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NETL NEWS

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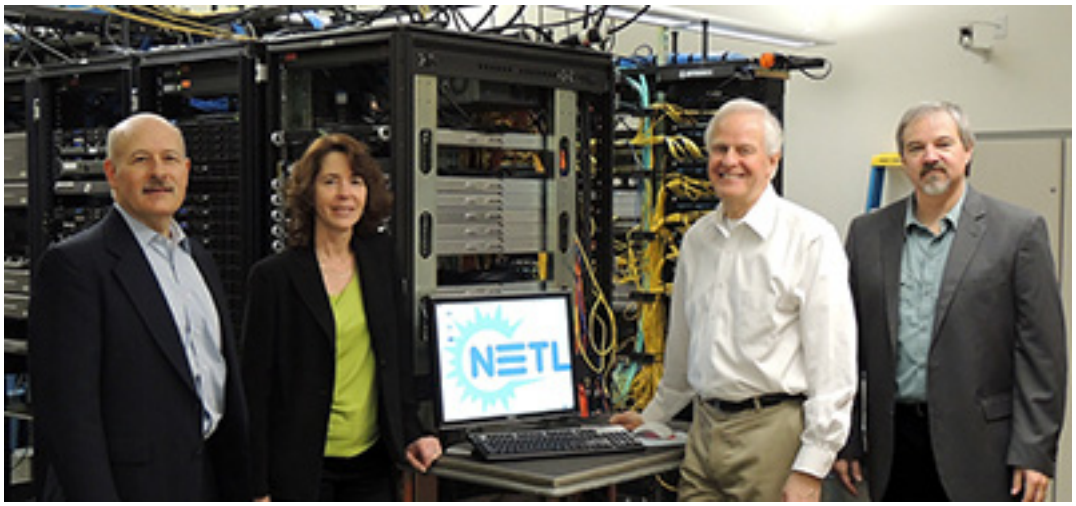
NETL Computer Sharing Cultivates STEM Careers

Albany, Ore. — The National Energy Technology Laboratory (NETL) invests in science, technology, engineering, and math (STEM) education, providing opportunities and tools to launch students into successful careers as scientists and engineers. Our relationship with Oregon State University (OSU) is a prime example of how NETL nurtures STEM education through research opportunities. Endeavors like these capitalize on our high-performance computer culture, the foundation of the theoretical and experimental approach to solving energy conversion issues at NETL.



Representatives from NETL and OSU discuss how partnership nurtures education. Left to right: Dr. Richard (Rick) Spinrad, Vice President of Research, Oregon State University; Dr. Cindy Powell, Director of NETL's Office of Research and Development; Dr. Rich Holdren, Associate Vice President of Research, Oregon State University; and Dr. Paul E. King, NETL.

To assist energy research efforts at OSU, NETL placed several high-performance computing clusters in the College of Engineering for students and faculty to use with projects that support the Department of Energy's mission. Taking advantage of these highly advanced computers, OSU's Dr. Sourabh Apte and his graduate students work with NETL researchers on Energy Department-funded projects to develop models to better understand characteristics of oxy-fuel combustion at high temperatures. These simulations help develop approaches to retrofit power plants to increase their efficiency and assist them in producing flue gas streams more conducive for carbon capture.

Dr. Apte cites the computer resources as having a positive impact on the students' research. Two of OSU's recent PhD candidates in oxy-coal combustion, Mathew Cleveland and Andrew Cihonski, used their direct access to the NETL computer cluster to help them develop and test their models and algorithms. The high-performance computers were used for model and code development, testing, and validation prior to running these large, complex simulations on supercomputers like the Lonestar at the Texas Advanced Computing Center at the University of Texas, Austin. They agree that the computer cluster was invaluable for their doctoral research at OSU, allowing them to work close to home and develop familiarity with Unix/Linux and group code development in a large code base: rare skills in early college graduates, particularly outside the computer science community. Both students have completed their PhDs and begun their careers at Department of Energy national labs after publishing their work in reputed journals.

Work performed by OSU grad students on these clusters could inform the design of more efficient packed bed chemical reactors or help predict things like beach erosion in populated areas, movement of pollutants in a stream, or new ship propeller designs that dampen noise by getting rid of bubbles generated during rotation. Future use of the computer clusters at OSU promises access to more computational tools for the students, nurturing their educational growth and heading them in the right direction for successful job placement. Tomorrow's STEM leaders are a worthy NETL investment indeed.

NETL is a U.S. Department of Energy national laboratory that produces technological solutions to America's energy challenges. For more than 100 years, the laboratory has focused on developing tools and processes to provide clean, reliable, and affordable energy to the American people. Three NETL research sites—Albany, Ore., Morgantown, W.Va., and Pittsburgh, Pa.—conduct a broad range of energy and environmental research and development activities that support DOE's mission to advance the national, economic, and energy security of the United States.

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