



OAK  
RIDGE  
National Laboratory

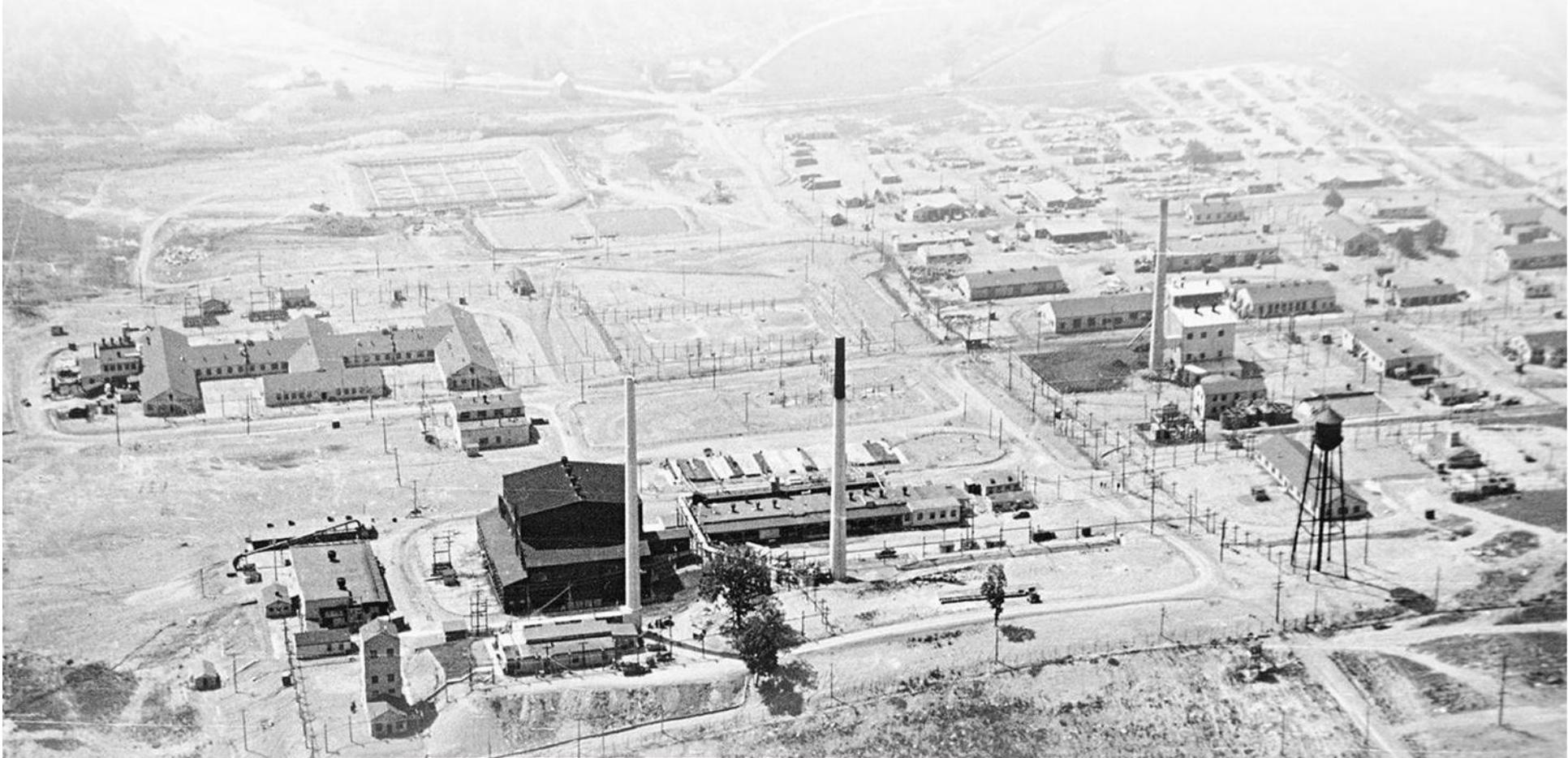
OAK RIDGE NATIONAL  
LABORATORY  
MANAGED BY THE  
U.S. DEPARTMENT OF ENERGY



**CAREER**  
**STARTS HERE**

*Channa Palmer*  
University Recruiting

# Oak Ridge National Laboratory evolved from the Manhattan Project



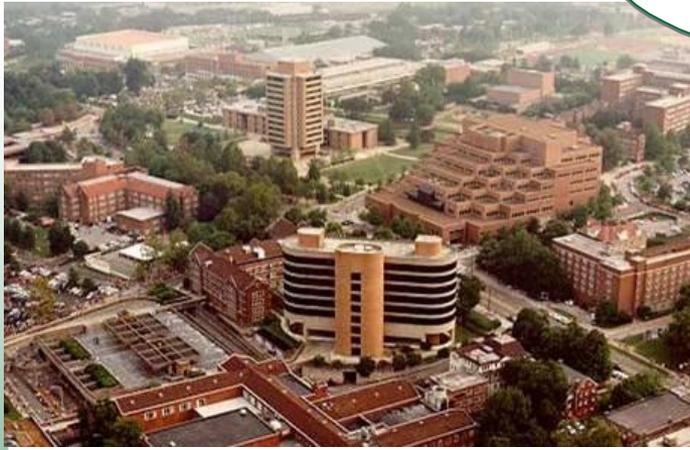
**ORNL in 1943**  
The Clinton Pile was the world's first continuously operated nuclear reactor

# Today, ORNL is DOE's largest science and energy laboratory



- \$1.5B budget
- 4,750 employees
- 4,000 research guests annually
- \$500 million invested in modernization
- United States most powerful open scientific computing facility
- Nation's largest concentration of open source materials research
- Nation's most diverse energy portfolio
- Operating the world's most intense pulsed neutron source
- Managing the billion-dollar U.S. ITER project

# UT-Battelle has managed ORNL since April 2000



**The University of Tennessee  
Knoxville, Tennessee**



**Battelle  
Columbus, Ohio**



# ORNL is well positioned to deliver science and technology for energy

We have an extraordinary set of assets

- Outstanding tools for materials R&D
