LABORATORY TOUR AGENDA

U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY

U.S. DEPARTMENT OF ENERGY'S CYBERFORCE™ COMPETITION
DEFENDING U.S. ENERGY INFRASTRUCTURE

FRIDAY – NOVEMBER 15, 2019 **TOURS BEGIN AND END IN B26, G51C**

TIME	TOPIC	PRESENTER(S)
1:00 – 1:05pm	Welcome, Introduction	Eddie Christy, Technology Development & Integration Center
1:05 – 1:15pm	NETL Overview	Antonio Ferreira, Ph.D., Chief Information Officer
1:15 – 1:25pm	Graduate Opportunities	Kate Nielsen, Office of S&T Career Management
1:25 – 1:30pm	Safety Video	
1:30 – 2:15pm	Laboratory Tour	**See tour stop descriptions below for specific tour stop speaker.*
2:15 – 2:30pm	NETL Cybersecurity Demonstration	Mike Rozycki, Information Technology (Cybersecurity & IA)

TOUR STOP DESCRIPTIONS

Multiphase Flow Experiments for Computational Multiphase Model Development and Validation
The Multiphase Flow Analysis Laboratory (MFAL) provides facilities for fundamental tests on particles and flowing particle systems to support multiphase model development and validation. The MFAL has capabilities to perform detailed characterization of particles, including size distribution, shape, density, and fluidization characteristics. The MFAL also provides a broad range of fluidization and particle flow systems including fixed bed, hopper flow, bubbling fluidized bed, circulating fluidized bed, and novel devices for particle separation and flow control. These capabilities provide the fundamental information necessary for accurate computational modeling as well as high quality data for validation of model predictions.
Speaker: Bill Rogers

The NETL Supercomputer: Joule
The National Energy Technology Laboratory (NETL) is home to Joule– among the world's fastest high-performance computers – along with advanced visualization centers serving the organization's research and development needs. The system is undergoing a $16.5 million refresh, which began in fall 2018, that is planned to provide a 10-fold increase in computational power, placing Joule among the top 100 supercomputers in the world.

Supercomputing provides the foundation of NETL's research efforts on behalf of the Department of Energy, and NETL maintains supercomputing capabilities to effectively support its research to meet DOE's Fossil Energy goals. Supercomputing allows NETL researchers to simulate phenomena that are difficult or impossible to otherwise measure and observe. Faster supercomputers enable more accurate simulations, generating greater confidence in using simulation results for decision-making. This simulation-based engineering approach helps NETL to reduce the cost and time of technology development at every stage: speeding up the discovery of new materials, increasing the reliability and performance of novel devices, and reducing the risk inherent in scaling up processes. Ultimately, supercomputing gives NETL and its industry partners an innovation advantage, enabling the development of globally competitive technologies and a sustainable, affordable energy portfolio for the nation.

Speaker: Tracey Williams

3D Printing for Prototyping Novel Multiphase Flow Experiments and Devices

The Multiphase Flow Analysis Laboratory (MFAL) uses 3-D printing capabilities for rapid prototyping of novel test rigs for measuring complex multiphase flow behavior to support model development and validation. The use of transparent plastic resins and additive manufacturing allows for the imaging and measurement of flow behavior in critical regions of interest to multiphase flow analysts in a more timely and cost effective manner. This approach also permits collection of accurate and detailed data for model validation using imaging techniques such as Laser Doppler Velocimetry, Particle Tracking Velocimetry, High Speed Video, and Laser-based Holography. Additive manufacturing also allows the direct printing of optimized prototypes for testing where the optimization was done using custom simulation-based optimization tools based on the use of NETL's multiphase flow computational fluid dynamics software. The virtual optimized prototypes can move directly from the computer simulations to the manufactured prototype for testing. Large-scale (15x15x10 inch) and small-scale (5.7 x 5.7 x 6.9 inch) stereo lithography printers are used with a variety of resins – ranging from clear standard resign allowing for flow imaging to high performance "engineering" resins (high temperature, high strength) for more demanding conditions. Future plans include the use of ceramic resins (1000C) for prototyping high temperature components as part of the reactor optimization process.

Speaker: Timothy Floyd, Bryan Hughes