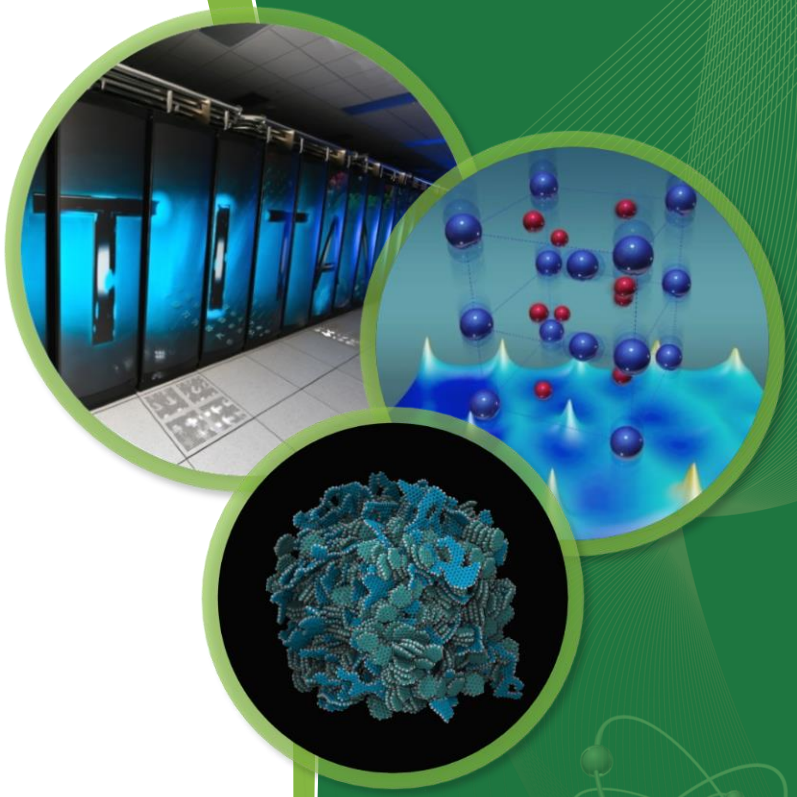
Oak Ridge National Laboratory Biological and Environmental Research



