

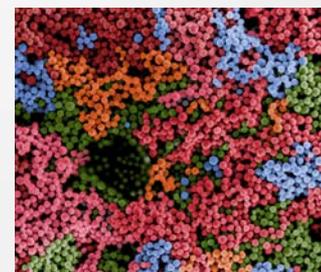
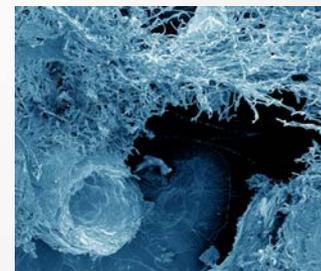
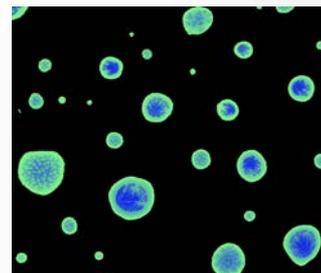
# Working with EMSL: FY 2017 Call for Proposals

February 12, 2016

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www.EMSL.PNNL.gov



- Proposal opportunities using EMSL
- Call for FY2017 Science Theme proposals
- Science themes and focused topics
- Review process & criteria
- Successful proposals
- Contacts ([www.emsl.pnl.gov](http://www.emsl.pnl.gov))
- Questions



# EMSL offers users a variety of proposal options to support user community

Users request access via a peer-reviewed proposal process

Use of EMSL capabilities *at no cost* for research intended for publication

Three types of user proposals:

- **Annual or Special Calls**
  - ▶ Annual calls usually issued in winter
  - ▶ Options to focus on Science Theme topics or use of multiple facilities (e.g. JGI-EMSL)
  - ▶ Can also include special calls outside of annual schedule
- **General**
  - ▶ Access variable (up to 1 year)
  - ▶ Submitted at any time
- **Scientific Partner**
  - ▶ Cost-share to build capability
  - ▶ Can be submitted any time



# Current Calls for Proposals:

- Science Theme Research, *deadline February 29, 2016*
- JGI-EMSL Collaborative Science, *deadline April 4, 2016*

## Call for FY2017 Proposals for Science Theme Research

EMSL's annual Call for Proposals is open January 5 – February 29, 2016 for high-impact user research proposals focused on selected topics in four Science Themes. Award decisions will be made by July 31, 2016 and approved proposals will be granted access to EMSL resources beginning October 1, 2016.

- May be submitted via User Portal until **11:00 P.M. on Monday, February 29**
- Preference given to proposals addressing the focus topics.
- Valid for 2 years, providing that sufficient progress toward stated goals is demonstrated in first year.



EMSL's vision is to *pioneer discoveries* and *mobilize the scientific community* to provide the *molecular science foundations* for *BER research priorities* and our nation's *critical biological, environmental and energy challenges*

## BIOLOGY

Rational design of biological systems

## ENVIRONMENT

Understand the role of natural or anthropogenic inputs on climate and subsurface systems

## ENERGY

Efficient energy storage and conversion

### Science Themes & Leadership Areas

**Biosystem Dynamics & Design**

*Metabolic Compartmentalization*

**Atmospheric Aerosol Systems**

*Biogenic Organic Aerosols*

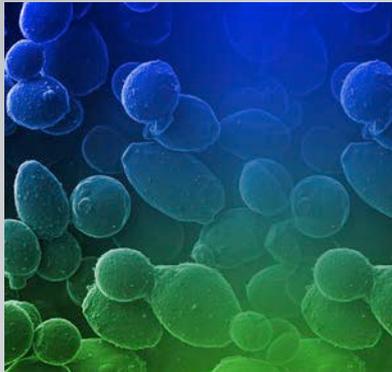
**Terrestrial & Subsurface Ecosystems**

*Hydrobiogeochemical Elemental Cycling*

**Energy Materials & Processes**

*Solvent Mediated Interfacial Chemistry*

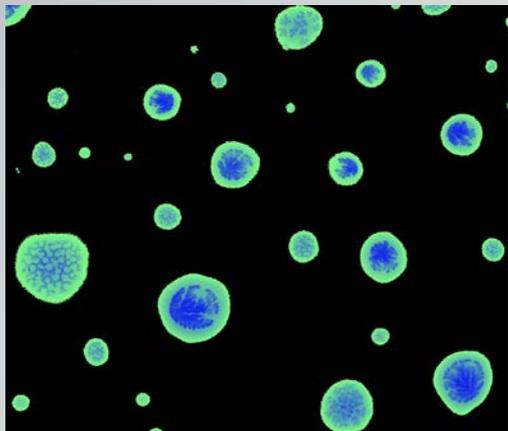
# Biosystem Dynamics & Design (BDD) Science Theme



