

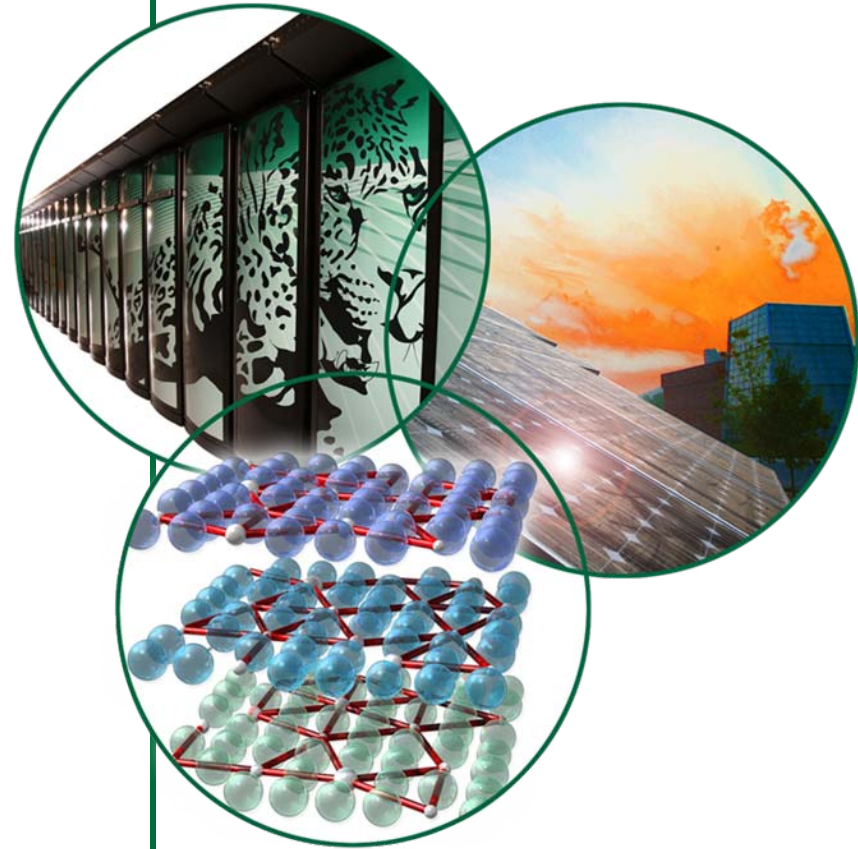
Creating Sustainable Partnerships:

Lessons Learned and Achievements Realized

Presented to
Women-Owned Small
Business Day

Tom Ballard
Director – Partnerships
Oak Ridge National Laboratory

Oak Ridge, Tennessee
August 24, 2010



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

- \$1.55B budget
- 4,700 employees
- 4,000 research guests annually
- \$500 million invested in modernization

- **Nation's** largest concentration of open source materials research
- **World's** most intense pulsed neutron source and a world-class research reactor

- **World's** most powerful open scientific computing facility
- **Nation's** most diverse energy portfolio
- Managing the billion-dollar U.S. ITER project



ORNL is managed by UT-Battelle, LLC

The University of Tennessee



Battelle Memorial Institute



- An ORNL partner since 1946
- State-funded Science Alliance started in 1982, to build programs with ORNL
- Shared research and joint appointments
- Joint institutes in advanced materials, biological sciences, computational sciences, neutron sciences, and nuclear physics