- World-leading systems for open scientific computing
- BioEnergy Science Center
- Growing strength in climate change impact R&D
- The nation's broadest portfolio of energy programs
- Unique resources for nuclear technology
- Robust national security programs

**Our challenge:**  
Use these assets to enable science and technology breakthroughs that transform our energy future



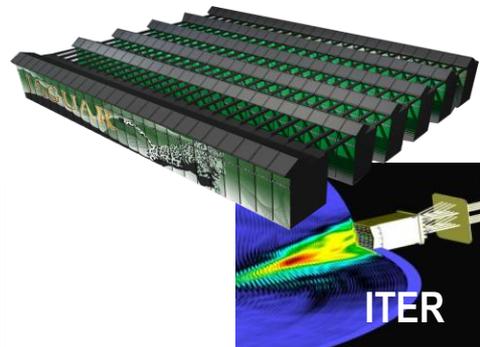
# Delivering science and technology:

We lead major R&D programs for DOE and other customers

**Energy Technologies**



**Ultrascale Computing**

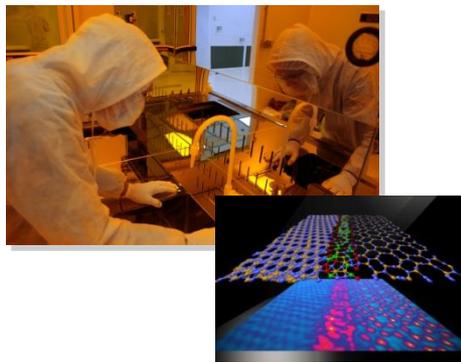


**Bioenergy**



**Climate**

**Materials at the Nanoscale**



**Neutron Sciences**



**Nuclear Energy**

**National Security**



# Leading the development of ultrascale scientific computing

- Leadership Computing Facility:

- United State's most powerful open scientific computing facility
- Jaguar XT operating at 2.2 petaflops
- Exascale system by the end of the next decade
- Focus on computationally intensive projects of large scale and high scientific impact

- Addressing key science and technology issues

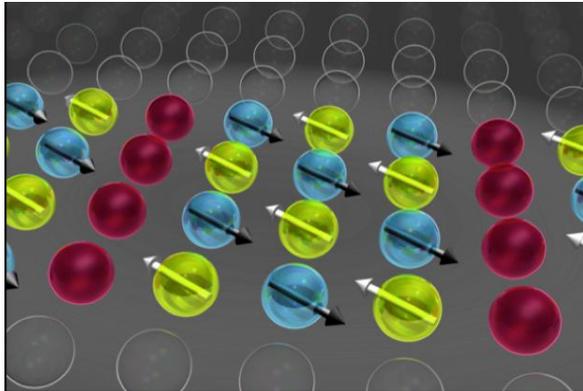
- Climate
- Fusion
- Materials
- Bioenergy



