

## Become an EMSL User

Researchers from around the world are encouraged to submit a proposal to use EMSL's unique capabilities in combination with each other with an emphasis on merging computational and experimental instruments. To submit a proposal for use of EMSL or to learn more about the science conducted at EMSL and the instruments and expertise available to users, visit [www.emsl.pnl.gov](http://www.emsl.pnl.gov).



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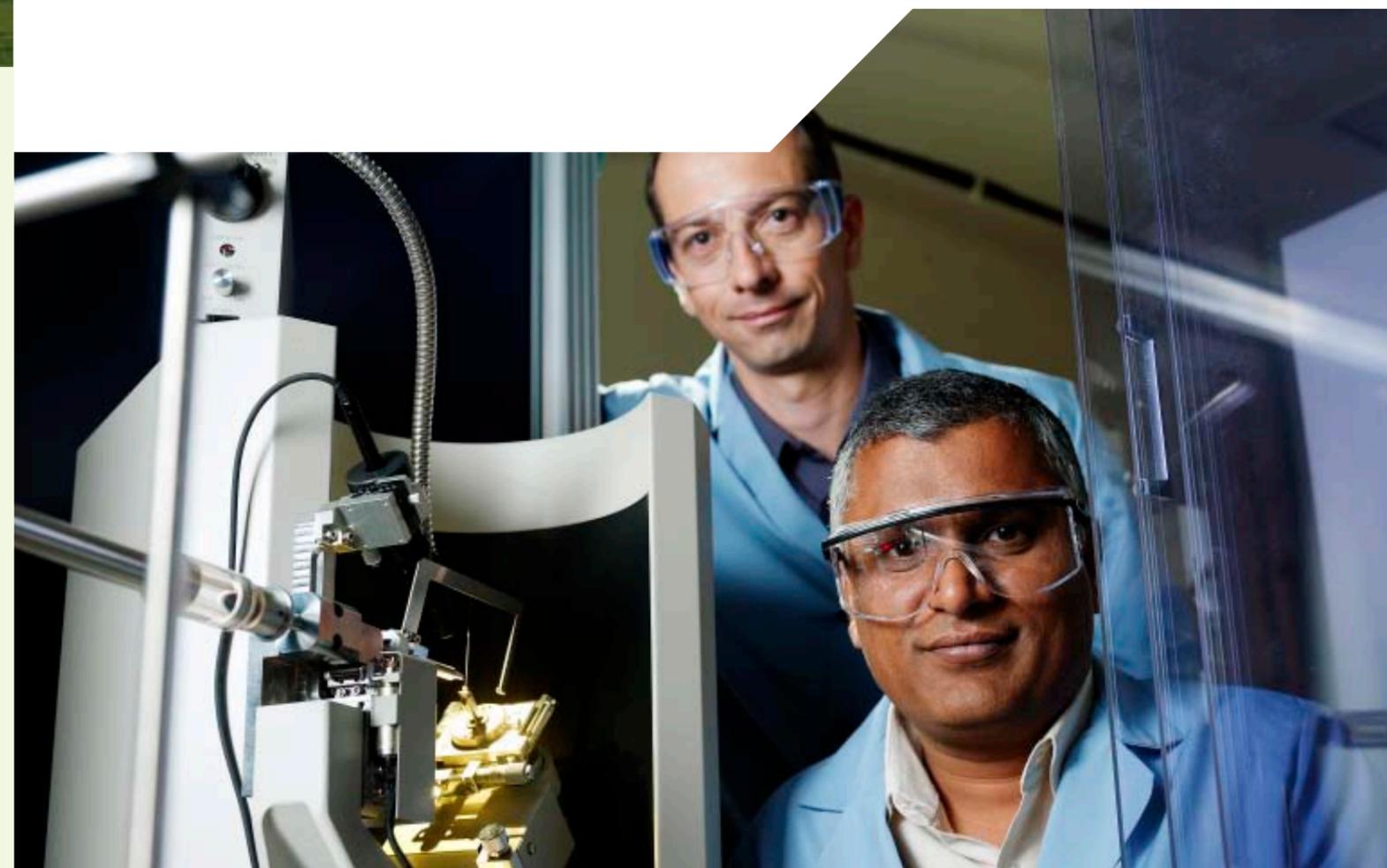
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Scientific Innovation Through Integration