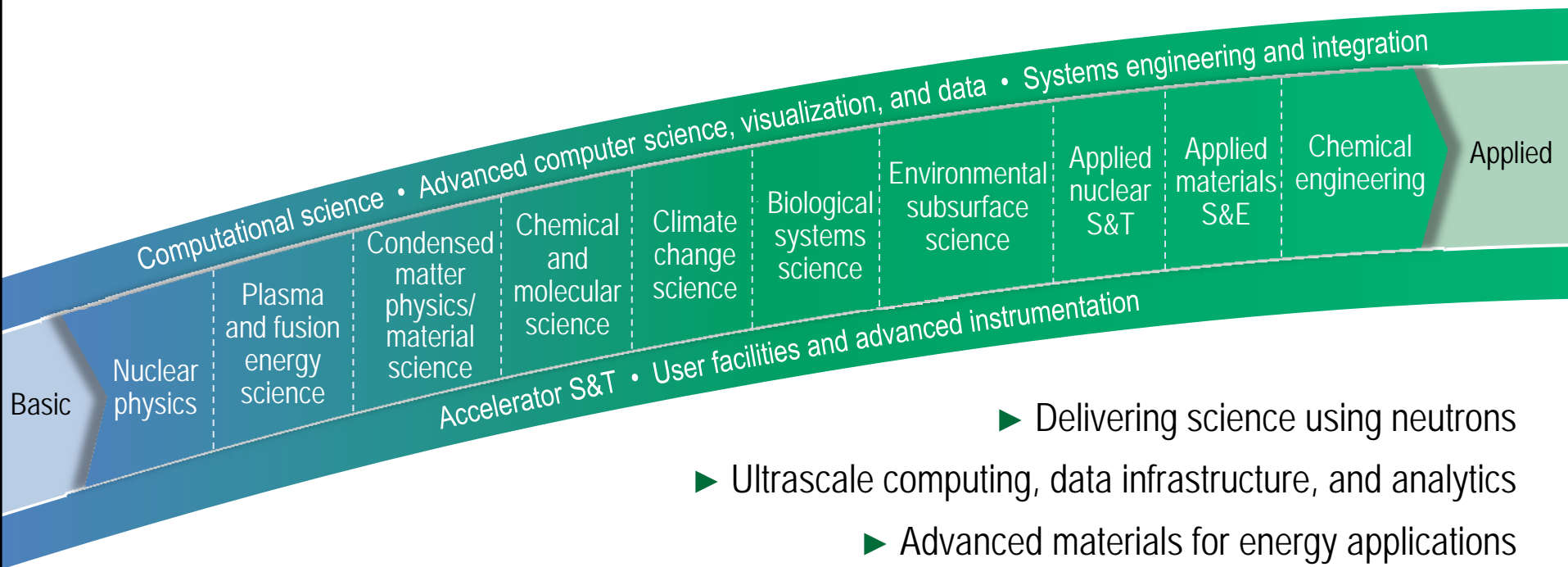
- A 65-year relationship with DOE
- Develops and deploys technology worldwide
- Manages or co-manages 6 DOE national laboratories: ORNL (with UT), Brookhaven (with SUNY-Stony Brook), Idaho, Lawrence Livermore (with UC and Bechtel), NREL (with MRI), and Pacific Northwest

ORNL's mission

Deliver scientific discoveries and technical breakthroughs that will accelerate the development and deployment of solutions in clean energy and security, and in doing so create economic opportunity for the nation



We are focusing our distinctive capabilities on mission outcomes



- ▶ Delivering science using neutrons
- ▶ Ultrascale computing, data infrastructure, and analytics
 - ▶ Advanced materials for energy applications
 - ▶ Understanding climate change impacts
- ▶ Biomass production and conversion for energy and materials
- ▶ Transformational high-temperature nuclear energy systems
 - ▶ Fusion science and technology in the ITER era

Transforming the Laboratory with 21st century research facilities

East Campus



Chestnut Ridge Campus



Science and Technology Park

West Campus

Delivering science and technology:

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

Energy technologies



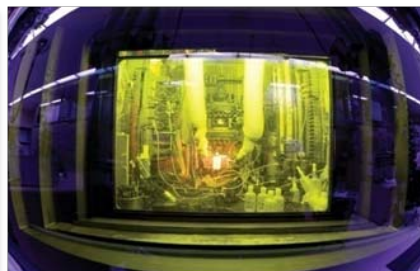
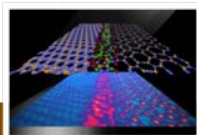
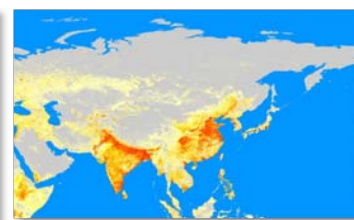
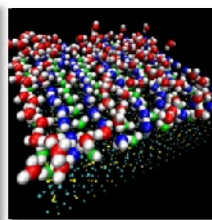
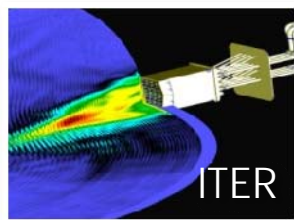
Ultrascale computing



