

Dr. Geo Richards, Focus Area Lead, Energy Systems Dynamics

Dr. Geo Richards has more than 25 years of experience in energy systems research, including all types of energy conversion devices, with a particular interest in gas turbines and combustion. He leads the Energy Systems Dynamics Focus Area, providing technical direction for research groups investigating turbine combustion, heat transfer, carbon capture, high-temperature fuel cells, alternative fuels, and gasification technology. In addition to conducting his own research, Dr. Richards's responsibilities include developing and executing cooperative research agreements with private industry and academia, and evaluating proposed concepts related to energy conversion. He also serves as a Research Advisor for both graduate and postgraduate investigators visiting from academic institutions.

Chris Guenther, Director Computational Science and Engineering Division

Chris Guenther is the Director of the Computational Science & Engineering Division at the Department of Energy's National Energy Technology Laboratory (NETL) in Morgantown, West Virginia. Currently, within his division are Federal research scientists, post-doctoral fellows, and university professors and students conducting research in reacting multiphase flow science, process modeling, multiscale modeling, dynamics and control, and optimization. Prior to this position Dr. Guenther was the Research Group Leader of the Multiphase Flow Research Group at NETL's Office of Research and Development. His research over the last 15 years has concentrated exclusively on computational model development and experimental validation of reacting, densely loaded multiphase systems. During this time his research included developing full-scale Eulerian-Eulerian models for advanced fossil energy systems with special emphasis on coal gasification applications. His research into the development, validation and applications of full-scale coal gasification models was one of the first examples of the use of high performance computing for reacting, transient, 3D, Eulerian-Eulerian models in the open literature. Currently, his work over the last three years has been leading a team of NETL, contractor and university researchers in providing comments and recommendations into the use of Pulse Jet Mixers (PJM) at the Waste Treatment & Immobilization Plant (WTP) to process nuclear waste at the Hanford site located in the state of Washington. His team has provided surveillance of DOE's Office of River Protection (ORP) contractor's verification and validation of computational fluid dynamics software, as it was being applied for design confirmation of the Pulse Jet Mixing vessels. Recently, his team's efforts have shifted to reviewing and providing recommendations to ORP into the full-scale vessel test plans for design verification of WTP PJM vessels and the use of dimensional analysis to support confirmation of the mixing requirements for the WTP PJM vessels.

William Rogers, Team Leader Multiphase Flow Team

Dr. Rogers has a B.S., M.S., and Ph.D. in Mechanical Engineering from West Virginia University. He has an MBA from West Virginia University and is a Registered Professional Engineer. In addition to industrial experience in chemical process and steel industries, Dr. Rogers has worked at NETL for 30 years in various technical and managerial roles associated with energy R&D. His research interests include computational fluid dynamics in combustion, gasification, fuel cells, and experimentation for model validation. Presently Dr. Rogers is the Leader of the NETL Multiphase Flow Team.

Dr. Lawrence Shadle, Director, Thermal Sciences Division

Dr. Lawrence Shadle is an expert in applying fluidization and transport technologies to process fossil fuels and clean up the emissions from those conversion processes. He has conducted both experimental and computational-modeling research into coal and oil shale processing, such as gasification, combustion, liquefaction, and emission control. His interest in the statistical design of experiments is an

asset to quantifying experimental uncertainty so that experimental data can be compared objectively with computational simulations. While serving as the Experimental Research Group Leader in the Computational Sciences Division, Dr. Shadle developed a world-class fluidization research facility with a focus on model validation. He also conducted experiments used internationally to benchmark and validate computational fluid dynamic models. Dr. Shadle is currently the Director of NETL-ORD's Thermal Sciences Division and has participated in numerous review panels at DOE, including providing technical guidance on shale during the reforms of the Energy Policy Act in 2005.

Michael Buric, Senior Researcher in the Sensors & Diagnostics Team

Dr. Michael P. Buric started work at the National Energy Technology Laboratory in Morgantown, West Virginia in October, 2010 after completing his PhD studies in Electrical Engineering at the University of Pittsburgh with graduate work in Lasers and Optical Spectroscopy. His dissertation was funded by an NETL Regional University Alliance Program aimed at enabling the use of Raman spectroscopy for the real-time measurement of gaseous mixtures. This work resulted in an accepted Raman sensor patent, and spurred additional research in the construction and field-testing of novel portable Raman gas monitoring equipment. Dr. Buric is now an active researcher in the Office of Research and Development at NETL working on the Advanced Sensors and Controls Team where he is responsible for the design and testing of fieldable Raman measurement systems for various applications, as well as fabrication and modeling of fiber-based optical sensors and similar devices. He is a member of SPIE with numerous publications in relevant optics journals and several fiber-optic sensor patents. His current research interests include fiber optic sensors, nano-optical devices, advanced energy-system control, Raman spectroscopy, optical modeling, and novel-waveguide fabrication.

Doug Straub, Senior Researcher in the Reactor & Process Development Team

Doug Straub is a mechanical/research engineer that has over 20 years of experience in the general areas of combustion, heat transfer, and sensor development. Doug has been responsible for the development of several experimental test facilities at NETL, including NETL's 50kW circulating chemical looping reactor. This test facility, which is also the topic of discussion today, is arguably the world's smallest of its kind (whether that is an accomplishment, or not, remains to be seen). Doug grew up on a dairy farm in Eastern Ohio and enjoys being with family, friends, and an occasional John Wooden quote, like "It's what you learn after you know it all that counts". Currently, Doug leads the Office of Research and Development's Advanced Combustion portfolio that includes Chemical Looping Combustion as one of its main areas.