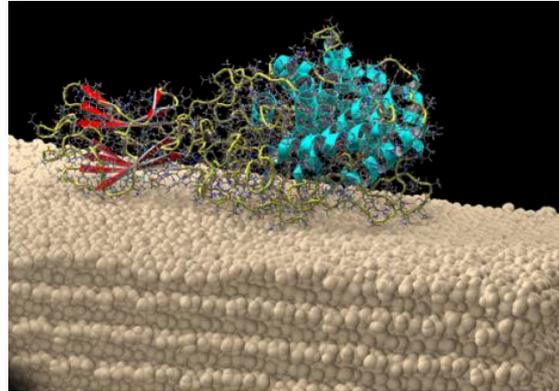
**The world's most powerful system for open science**

# High-performance computing is opening new research frontiers

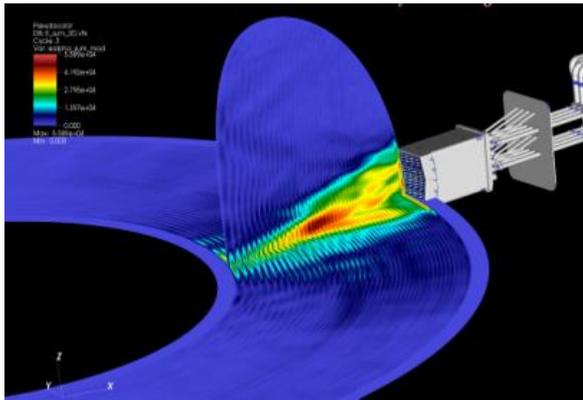
Physics of high-temperature superconducting cuprates



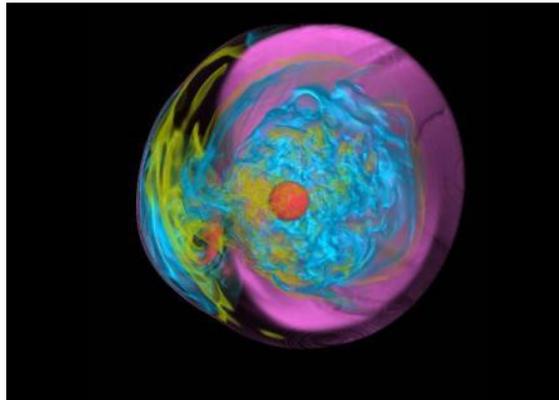
Protein structure and function for cellulose-to-ethanol conversion



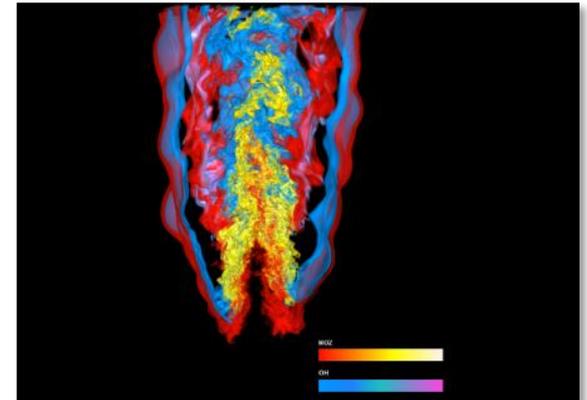
Global simulation of CO<sub>2</sub> dynamics



Optimization of plasma heating systems for fusion experiments



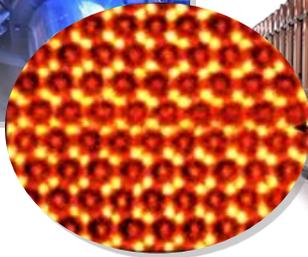
Fundamental instability of supernova shocks