Climate



Bioenergy



Materials at the nanoscale

Neutron sciences

Nuclear energy

National security

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

High Flux Isotope Reactor:
Intense steady-state neutron flux
and a high-brightness cold neutron source

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



Joint Institute
for Neutron Sciences:
User gateway for SNS and HFIR

Delivering neutrons to a growing user community

Leading the development of ultrascale scientific computing

- DOE Leadership Computing Facility:
 - World's most powerful open scientific computing facility
 - Jaguar XT operating at >2 petaflops
 - Exascale system by 2018
 - Focus on computationally intensive projects of large scale and high scientific impact
- NSF National Center for Computational Sciences:
 - Kraken operating at >1 petaflops
 - Partnership with the University of Tennessee
- NOAA Climate Prediction Center



The world's most powerful systems for open science

Translating science and technology into sustainable energy solutions

Clean and affordable electricity



Nuclear power
Solar photovoltaics
Batteries
and energy storage
Secure and reliable
electric grid

Sustainable transportation



Lightweight materials
Power electronics
Biofuels
Batteries

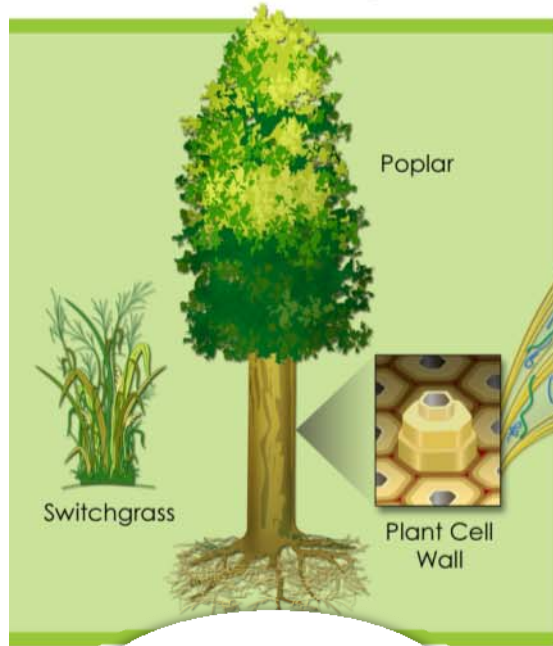
Energy efficiency



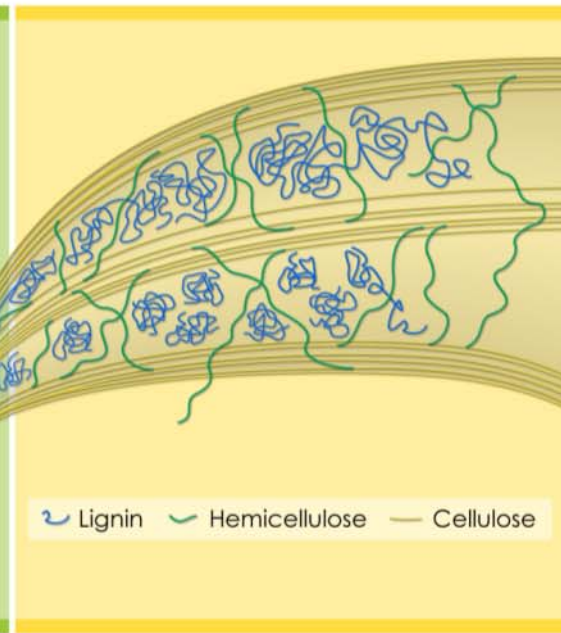
Industry
Manufacturing
Buildings

Sustainable energy solutions: Clean, viable, and plentiful alternative fuel sources

