



SciTech Northwest 2016:

Inventions are Clean, Collaborative and Cleared for Launch

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INTRODUCTION

The day after the 2016 United States Presidential election, Washington State research organizations were ready to launch clean energy, biotechnology and data science solutions positioned to move the country forward on a positive note. At SciTech Northwest 2016, sponsored by [Technology Alliance](#) on November 9, Washington research institutions on both sides of the Cascade Mountains demonstrated market-ready research and services to invited investors and technologists. The forum focused on three cutting edge technologies—cyber and data analytics, clean energy and biotechnology. Out of the 120-150 people in attendance, I estimated that one fifth were women.

THREE TECHNOLOGY TRACKS, THREE GOALS

The goals of the event's technologies were to use technology to reduce human's negative impact on the global environment while improving efficiency and reliability. Solving all three challenges simultaneously was a victory for the solutions presented. Technology solutions developed by [Pacific Northwest National Laboratory](#) (PNNL) in the Tri-Cities area of eastern Washington, the [University of Washington](#) (UW) in Seattle and [Washington State University](#) (WSU) in Pullman provided hands-on demonstrations for just-in-time sensor data feedback, bioproducts and engineering and manufacturing techniques that would help companies and consumers achieve a more balanced environmental and technological footprint while reducing time and labor.

Cyber and Data Analytics

The cyber and data analytics track had exhibits of analytics software and hardware solutions that enabled humans to make knowledge-based decisions and take action quickly to avoid threats. Dr. Luke Gosink, PhD, from PNNL demonstrated Hydra Software, a software and sensor array with applications for early detection of power fluctuations and disease in animals. In PNNL's practical implementation, cattle ranchers could put sensor harnesses on cattle to collect vital signs and wirelessly send the information to a control center, enabling operators to make just-in-time decisions about animal health and safety. Early detection of disease could speed immunization, inoculation and/or quarantine decisions by as much as 36 hours, thereby saving thousands of cattle

from exposure and infection. Gosink said PNNL researchers were discussing a large-scale pilot project with a major U.S. swine producer to use the harnesses with 30,000 pigs.

Cameras mounted on flying drones combined with algorithms enabled researchers to evaluate plants on farms. At WSU, Dr. Sindhuja Sankaran's team developed a data analytics and visual processing system that used visual data gathered from drones to determine the health of plants in large-scale agriculture operations. Instead of a person spending the better part of a day walking the fields with more than 800 plant plots to assess how well plants were doing on various allotments of water, a person could spend less than 10 minutes flying a drone systematically over the field, gathering visual images of crops. Sankaran said the algorithms then process the images to detect signs of plant flowering, hydration and disease, for example.

PNNL's Scalable Reasoning System (SRS) is a software framework, analytics and visualization engine that enables users to evaluate large quantities of unstructured information and develop an information schema for their subject matter. The system is agnostic in regards to business vertical markets; given any real-time electronic data source, such as peer-reviewed research articles, a business can curate a collection of data pertaining to their subject interests and tag them for further evaluation and review. Algorithmic models "uncover relationships, patterns and trends in the data," according to the product brochure. A web browser graphical user interface (GUI) provides visual feedback about the information and enables users to select and classify files.

Biotechnology and Clean Energy

Treating kidney stones, developing vaccines and expanding glucose monitor capabilities were a few of the biotechnology displays addressing a wide variety of health-based activities. In keeping with the green revolution, PNNL had a liquefaction technology that converts biomass into biocrude and fuels.

At WSU the Hydrogen Properties for Energy Research (HYPER) division developed a transportable module for liquid hydrogen fuel. While the current source of hydrogen gas is run-off from the fossil fuel natural gas, the output of hydrogen fuel is water, which has zero carbon emissions. There are fueling stations in California, but installing stations along the entire west coast has proved challenging due to transportation limits and costs of setting up fueling stations. WSU's invention of a portable fuel container is a cornerstone in extending hydrogen fueling from southern California to the Puget Sound.

PNNL developed a welding process that uses friction to bind together different metallic materials of different depths and weights, for example, aluminum and steel. The process does not require solder or heat. Rather, it uses spinning pistons of different sizes to bind the sheets of metal together. PNNL's developers are working with an automaker to implement the technique on an assembly line for manufacturing doors.

Finally, a UW research team developed a means to charge lithium ion batteries used in cars. The charging method improves efficiency in two ways; a user can choose a method that either increases battery life by 20 percent or reduces charging time by 20 percent.

CONCLUSION

These were just a few of the more than 20 products and services demonstrated at SciTech Northwest 2016. Investments in data science, biotechnology and carbon-neutral energy will prove fruitful for Washington startups for the next decade and beyond. Pairing the revolutionary technologies with the appropriate commercialization strategies will lead to products and services that extend clean energy to more people, improve food safety and increase food production for a growing planet.