10-9-2019

Biological and Environmental Research

Katy Christiansen, PhD

Follow this and additional works at: https://digitalcommons.mtech.edu/national-lab-day
Biological and Environmental Research

Katy Christiansen, Ph.D.
Lawrence Berkeley National Laboratory
October 8, 2019
DOE’s Office of Biological and Environmental Research

• Mission: support transformative science and scientific user facilities to achieve a predictive understanding of complex biological, earth, and environmental systems for energy and infrastructure security, independence, and prosperity.

• The program seeks to understand the biological, biogeochemical, and physical processes that span from molecular and genomics-controlled scales to the regional and global scales that govern changes in watershed dynamics, climate, and the earth system.
BER is comprised of two Divisions

<table>
<thead>
<tr>
<th>Biological Systems Science Division</th>
<th>Earth and Environmental Systems Sciences Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Genomics</td>
<td>• Atmospheric system</td>
</tr>
<tr>
<td>• Computational biosciences</td>
<td>• Earth and environmental systems modeling</td>
</tr>
<tr>
<td>• Biomolecular characterization and imaging science</td>
<td>• Terrestrial ecosystems</td>
</tr>
<tr>
<td>• Joint Genome Institute User Facility</td>
<td>• Subsurface biogeochemistry</td>
</tr>
<tr>
<td>• Bioenergy Research Centers</td>
<td>• Atmospheric Radiation Measurement User Facility</td>
</tr>
<tr>
<td></td>
<td>• Environmental Molecular Sciences Laboratory User Facility</td>
</tr>
</tbody>
</table>
### BER funds university and national lab research differently

<table>
<thead>
<tr>
<th>Type</th>
<th>Lead</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding Opportunity Announcements (FOAs)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Scientific Focus Areas</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Other lab calls</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>
User Facilities

• User Facilities are funded by DOE to provide research and expertise for the scientific community

• Specialized research that requires domain expertise and large capital equipment investments

• Regular calls for user proposals + competitive selection process
DOE Joint Genome Institute

Large-scale genomics and analysis of plants, microbes, and communities of microbes relevant to the DOE mission goals of harnessing science and technology for addressing energy and environmental challenges

>8,000 data downloaders
>13,000 portal users

Academic 1,365
Other Research Institutes 352
DOE National Laboratory 143
Industry 22

ORCID registration required
Digital Object Identifiers (DOIs) for all datasets from new proposals
Atmospheric Radiation Measurement Research Facility

Continuous observation of cloud and aerosol properties across a range of climate conditions to understand Earth’s energy balance.
Environmental Molecular Sciences Laboratory

EMSL accelerates scientific discovery and pioneers new capabilities to understand biological and environmental processes across temporal and spatial scales

Academic 214
Other DOE National Laboratory 52
Industry 6
Some Berkeley Lab BER-funded projects
Data and analysis

DOE Systems Biology Knowledgebase

- Knowledge creation and discovery environment
- Powerful scientific framework for predicting function of biomolecules, microorganisms, plants and their communities

National Microbiome Data Collaborative

- Empower the research community to more effectively harness microbiome data
- Connect data resources and compute for open science and shared ownership
Understanding microbial communities

ENIGMA

- Develop a predictive understanding of basic biological processes and how these processes impact ecosystem functions
- Link biology to environment

mCAFEs

- Enabling a Mechanistic and Predictive Understanding of Rhizosphere Microbial Communities
- Development of fabricated laboratory ecosystems
Other ways to interact with national labs
DOE programs for faculty and students

- **Visiting Faculty Program**
  - Faculty member + up to 2 students collaborate with national lab staff on DOE-relevant projects

- **Office of Science Graduate Student Research Program**
  - Supplemental awards to graduate students to perform part of their research at a national lab

- **Science Undergraduate Laboratory Internships**
  - Research experience for undergraduates at national laboratories

- **Community College Internships**
  - Technical training at national labs for community college students

https://science.osti.gov/wdts
Thank you!

Katy Christiansen
kmchristiansen@lbl.gov