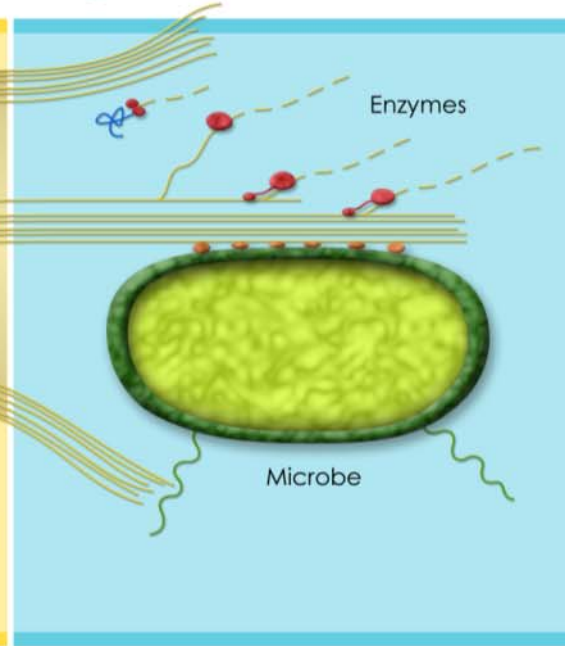
Biomass formation and modification



Characterization and modeling



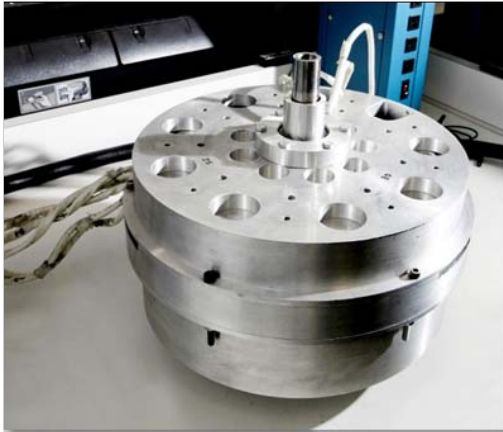
Biomass deconstruction and conversion



Revolutionizing how biomass is processed and converted

Sustainable energy solutions: DOE's largest and most diverse transportation research program

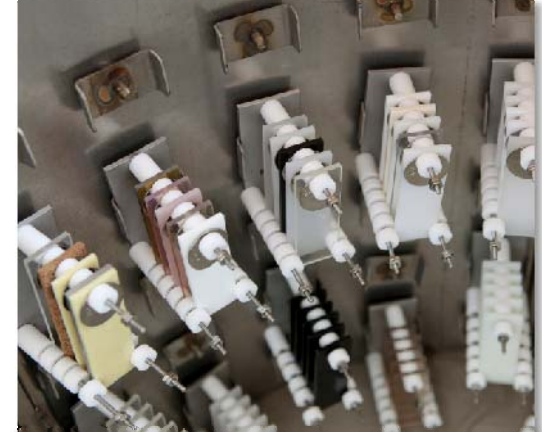
Developing energy-efficient, low-emissions transportation technologies
that enable America to use less petroleum



Low-cost,
high-efficiency motors
and inverters/converters
for electric hybrid vehicles



Lighter-weight
structural materials
and propulsion
materials



Technology for advanced
combustion regimes
with reduced emissions
without fuel efficiency penalty

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



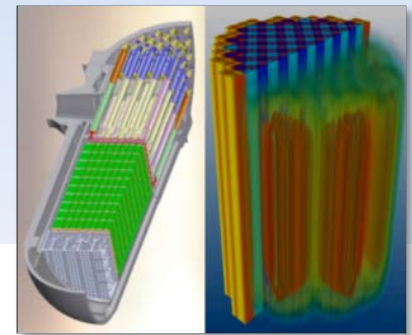
2

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



CASL:

A unique lab-university-industry partnership

Core partners

- Oak Ridge National Laboratory
- Electric Power Research Institute
- Idaho National Laboratory
- Los Alamos National Laboratory
- Massachusetts Institute of Technology
- North Carolina State University
- Sandia National Laboratories
- Tennessee Valley Authority
- University of Michigan
- Westinghouse Electric Company