Next-generation combustion devices burning alternative fuels

# Expanding our understanding of materials

Atomic resolution electron microscopy



DOE's first nanoscale science research center

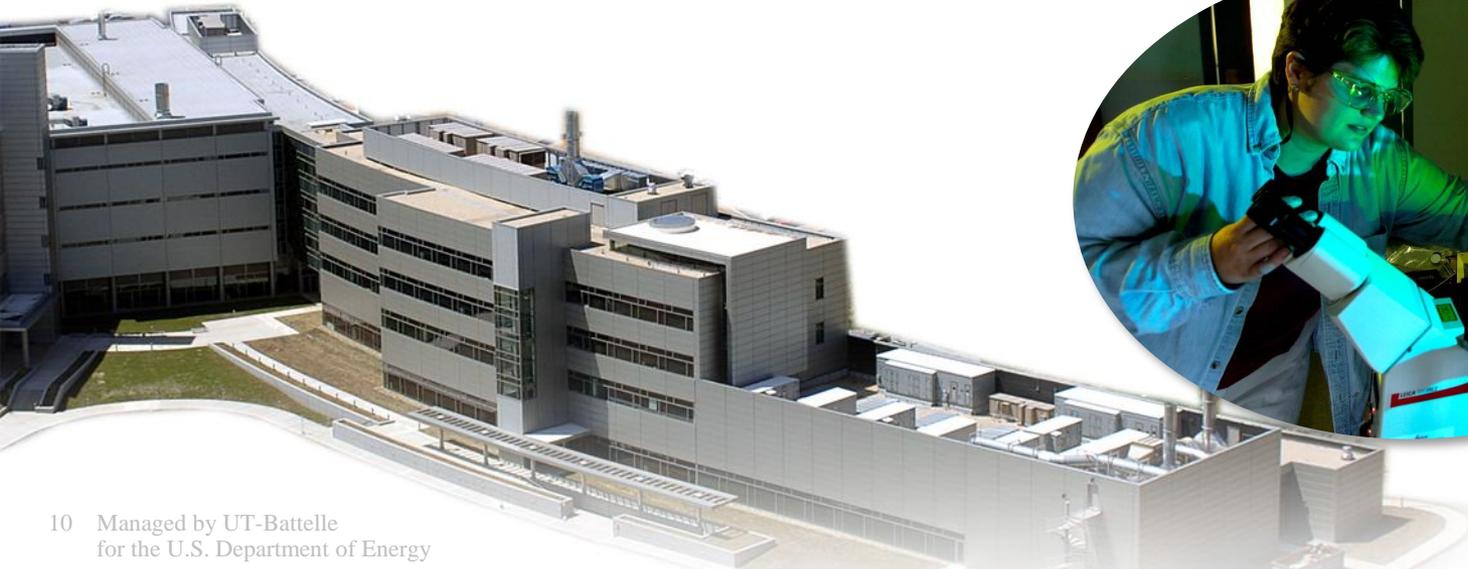
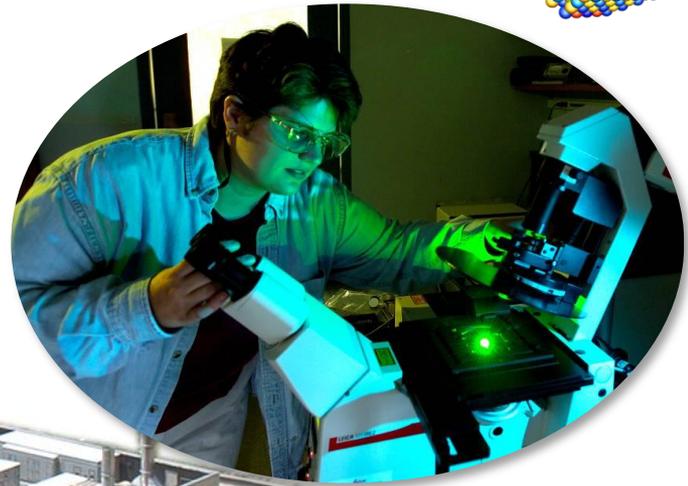
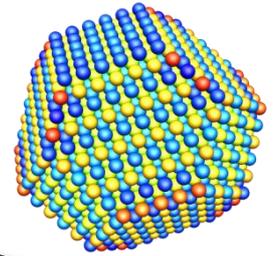


Hundreds of industry partners, thousands of university users

# World-class capabilities for materials R&D

- DOE's first Nanoscale Science Research Center
  - Nanofabrication
  - Nanoscale characterization
  - Materials synthesis and chemistry at the nanoscale
- World leading facilities (neutron scattering, electron microscopy, High Temperature Materials Laboratory)
- Synthesis and processing (alloys, ceramics, thin films, nanofabrication, laser and infrared processing)
- Hundreds of industrial partners; thousands of university users