**Focus:** Intra and inter-cellular complexes and dynamic processes in microbes (archaea, bacteria and algae), fungi and plants leading to improved strategies for biofuel and bio-based products.

## 2017 Target Areas:

- Subcellular **localization** of **metabolism** and other processes.
- **Carbon, nitrogen, phosphorus and sulfur flux; coupling experiments** with computational **modeling**
- **Inter- and intracellular signaling** influencing system-level processes, **molecular characterization** of **energy metabolism** and **storage pathways**
- Post-translational **processes** and modifications that **regulate carbon cycling** or influence **energy storage** and **biomass** accumulation.
- **Modeling** and simulation of **metabolic pathways** to support synthetic biology.

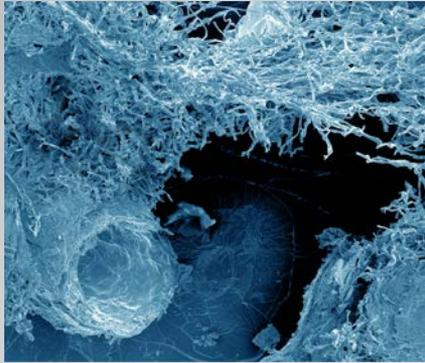


**Focus:** Molecular scale understanding of atmospheric aerosols to improve the representation of aerosols in process, regional, and climate models, thereby increasing the accuracy of climate predictions.

## 2017 Target Areas:

- **Formation and climate-relevant properties of aerosol particles**, particularly secondary organic aerosol (SOA)
  - Role interactions of **biogenic** and **anthropogenic** emissions play in **producing SOA**
- Processes by which **aerosol particles** control **ice nucleation**
- The role of **land-surface interactions** in determining physicochemical **properties of aerosol** particles.
- Computation **linking molecular properties** to aerosol **formation and impacts**

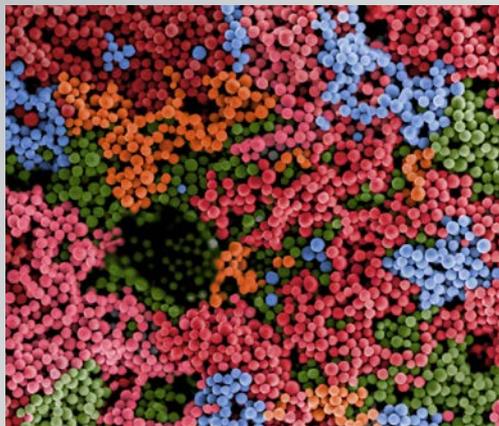
# Terrestrial & Subsurface Ecosystems (TSE) Science Theme



**Focus:** Obtaining a holistic understanding of cycling of biogeochemical critical elements (e.g. C, N, S, P, Mn, Fe), and contaminants in terrestrial and subsurface environments to enable predictive understanding of earth systems and improved strategies for contaminant management

## 2017 Target Areas:

- Molecular-scale **mechanisms** that drive **C dynamics in soils** and subsurface environments,
- Molecular- to pore-scale processes that control **the fate and transport of critical elements** and contaminants in **terrestrial and subsurface environments**
- Role of hydrologic **transport processes** in the creation of **biogeochemical gradients** and **chemical heterogeneity**
- **Environmental chemistry of radionuclides** that control their reactivity and **chemical fate and transport**
- **Multiscale computational methods to link hydrological and biogeochemical processes across** molecular, pore, and porous medium **scales.**