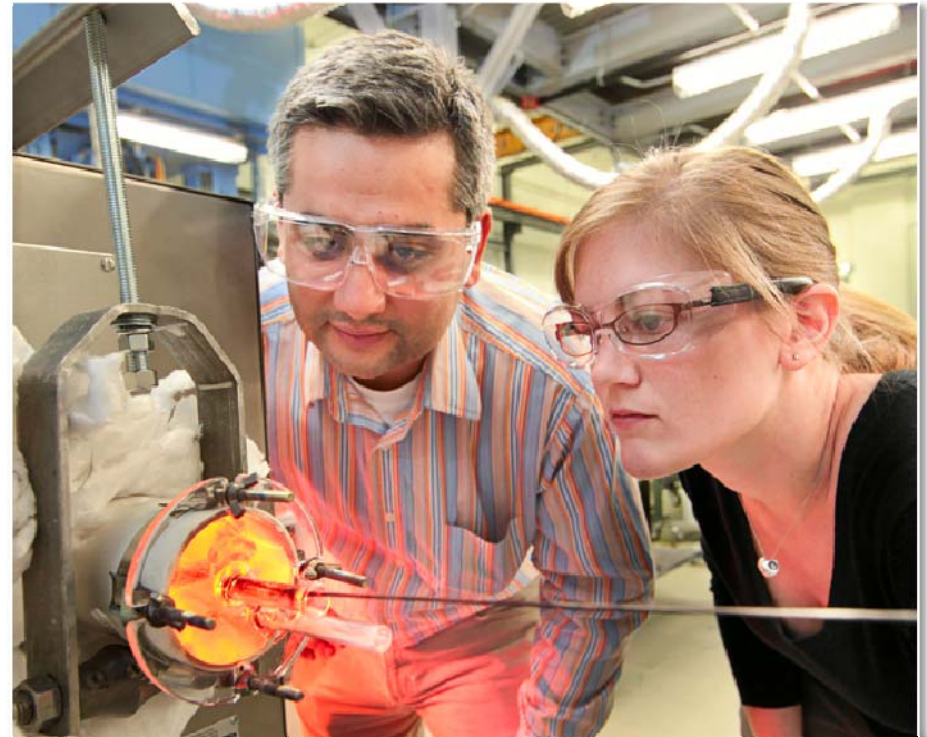
Building on longstanding, productive relationships and collaborations to forge a close, cohesive, and interdependent team that is fully committed to a well-defined plan of action

Individual contributors

- ASCOMP GmbH
- CD-adapco, Inc.
- City University of New York
- Florida State University
- Imperial College London
- Rensselaer Polytechnic Institute
- Southern States Energy Board
- Texas A&M University
- University of Florida
- University of Tennessee
- University of Wisconsin
- Worcester Polytechnic Institute