Understanding materials and chemistry at the length scale where properties are determined



# Putting the world's best tools for neutron scattering to work

**Spallation Neutron Source:**  
World's most powerful accelerator-based neutron source

**High Flux Isotope Reactor:**  
Complementary capabilities and a new cold neutron source

**UT-ORNL Joint Institute for Neutron Sciences:**  
User gateway for SNS and HFIR

Delivering neutrons to hundreds of users



# Consortium for Advanced Simulation of Light Water Reactors

## Building a virtual reactor to enable advances in nuclear energy



1

**Reduce capital and operating costs** per unit energy by enabling power uprates and life extension



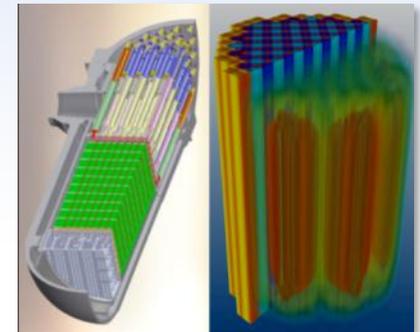
2

**Reduce nuclear waste** volume generated by enabling higher fuel burnups



3

**Enhance nuclear safety** by delivering high-fidelity predictive capability for component and system performance from beginning of life through failure



# Transforming the new biology into bioenergy and biomaterials production

Developing biobased solutions for energy, the environment, and carbon sequestration



Partnering with the University of Tennessee to develop a pilot-scale biorefinery and R&D facility for cellulosic ethanol

# Collaborating to break the biological barriers to cellulosic ethanol

- BioEnergy Science Center
  - \$135M in DOE funding, plus partner contributions
  - Anchored by UT-ORNL Joint Institute for Biological Sciences
- Tennessee Biofuels Initiative
  - \$72M in state funding, plus industrial partner contributions
  - Includes research, facilities and equipment, pilot-scale demonstration, and agricultural price supports
- Total investment: Close to a quarter of a billion dollars



Developing an integrated biofuels resource:  
Fundamental science through  
pilot-scale demonstration

# Exploring how ecosystems respond to global and regional change

Plant sciences



Carbon cycle and ecosystem research



Subsurface science



Ecological management



## Detect, model, and simulate environmental responses

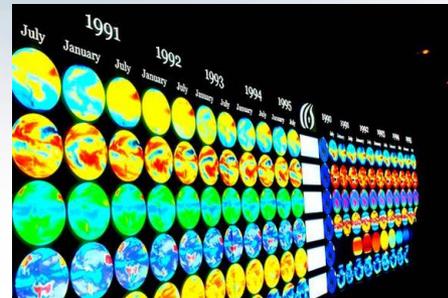
Microbial ecology and functional genomics



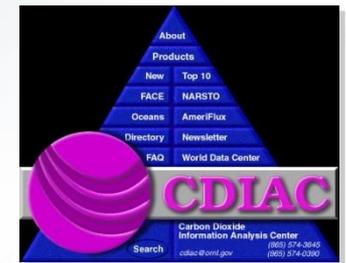
Society-technology interfaces



Global climate simulation



Environmental data systems



# Translating science and technology into energy solutions

## Generation

**Fossil**  
**Fission**  
**Renewables**  
**Fusion**



## Distribution

**Transmission technology**  
**Hydrogen**  
**Distributed energy resources**



## Consumption

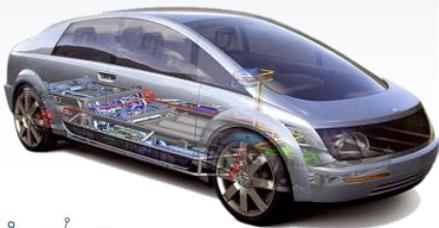
**Buildings**  
**Industry**  
**Transportation**



**Supporting national goals  
for energy security and independence**

# We partner with industry to put our energy innovations to work

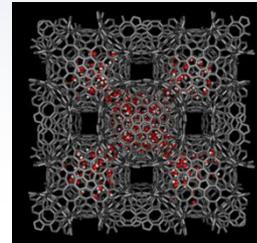
## Transformational transportation technologies



