internship involves the development and testing of high performance graphical software. Mentor Graphics makes software to enable the design and development of electronics systems and integrated circuits. David will be designing, developing, debugging and supporting software for visualizing integrated circuits. David will collaborate with a group of senior engineers, quality assurance, and product marketing staff. For more information, see www.mentor.com/products/ic_nanometer_design/verification-signoff/physical-verification/calibre-nmdrc/.

Student: **Adam Oken** (incoming senior, parents- Melanie Fried-Oken and Barry Oken)
Mentor: Mr. David O'Claire, Bonneville Power Administration
Internship: **Structural Engineering Internship**. The Bonneville Power Administration (BPA) is a federal nonprofit agency responsible for transporting the region's hydro, wind, nuclear and other electrical power to local power distribution companies or larger customers. Within BPA's 300,000 square mile service are over 15,000 miles of high voltage transmission lines, 400 substations and 200 communication sites. The Structural Design (TELD) group within BPA, designs and assists with the construction and maintenance of the thousands of structures and foundations on BPA's system. Adam will work with the Structural Design group. First, Adam will be responsible to collect and organize BPA's structural data for communication sites. The data include tower drawings, foundation drawings and structural calculations. The student will inventory the drawings, convert them to scanned pdf files and transfer them to BPA's electronic network. This critical task will greatly improve access to this information and enhance the structural department's ability to serve its customers. Second, Adam will participate in the full range of active structural design projects. This participation will consist of frequent trips to the field, use of structural design software and the development of design drawings using computer drafting. Adam will be exposed to a broad range of engineering activities and will have the opportunity to tailor the experience to his own personal interests under the guidance of the mentor. For general information about BPA, see: www.bpa.gov/corporate.

Additional summer STEM opportunities can be found here:
http://www.saturdayacademy.org/Portals/0/documents/ASE%20Documents/Other%20STEM%20Resources2.pdf.