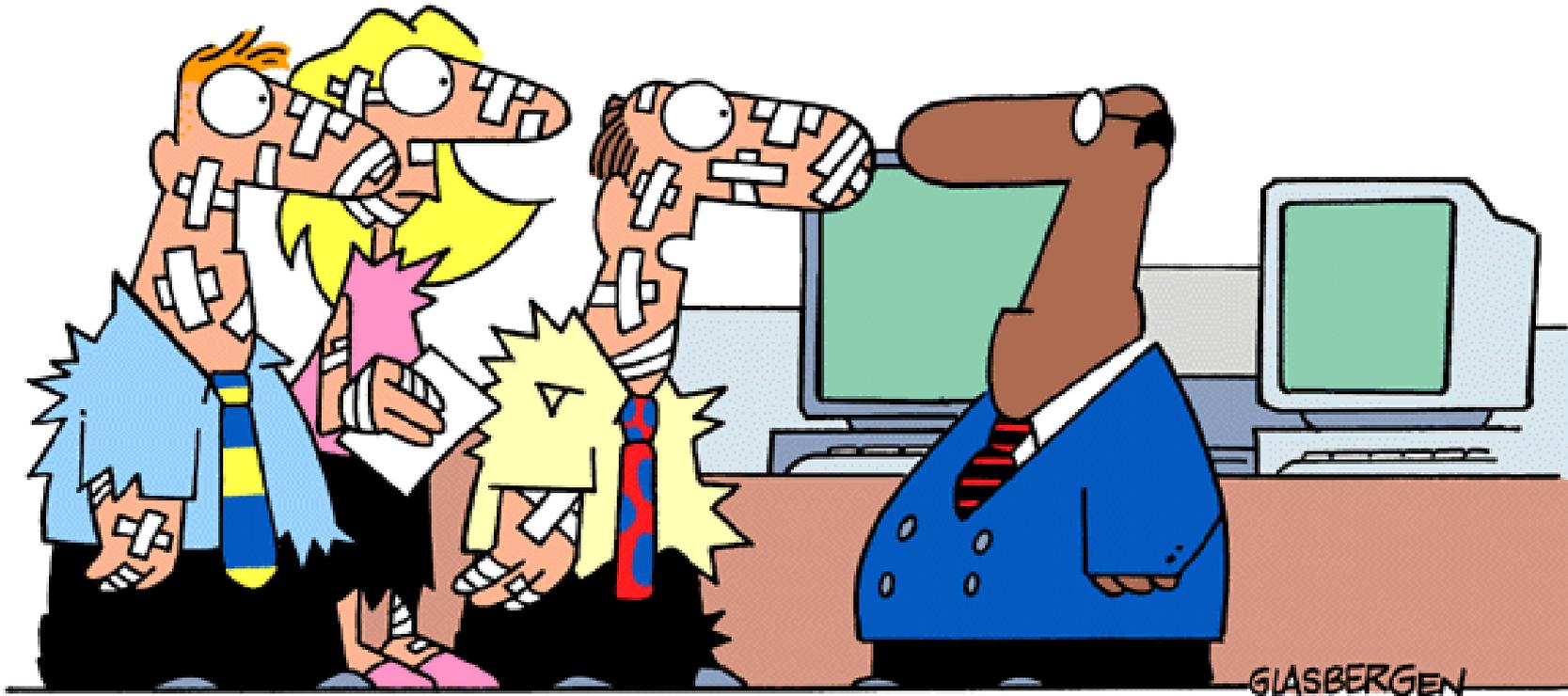
**Focus:** Increasing our understanding of energy materials and processes to enable the development of advanced energy conversion and storage systems.

## 2017 Target Areas:

- Physical and chemical **properties of interfaces** relevant to **degradation of biomass** and **upgrading** of bioproduced fuels and renewable chemicals
- Dynamic and **emergent processes** occurring at **solvent-mediated interfaces** that impact **biomass** degradation or **energy conversion**.
- **Multiscale modeling** methods to extend the applicability of atomic- or molecular-scale simulations to meso-scale systems

# What Makes a Good Proposal?

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**"Frankly, sir, we're tired of being  
on the cutting edge of technology."**

We like work at the cutting edge:

Scientific Merit, Quality and Innovation are the primary evaluation criteria!  
What about your research is at the cutting edge of science or technology?