Helping to develop the next generation of scientists and engineers

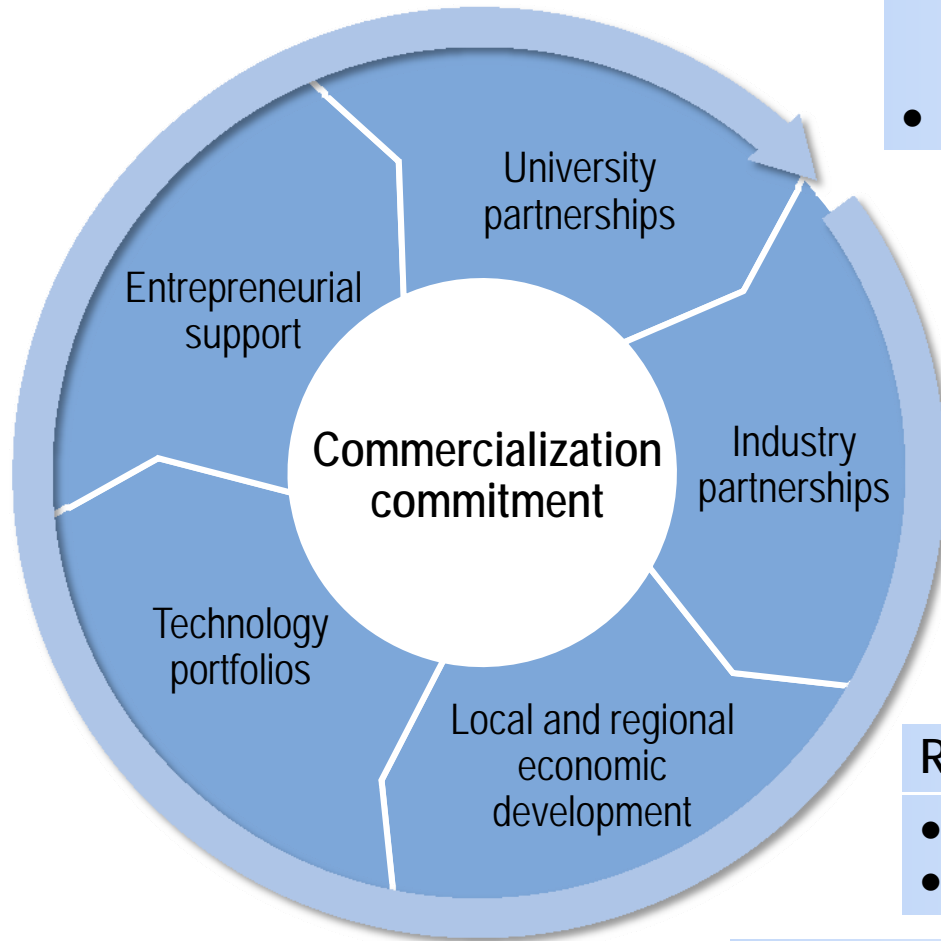
- Providing educational and research experiences for students and faculty at all levels
 - Prestigious postdoctoral fellowships
 - Graduate education programs with an emphasis on interdisciplinary energy science and technology
- Investing in facilities and teachers for area schools
- Participating in regional education and workforce development efforts



We help connect the lab to the outside world and the world to ORNL



We produce results!



Patents

- U.S. patents, 2003–2009
 - Applications filed: 556
 - Patents issued: 275
- 567 active international patents

Licensing

- FY09 income: \$1.41M
- 157 active technology licenses

Research agreements

- New in FY09: 274
 - Work for Others: 86
 - User agreements: 176
 - CRADAs: 12

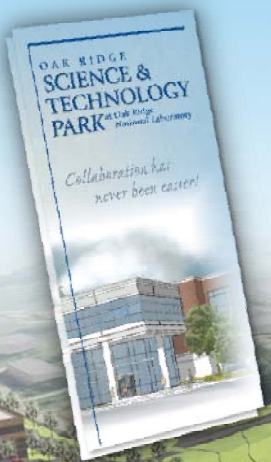
R&D 100 awards

- FY09: 8
- Since 1963: 148

New companies

- FY09: 5
- Since April 2000: 89

Our "first of its kind" S & T Park offers space for companies seeking an ORNL address for collaboration



Future Building Site

Building Site Now Available

Halcyon Commercialization Center



Single Offices and Labs Now Available

Pro2Serve National Energy Security Center



Limited Office Space Available January 2010



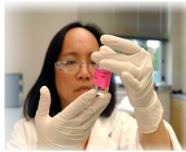
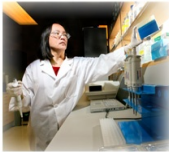
...supporting research commercialization
collaborations between companies and ORNL

Current Tenants include:

Strata G
Xcel Engineering
Palmer Labs
LRS Federal
General Atomics
Emerson Electric
C3 International
Technology 2020
RFViz, Inc.
Plasan Carbon Composites
GC Technical Services

We have many success stories that reinforce our work as an engine of innovation.

Start-up licensee



A New Dimension in Power

Established licensee



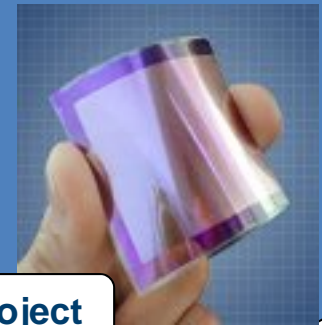
Local Life Sciences Licensee



imagination at work



CRADA Project



WFO Project

Oak Ridge National Laboratory:

Meeting the challenges of the 21st century through “win-win” partnerships with a variety of collaborators



www.ornl.gov