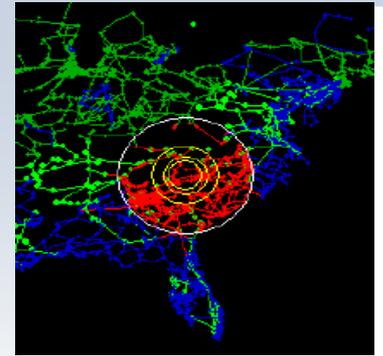
## High-efficiency green buildings



## Advanced materials for energy applications

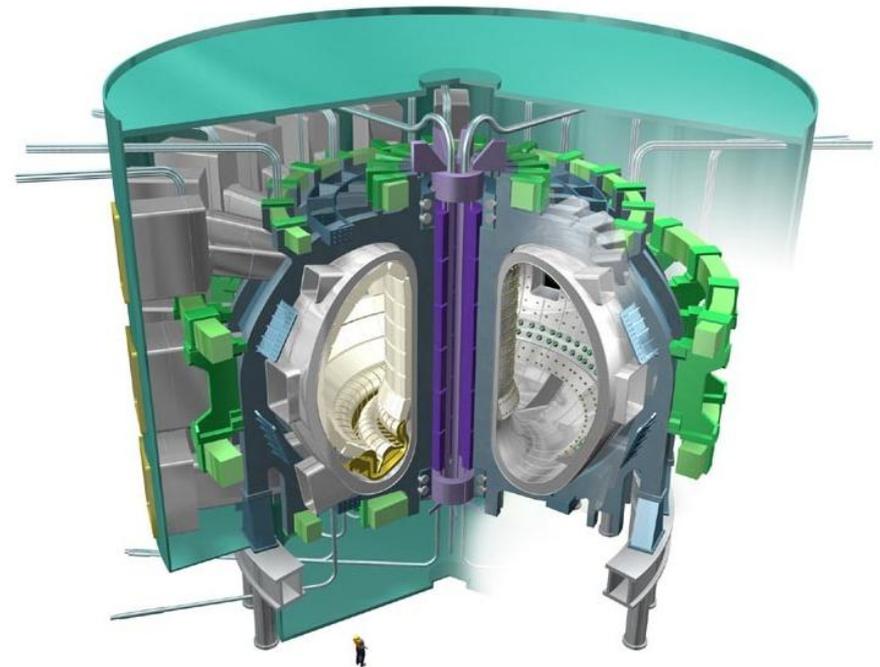


## Electric grid reliability and resilience



# ORNL is managing the U.S. ITER Project for DOE

- Joint international R&D project aimed at demonstrating the scientific and technical feasibility of fusion power
- The United States is contributing:
  - Hardware procurement (including R&D and design)
  - Staff assignments
  - Cash and contingency
- Our work includes arranging for export of U.S.-provided hardware and for release of information important to the project

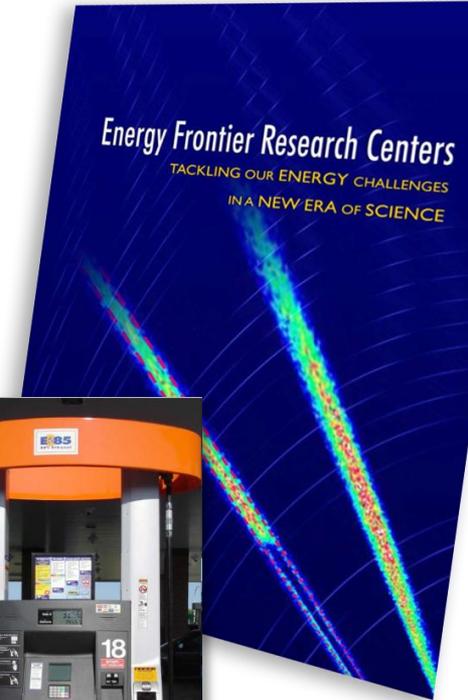
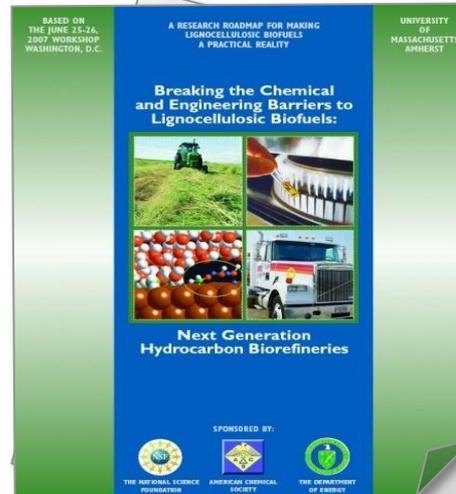


