Combining resources to enable greater scientific impact

ABOUT FICUS, EMSL AND JGI

FICUS was launched in 2013 to encourage and enable researchers to use the expertise and capabilities of multiple user facilities stewarded by the Department of Energy Office of Science. In recognition of the increasingly collaborative and multidisciplinary nature of biological projects, this initiative aims to encourage innovative research exploiting the wide range of capabilities available at EMSL and JGI.

Founded in 1997 and located at Pacific Northwest National Laboratory, EMSL is a world-class biological and environmental molecular science user facility with a vision to lead the scientific community in gaining a predictive understanding of molecular processes that control the flux of materials underpinning biological and ecosystem functions. For FICUS projects, EMSL focuses on “omics” and imaging technologies including mass spectrometry, NMR, a variety of microscopic imaging, spectroscopy as well as leading edge modeling and simulation.

The JGI, also founded in 1997 and located at Lawrence Berkeley National Laboratory, provides innovative genomic capabilities to a global community of researchers addressing the most pressing scientific challenges related to energy production and environmental systems. Along with a well-developed sequencing capability, JGI focuses on functional assignments from sequence knowledge through additional capabilities such as DNA design and synthesis, metabolomics, and computational analysis that enable systems based scientific approaches.

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JGI and EMSL are DOE Office of Science user facilities and sponsored by the Office of Biological and Environmental Research.

The annual call will be announced on January 9, 2019 with Letters of Intent due mid-March.

Typically, researchers use resources for little to no cost if results are shared in open literature.
Microbial Diversity May Prove Key to Gas Releases from Thawing Permafrost
Virginia Rich, The Ohio State University
Researchers sampled thawing permafrost and studied the genomic composition of more than 1,500 microbes to discover which types of microbes degraded organic matter into carbon dioxide and methane. These results link changing biogeochemistry to specific microbial types—providing key information for predicting the impact of environmental changes on permafrost ecosystems.

How Injected Microbes Persist in Hydraulically Fractured Shale
Kelly Wrighton, now Colorado State University, formerly The Ohio State University
Blending lab studies with measurements of real-world samples, researchers developed a computational model to identify key indicators of microbial activity in fractured shale. The team discovered mechanisms behind critical biochemical reactions, including ways to predict microbial activity for improved natural gas production.

Facilities Integrating Collaborations for User Science (FICUS) inspires researchers to work with multiple user facilities through a single research proposal. Combining the power of genomics at the Joint Genome Institute (JGI) with the advanced molecular characterization capabilities at EMSL, the Environmental Molecular Sciences Laboratory, scientific discovery can go beyond what each facility could explore and contribute separately.

SAMPLES OF RESEARCH USING FICUS

Unlocking the Potential of Fungal Enzymes to Break Down Plant Cell Walls
Michelle O’Malley, University of California, Santa Barbara
Researchers analyzed proteins that play a role in multi-enzyme complexes called cellulosomes in anaerobic gut fungi and discovered a new family of genes critical for cellulosome assembly across diverse fungal species. The fungal cellulosomes contained additional lignocellulose-degrading enzymes not found in bacterial cellulosomes. This finding could lead to novel strategies for efficient biofuel production.

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