ORNL, Computing, & Data Science

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Neuromorphic Computing Workshop 2016
The Clinton Pile was the world’s first continuously operated nuclear reactor

Chemical processing techniques were developed to separate plutonium from irradiated fuel
Today, ORNL is DOE’s largest science and energy laboratory

- Approximately $1.4 billion budget
- More than 4,000 employees
- 3,000 research guests annually
- $500 million modernization investment
- Nation’s largest materials research portfolio
- Nation’s most powerful open scientific computing facility
- World’s most intense neutron source
- World-class research reactor
- Nation’s most diverse energy portfolio
- Managing billion-dollar U.S. ITER project
ORNL’s mission
Deliver scientific discoveries and technical breakthroughs that will accelerate the development and deployment of solutions in clean energy and global security, and in doing so create economic opportunity for the nation.
ORNL’s core capabilities position us to tackle compelling S&T challenges
ORNL’s core capabilities enable a robust laboratory R&D agenda

- Advance the science and impact of neutrons
- Scale computing and data analytics to exascale and beyond for science and energy
- Advance the scientific basis for breakthrough nuclear technologies and systems
- Advance understanding of complexity in biological, environmental, and climate systems
- Accelerate the discovery and design of new materials for energy
- Accelerate R&D and manufacturing of integrated energy systems
- Deliver science and technology to address complex security challenges
- Advance the scientific basis for breakthrough nuclear technologies and systems
- Deliver science and technology to address complex security challenges

CCSD represented in red
ORNL is organized to solve grand challenge problems
ORNL programs in computing support all four discovery paradigms

Scientific discoveries: Understanding complex systems of systems

- Experiment
  - Facilities and systems infrastructure
  - NCCS, JICS

- Theory
  - Mathematics, computer science, and computational science R&D
  - CSMD, CSED

- Simulation
  - Cyber and information technology (IT) systems
  - ITSD

- Data
Computer Science & Mathematics (CSM)

Computer Science and Mathematics Division
Barney Maccabe, Director

Administration
Lora Wolfe

Technical
Daniel Pack

Chief Technologist
Al Geist

Finance
Ursula Henderson

International
Thomas Schulthess

Computational Chemical and Material Sciences
Bobby Sumpter

Computational Earth Sciences
Kate Evans

Computational Biomolecular Modeling and Bioinformatics
Mike Leuze

Computational Engineering and Energy Sciences
John Turner

Computational and Applied Mathematics
Clayton Webster

Complex Systems
Jacob Barhen

Future Technologies
Jeffery Vetter

Computer Science Research
David Bernholdt

Scientific Data
Scott Klasky

Staffing

125 Staff
14 Joint Faculty
6 Students
8 Admin Support

Staff Support

30% DOE/ASCR
26% DOE/Other
19% US DoD
10% LDRD
8% WFO
5% Joint Faculty
2% Other
Computer Science and Mathematics
Core Research Areas

- Biology
- Complex Systems
- Energy Science
- Earth Sciences
- Computer Engineering
- Future Technology
- Computer Science
- Scientific Data
- Materials/Chemistry
- Mathematics
- Infrastructure/Deployment/Solutions
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<th>Sensing &amp; Big Data</th>
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<td>Leadership Computing</td>
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<td>Urban Systems</td>
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<td>Data-driven Smart Sensing</td>
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<td>Materials: SNS &amp; CNMS, Adv Mfg</td>
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<td>Text Analytics &amp; NLP</td>
<td>Health (PHI, MVP)</td>
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<td>Information</td>
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<td>Energy (KDF: Biomass)</td>
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<td>Energy: Biomass</td>
<td>Deep Learning</td>
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<td>Environment: Climate</td>
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<td>Streaming: Facilities, Open Source, IoT</td>
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Summary

• Welcome to ORNL!
• Feel free to reach out to any of our staff to discuss collaboration opportunities while you are here.
• We hope you thoroughly enjoy your time here and have a productive workshop.