# Enhancing global, national, and homeland security



# ORNL offers:

- Collaboration
- Joint research proposals
- User facilities
- Shared students and Postdocs
- Joint faculty and research appointments
- Visiting scientists and engineers
- Cooperative research agreements
- Work for others
- Student internship research experiences



# ORNL Scientific User Facilities

- Building Technologies Research and Integration Center
- Center for Nanophase Materials Sciences
- Center for Structural Molecular Biology
- High Flux Isotope Reactor
- High Temperature Materials Laboratory
- Holifield Radioactive Ion Beam Facility
- National Center for Computational Sciences
- National Transportation Research Center
- Oak Ridge Electron Linear Accelerator
- Safeguards Laboratory
- Shared Research Equipment Facility
- Spallation Neutron Source



# ORNL Interns Tell it Best!



# Hear about us from an ORNL Postdoc



# At a Glance: Student, Postdoctoral, and Fellow Programs

Undergraduate	Graduate	Postdoctoral	Faculty	Fellows*
<ul style="list-style-type: none"> <li>• Co-op program</li> <li>• DHS HS-STEM Internship</li> <li>• HERE@ORNL</li> <li>• Laboratory Technology Program</li> <li>• Nuclear Engineering Science Laboratory Synthesis Internship</li> <li>• Research Alliance in Math and Science</li> <li>• Science Undergraduate Laboratory Internship</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced Short-Term Research Opportunity</li> <li>• HERE@ORNL</li> <li>• Nuclear Engineering Science Laboratory Synthesis Internship</li> <li>• Research Alliance in Math and Science</li> <li>• Post-Master's Research Participation</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced Short-Term Research Opportunity</li> <li>• Instrument Development Fellows</li> <li>• Postdoctoral research associates</li> </ul>	<ul style="list-style-type: none"> <li>• DHS Summer Research Team</li> <li>• Faculty and Student Team</li> <li>• HERE@ORNL</li> <li>• NRC Faculty Research Participation</li> <li>• Sabbaticals and summer research</li> </ul>	<ul style="list-style-type: none"> <li>• Eugene Wigner Fellows</li> <li>• Alvin M. Weinberg Fellows</li> <li>• Clifford Shull Fellows: Neutron science</li> <li>• Alston Householder Fellows: Scientific computing</li> </ul>

\* ORNL employment program

<http://jobs.ornl.gov>

# Want to continue your education? Consider our CIRE Programs

## UTK-ORNL Distinguished Graduate Fellowship

### Oak Ridge National Laboratory

ORNL is home to an extraordinary collection of research facilities, including the world's fastest and fourth fastest supercomputers, the Spallation Neutron Source (the world's most powerful pulsed source for neutron scattering), and the High Flux Isotope Reactor (world-leading steady-state neutron fluxes). These facilities, in combination with world-class capabilities in nanoscale science and engineering, nuclear engineering, nuclear physics, and materials and chemical sciences, provide an exceptional multidisciplinary environment for forefront science and energy research.

## UTK-ORNL DISTINGUISHED GRADUATE FELLOWSHIP



THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE

OAK  
RIDGE  
National Laboratory



For information about the UTK-ORNL Distinguished Graduate Fellowship Program, contact

Lee Riedinger  
Professor of Physics and  
Director, Center for Interdisciplinary Research and  
Graduate Education  
University of Tennessee Knoxville  
Knoxville, TN 37996-1200  
lrieding@utk.edu

The University of Tennessee is an EEO/AAE/DFW/ADA/Section 504/ADA/AAEAA institution in the provision of educational and employment programs and services. EOE: M/F/D/V. U.S. Department of Energy Office for Interdisciplinary Research and Graduate Education at the assistance of UTK Division Communications, 21 Communications Bldg., Knoxville, TN 37996, 865-698-5165, Fax: 865-

## CIRE - Both Programs

### ONE GREAT PARTNERSHIP—TWO GREAT OPPORTUNITIES!



The University of Tennessee, Knoxville, and Oak Ridge National Laboratory have jointly created the Center for Interdisciplinary Research and Graduate Education (CIRE), the home of two joint graduate programs that offer an outstanding blend of the cultures of a comprehensive research university and a major national laboratory.