Presented to the

Biological and Environmental Research Advisory Committee

Thomas E. Mason
Director

March 22, 2016
Gaithersburg, MD

ORNL is managed by UT-Battelle
for the US Department of Energy

OAK RIDGE National Laboratory

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

Integrating and applying 23 core capabilities

$1.5B budget

4,500 employees

$750M modernization investment

Nation's largest materials research portfolio

3,200 research guests annually

Innovative biosystems, climate, and environmental research

Forefront scientific computing facilities

World's most intense pulsed neutron source

World-class research reactor: Bio-SANS

1,888 journal articles published in CY14

Nation's most diverse energy portfolio

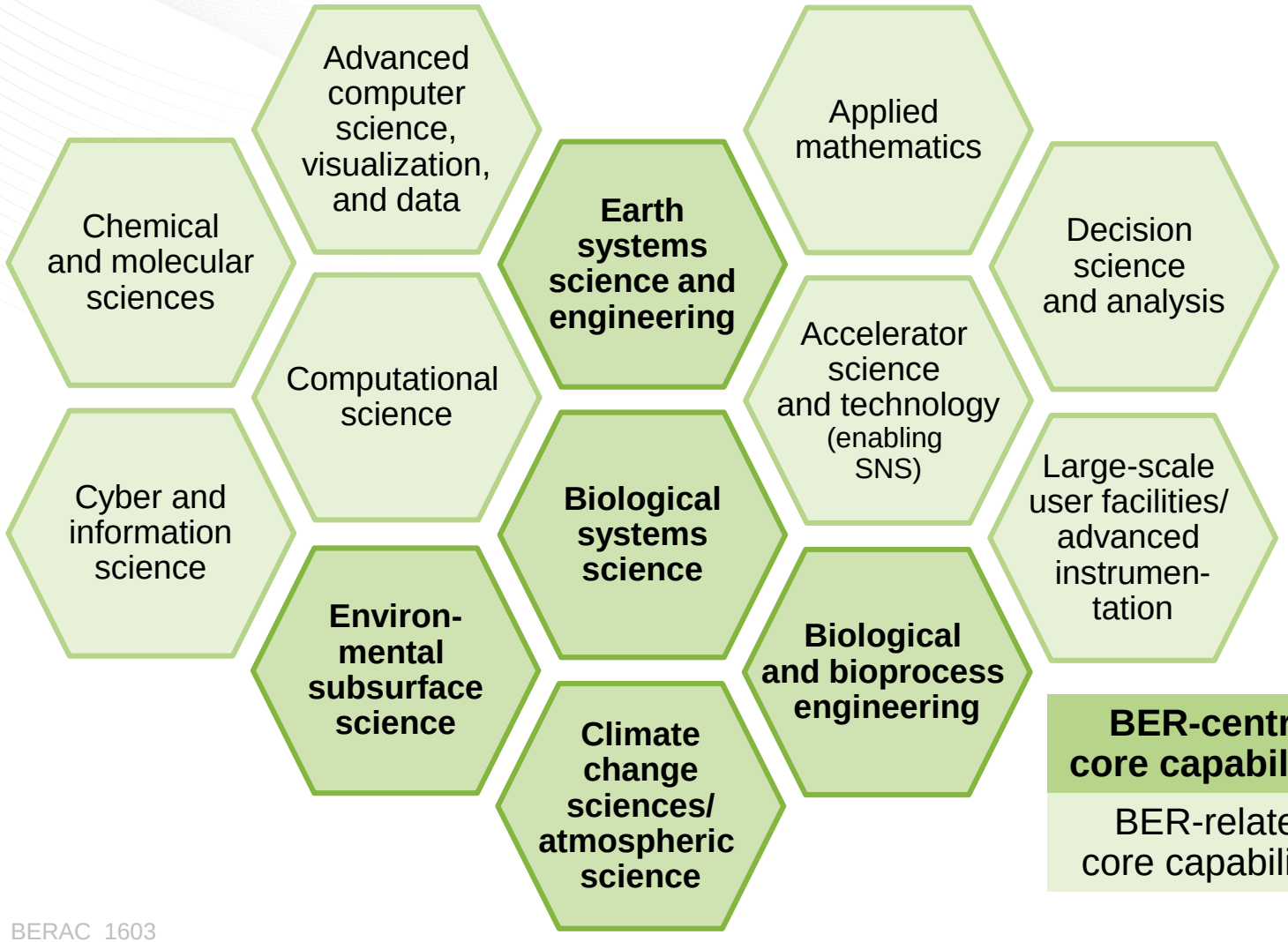
Managing mission-critical projects: US ITER, ECP

198 invention disclosures in FY15

66 patents issued in FY15

Delivering mission outcomes

We exploit synergies among our core capabilities to deliver science for BER



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)

Other resources

- 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)

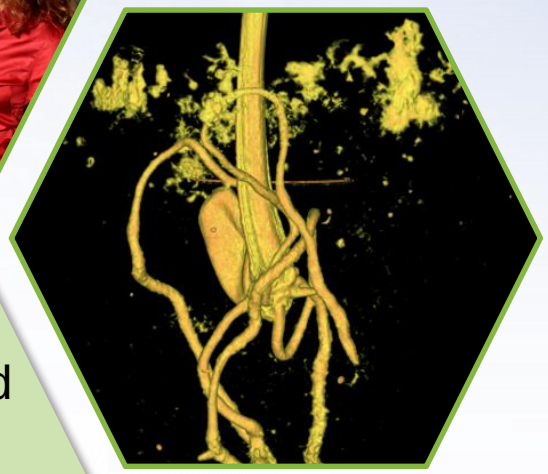
Future: Science to enable solutions in clean energy and environmental sustainability

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 strategic partnerships to support BER vision and Mission Innovation

Leveraging distinctive DOE and ORNL resources	Expanding research collaborations	Developing next-generation talent
• Current/continuing activities – Climate Change Science Institute – Urban Dynamics Institute – Compute and Data Environment for Science (CADES) • Emerging/planned assets – Exascale Computing Project: Applications in biology, climate, subsurface – SNS Second Target Station: New capabilities for biology and soft matter	• Multi-institutional BER projects – BESC (lead: ORNL) – PMI (lead: ORNL) – ENIGMA – KBase – Mercury SFA (lead: ORNL) – NGEE-Arctic (lead: ORNL) – NGEE-Tropics – SPRUCE (lead: ORNL) – ACME • Support for other agencies – NOAA National Climate-Computing Research Center – NSF National Ecological Observatory Network	• Engaging graduate students in ORNL research programs – UT School of Genome Science and Technology (44) – UT-ORNL Bredesen Center (129) – Graduate Opportunities program (51) – National GEM Consortium (13) • Recruiting top-notch researchers – Named fellowships (23) – Strategic hires