# What Makes a Good Proposal?

## Review Panels of Each Science Theme Score in 5 areas



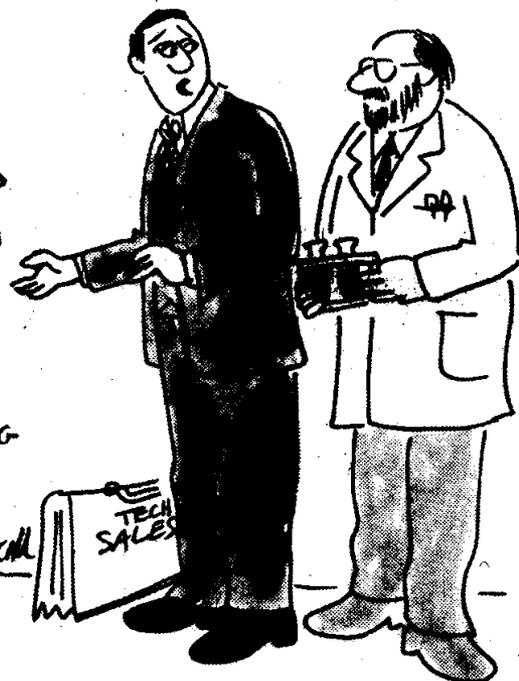
- **Criterion 1:** Scientific merit and quality of the proposed research (50%)
- **Criterion 2:** Qualifications of the proposed research team to achieve proposal goals and contribute to high-impact science (10%)
- **Criterion 3:** Relevance of the proposed research to EMSL's mission (10%)
- **Criterion 4:** Impact of the proposed research on one or more EMSL Science Themes and the specific call (20%)
- **Criterion 5:** Appropriateness and reasonableness of the request for EMSL resources for the proposed research (10%)

# Scoring Guidelines to review panels

Score	Science Merit	Team Qualifications	Mission Impact	Science Theme Relevance	Resource Use	Calibration Summary
5 Extraordinary	<u>Innovative</u> research; great impact; will <u>launch new direction or clearly impact</u> outstanding problems in the research field.	Excellent track record in research field; results expected to have high impact.	<u>Direct relevance</u> to BER mission; strong support of DOE mission or significant economic or societal impact; <u>unique or innovative applications</u> of EMSL capabilities; exceptionally strong plan for developing <u>predictive understanding</u> .	Excellent fit to Call's focused topics in one or more science themes.	State-of-the-art resources are requested and are essential to perform this research.	Personally advocate for this proposal; ranks within the <u>top 5% of proposals</u> reviewed.
4 Excellent	<u>Well-conceived</u> , original; strong potential for important contribution to research field.	Strong track record in research field; results likely to have high impact.	Directly addresses DOE mission; broadly addresses BER mission; unique or innovative applications of EMSL capabilities; well-designed plan for developing predictive understanding.	Strong fit to the Call's focused topics in at least one science theme.	State-of-the-art resources are requested or would significantly enhance the results.	Highly recommend this proposal; ranks within the top <u>25% of proposals</u> reviewed.
3 Good	Not groundbreaking but likely to produce <u>significant results</u> .	Solid track record; results likely to have impact.	Broadly supports DOE or national needs.	Does not address Call's focused topics but broadly addresses one or more science themes.	Resources well integrated, although not necessarily using state of the art or unique instrumentation. EMSL would enhance results.	Recommend this proposal, if resources available; ranks within the top 50% of proposals reviewed.

EMSL has lots of great capabilities

MASS SPECTROSCOPY →  
RAMAN SPECTROSCOPY →  
← UV/IR SPECTROSCOPY  
NUCLEAR MAGNETIC RESONANCE →  
← ELECTRON SPIN RESONANCE  
X RAY EXCITATION →  
HYDROGEN PROFILING →  
HELIUM BACKSCATTERING ←

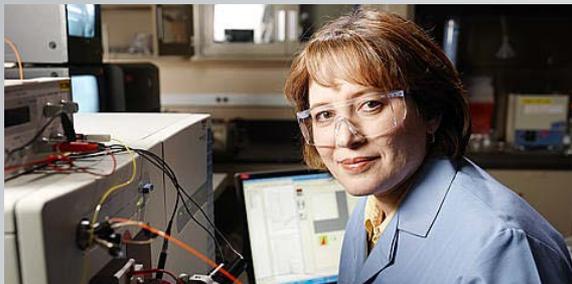


*"Which way is the men's room?"*

What do you need to know?  
Why is it important?  
How can EMSL capabilities  
get you there?