The Energy Science and Engineering Interdisciplinary Degree Program provides an annual stipend of \$28,000, tuition, and health insurance for Ph.D. candidates investigating

- Bioenergy and biofuels
- Environmental and climate science
- Nuclear energy
- Distributed energy and grid management
- Energy conversion and storage
- Renewable energy

The UTK-ORNL Distinguished Graduate Fellowship Program provides a \$30,000 stipend, tuition, and health insurance for Ph.D. candidates in various university departments pursuing research in

- Materials science and engineering, including neutron science
- Computational science and engineering
- Nuclear science and engineering

Come join our unique graduate programs, work alongside internationally renowned scientists, enjoy use of an extraordinary collection of research facilities, including the world's fastest supercomputers, and become a member of the next generation of the science and engineering elite.

The University of Tennessee, Knoxville, is an EEO/AAE/DFW/ADA/Section 504/ADA/AAEAA institution.



Imagine a better  
future, then do  
something about it.

THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE

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National Laboratory

For more information, go to <http://cire.utk.edu>

## Energy Science and Engineering

### Collaborating Institutions

The University of Tennessee, Knoxville, a major public research university with research expertise in nuclear engineering, materials science, nuclear physics, grid development and management, power electronics, energy storage, environmental science and engineering, and bioenergy, grants the degrees offered through the program and provides faculty mentors for many of the research projects.

Oak Ridge National Laboratory, the U.S. Department of Energy's largest science and energy laboratory, has research expertise in neutron science, energy, advanced materials, supercomputing, national security, and more. ORNL also has such internationally recognized research facilities as the Spallation Neutron Source; the High Flux Isotope Reactor; and Jaguar, the world's fastest supercomputer. Students will have opportunities to work at these facilities with ORNL researchers.

Imagine a better future,  
then do something  
about it.

OAK  
RIDGE  
National Laboratory

THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE

The ESE program is managed by the Center for Interdisciplinary Research and Graduate Education (CIRE) and based at both UTK and ORNL.

Contact

Lee Riedinger  
Professor of Physics and  
Director, Center for Interdisciplinary Research and  
Graduate Education  
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lrieding@utk.edu

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## GRADUATE PROGRAM IN ENERGY SCIENCE & ENGINEERING



THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE

OAK  
RIDGE  
National Laboratory

# Full Time Positions Plus Benefits

*50+ full-time positions open*

- Science Organizations
- Support Organizations

*Competitive Pay*

*Full Medical/ Dental Benefits*

*Pension & 401k*

*11 Paid Holidays*

*Educational Assistance*

*Health and Wellness Program*





### *Masters in Engineering*

- \$4,000 living stipend per semester up to four semesters
- Full tuition and fees at a GEM University
- Two paid summer internships with a GEM employer

### *Ph.D. Engineering or Science*

- 16,000 a year academic stipend
- GEM University Support up to 5th Year (equivalent with Graduate department)
- One paid summer internship with GEM employer

# Requirements

## MS Engineering Program Applicants:

- *Must be a senior, or graduate of an accredited engineering or computer science program at the time of application.*
- *GPA average of 2.8/4.0.*
- *Must intern for two summers with sponsoring GEM Employer.*

## Ph.D. Program Applicants:

- *Must be a senior or masters student*
- *Grade point average of 3.0/4.0.*
- *Must Intern with a GEM Employer*



# How to Apply



# Hints to Getting into Our Programs

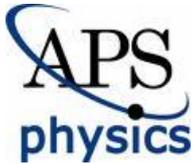
- *Attend Job Fairs and Info Sessions*
- *Apply online as soon as possible*
- *Write a strong focused essay*
- *Follow up with recruiters*



# Reaching Students



Rx3



On Campus



# Contact Information



CHANGING  
the **WORLD** ONE  
**CAREER** at a TIME

*Channa Palmer*

University Recruiting and Fellowship Programs

Oak Ridge National Laboratory

865-241-9426 office

865-253-5138 mobile

Email and IM: [palmerck@ornl.gov](mailto:palmerck@ornl.gov)

<http://jobs.ornl.gov>

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# Oak Ridge National Laboratory: *Meeting the Challenges of the 21st Century*

QUESTIONS?

