Oak Ridge National Laboratory
Biological and Environmental Research

Presented to the
Biological and Environmental Research Advisory Committee

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Director

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ORNL mission and overview: Science and innovation for clean energy and global security

- Integrated and applying 23 core capabilities
- Nation’s largest materials research portfolio
- Innovative biosystems, climate, and environmental research
- Forefront scientific computing facilities
- World’s most intense pulsed neutron source
- World-class research reactor: Bio-SANS
- Managing mission-critical projects: US ITER, ECP
- 1,888 journal articles published in CY14
- Nation’s most diverse energy portfolio
- 198 invention disclosures in FY15
- 66 patents issued in FY15

- Integrating and applying 23 core capabilities
  - 4,500 employees
  - 3,200 research guests annually
  - 1,800 modernization investment
  - $1.5B budget
  - 198 invention disclosures in FY15
  - 66 patents issued in FY15
  - 10,811 employees
  - 10,010

- Delivering mission outcomes
We exploit synergies among our core capabilities to deliver science for BER

**BER-centric core capabilities**

**BER-related core capabilities**

- Chemical and molecular sciences
- Environmental subsurface science
- Climate change sciences/atmospheric science
- Earth systems science and engineering
- Computational science
- Biological systems science
- Biological and bioprocess engineering
- Advanced computer science, visualization, and data
- Applied mathematics
- Decision science and analysis
- Accelerator science and technology (enabling SNS)
- Large-scale user facilities/advanced instrumentation

**Key user facilities**

- Center for Nanophase Materials Sciences (BES)
- High Flux Isotope Reactor (BES): Bio-SANS (BER)
- Oak Ridge Leadership Computing Facility (ASCR)
- Spallation Neutron Source (BES)
- Environmental Science Laboratory
- Aquatic Ecology Laboratory
- Plant Laboratory and greenhouses
- UT-ORNL Joint Institute for Biological Sciences
- Distinctive field research sites: Oak Ridge Reservation, SPRUCE, NGEE
- Compute and Data Environment for Science (CADES)

**Other resources**

- Advanced computer science, visualization, and data
- Applied mathematics
- Decision science and analysis
- Accelerator science and technology (enabling SNS)
- Large-scale user facilities/advanced instrumentation
Future: Science to enable solutions in clean energy and environmental sustainability

**ORNL supporting activities**

- Investing LDRD in complex biological and environmental systems
- Extending CADES for BER mission needs
- Expanding integration with applied programs
- Exploring Big Science Questions

- Explore complex biological and environmental systems at multiple scales via field, lab, and modeling studies
- Develop genome-informed modeling for fundamental research and adaptation to climate change
- Continue and extend R&D in earth systems science and data analytics

Future: Science to enable solutions in clean energy and environmental sustainability
Future strategic partnerships to support BER vision and Mission Innovation

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