- Clearly address **fit to call**
- Talk to **EMSL staff**, but not at the last minute
- Tell science theme review panel what is **novel, new, and critical** and **why**
- Have a clear verifiable **hypothesis** and an approach to test it
- **Make it easy** for reviewers to address review criteria
- Have **specific tasks, objectives** and **instrument needs**
- **Follow** the proposal **guidance**  
Some of the most common suggestions are summarized on our website:  
<http://www.emsl.pnnl.gov/emslweb/tips-writing-successful-proposals>

# EMSL provides unique suites of instrumentation to integrate with high-performance computing



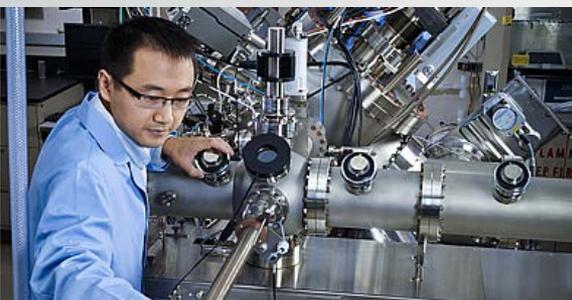
Mass Spectrometry



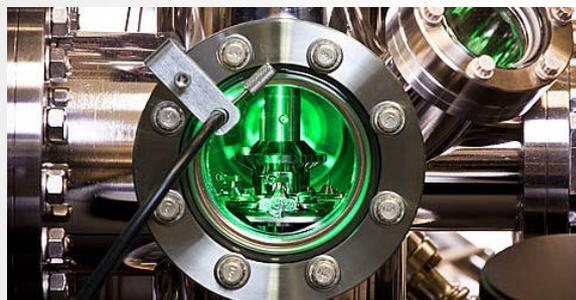
Cell Isolation & Systems Analysis



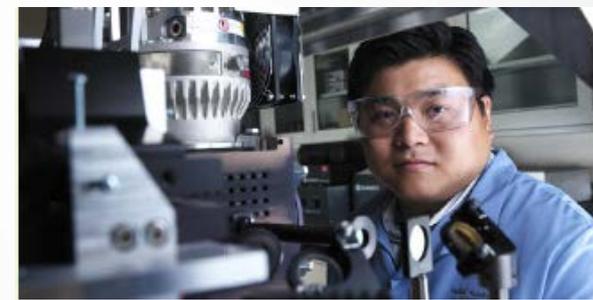
Molecular Science Computing



Deposition & Microfabrication



Spectroscopy & Diffraction



Instrument Development Lab



Subsurface Flow & Transport



NMR & EPR



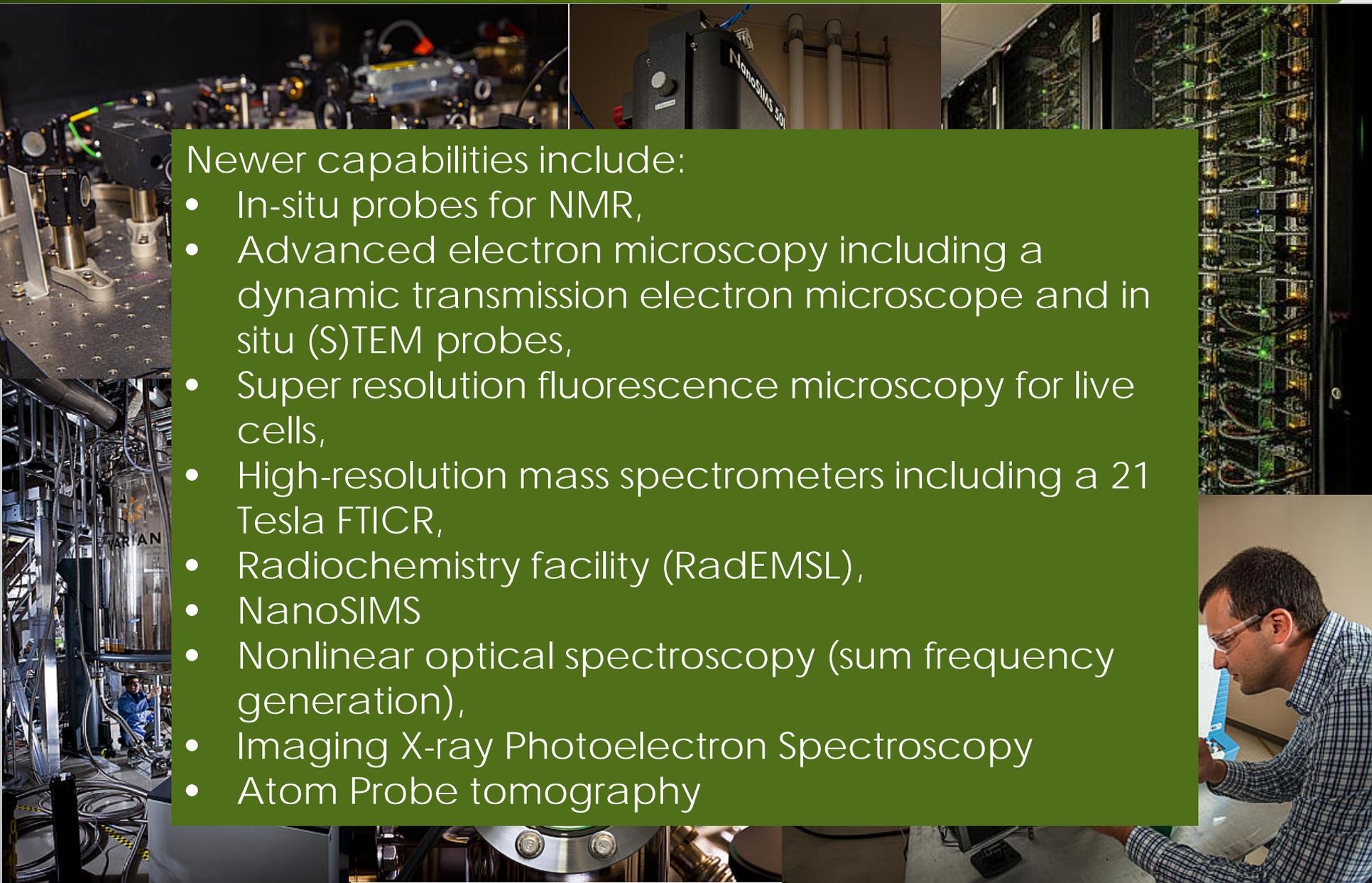
Microscopy

<http://www.emsl.pnl.gov/emslweb/scientific-capabilities>

# Newer capabilities: We love to see them produce great new science

Newer capabilities include:

- In-situ probes for NMR,
- Advanced electron microscopy including a dynamic transmission electron microscope and in situ (S)TEM probes,
- Super resolution fluorescence microscopy for live cells,
- High-resolution mass spectrometers including a 21 Tesla FTICR,
- Radiochemistry facility (RadEMSL),
- NanoSIMS
- Nonlinear optical spectroscopy (sum frequency generation),
- Imaging X-ray Photoelectron Spectroscopy
- Atom Probe tomography



**User Program Services:** Terry Law (emsl@pnnl.gov)

## Science Leads

- **John Shilling** – Atmospheric Aerosol Systems
- **Scott Baker** – Biosystem Dynamics and Design
- **Don Baer** – Energy Materials and Processes
- **Nancy Hess** – Terrestrial and Subsurface Ecosystems

[www.emsl.pnnl.gov](http://www.emsl.pnnl.gov)

## Capabilities & Capability Leads

- **Cell Isolation and Systems Analysis** – Galya Orr
- **Deposition & Microfabrication** – Mark Bowden
- **Mass Spectrometry** – Robby Robinson
- **Molecular Science Computing** – LeeAnn McCue
- **Microscopy** – Scott Lea
- **NMR and EPR** – Nancy Washton
- **Spectroscopy and Diffraction** – Mark Bowden
- **Subsurface Flow and Transport** – Mark Bowden