## State-of-the-Art Capabilities



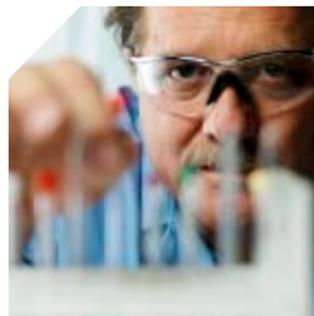
## EMSL's Mission

EMSL, a national scientific user facility at Pacific Northwest National Laboratory, provides integrated experimental and computational resources for discovery and technological innovation in the environmental molecular sciences to support the needs of DOE and the nation.

## Overview

EMSL's distinctive focus on integrating computational and experimental capabilities as well as collaborating among disciplines yields a strong, synergistic scientific environment. Bringing together experts and state-of-the-art instruments critical to their research under one roof, EMSL has helped thousands of researchers use a multidisciplinary, collaborative approach to solve some of the most important national challenges in energy and environmental sciences. EMSL houses an unparalleled collection of state-of-the-art capabilities used to address complex scientific challenges. Researchers from around the world are encouraged to use EMSL's unique capabilities in combination with each other with an emphasis on merging computational and experimental instruments.

## Cell Isolation and Systems Analysis



EMSL provides capabilities that allow researchers to isolate cells from environmental samples for subsequent high-throughput imaging, genomics, and proteomics analyses. This provides a foundation for understanding the dynamics of microbial communities and enables the new field of systems microbiology.

## Deposition and Microfabrication



EMSL offers sophisticated deposition and microfabrication tools for creating functional surfaces, nanomaterials, and thin films with specific properties. Users apply these methods to design and create materials (or materials systems) with specific surface, bulk, and interfacial properties for energy and environmental applications.



## Subsurface Flow and Transport

EMSL's subsurface flow and transport capabilities provide scientists an opportunity to integrate theory, experiment, and numerical simulation prior to field-scale studies. Based on models, they can conduct experiments at various scales, comparing experimental and numerical results to identify knowledge gaps. This approach is used to design remediation strategies for a variety of contaminants.

## Microscopy



EMSL's sophisticated suite of microscopy instruments yields micro-, nano-, and atomic-scale data for a broad range of sample types with applications to energy, the environment, and human health. Many microscopy instruments are equipped with features for specific applications, such as particle analysis, imaging in native environments, and simultaneous generation of complementary chemical, structural, and phase information.

## NMR and EPR



Researchers use EMSL's nuclear magnetic resonance (NMR) spectroscopy and electron paramagnetic resonance (EPR) spectroscopy capabilities to study molecular systems important to biology, environmental remediation, and sustainability as well as other areas of interest to the Department of Energy and the nation.

## Spectroscopy and Diffraction



A suite of spectroscopy and diffraction instruments in EMSL allow users to study solid-, liquid-, and gas-phase sample structure and composition with remarkable resolution. Ideal for integrated studies, spectrometers and diffractometers are easily coupled with EMSL's computational and modeling capabilities.

## Molecular Science Computing

EMSL provides the scientific user community with an expansive array of leading-edge hardware, software, and visualization capabilities for computational activities in environmental molecular research. Users are encouraged to combine computation with other state-of-the-art experimental tools, providing an integrated platform for scientific discovery.



## Mass Spectrometry

EMSL's expansive mass spectrometry capabilities enable high-throughput, high-resolution analysis of complex mixtures. These resources are applied to a broad range of scientific studies related to human health, environmental remediation, homeland security, and climate.

