

# Welcome to Oak Ridge National Laboratory



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**Sciences**

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# 1st Southeast Solar Summit — ORNL



Thank you to our co-host, the Southern Alliance for Clean Energy and all the Summit co-sponsors!

**SOUTHEAST**  
**SOLAR SUMMIT**



Southern Alliance for  
**Clean Energy**



**SUSTAINABLE  
FUTURE™**



# ORNL is DOE's largest multipurpose science laboratory

- **\$1.3 billion budget**
- **4,100 employees**
- **3,000 research guests annually**
- **Nation's largest unclassified scientific computing facility**
- **Nation's largest science facility: the \$1.4 billion Spallation Neutron Source**
- **Nation's largest concentration of open source materials research**
- **Nation's largest energy laboratory**
- **\$300 million modernization nearly complete**

# ORNL is uniquely positioned to deliver science and technology in the Southeast for energy

We have an extraordinary set of assets

- **Outstanding tools for materials R&D**
- **World's most powerful system for open scientific computing**
- **Bioenergy Science Center**
- **The nation's broadest portfolio of energy programs**
- **Unique resources for nuclear technology**
- **Robust national security programs**

**Deliver results that are significant on both the national and the international scale**



# Leveraging our energy R&D portfolio

- **Exceptionally broad programs**
- **Outstanding facilities for R&D**
- **Well connected to industry and universities**
  - TVA partnership: New grid visualization and modeling program
  - Automotive Research Alliance
  - Partnering with leading solar companies
- **Energy Efficiency and Renewable Energy**
  - Strong programs in Transportation and Industrial Technologies
  - Growth in hydrogen/fuel cell and biomass technologies
  - Emerging solar technology research
- **Electricity Delivery and Energy Reliability**
  - high-temperature superconductivity
  - grid visualization and modeling; energy storage
- **Fossil Energy**
- **Nuclear Energy**
- **DOE science programs: Basic energy sciences, bioenergy, fusion**

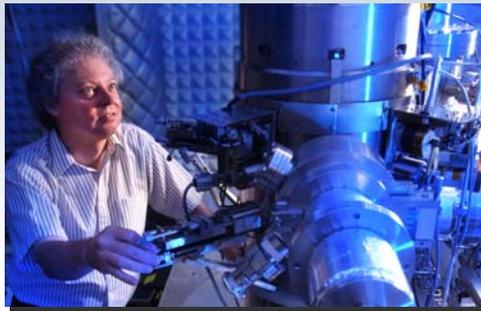


**New solar photovoltaic system at ORNL**



# User Centers at ORNL

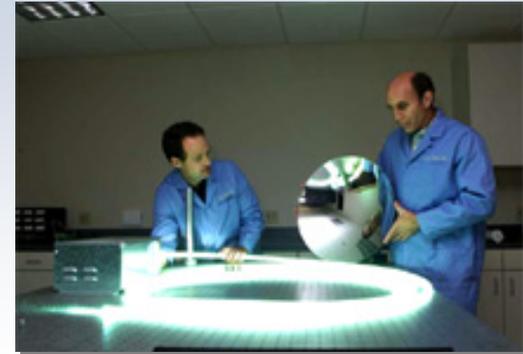
**High Temperature  
Materials Laboratory**



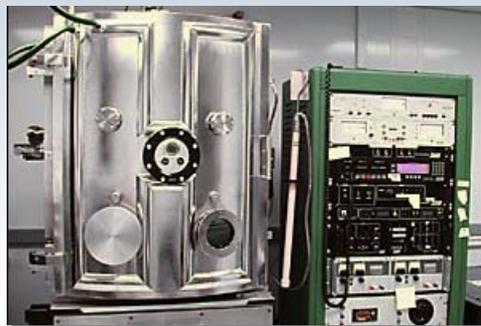
**Material Processing  
Group**



**Photonics Laboratory**



**Nanoscale Science &  
Technology Lab**



**Solar Technologies  
Laboratory**



**Center for Advanced Thin  
Film Solar Cells (CATS)**



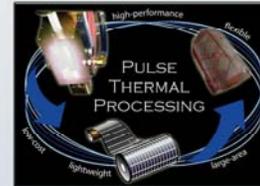
**UNVEILING AT SUMMIT!**

# Center for Advanced Thin Film Solar Cells

Oak Ridge National Laboratory is establishing a Center for Advanced Thin Film Solar Cells (CATS), which is a collaborative research user center that allows ORNL to assist surrounding solar cell manufacturers to advance thin film solar cell technology.

## Solar Cell Manufacturing

- Five year trend of > 30% annual market growth
- Record 1,460 MW installed worldwide in 2005
- U.S. manufacturing is losing ground
  - In 1997, U.S. manufactured 45% of PV cells
  - By 2005, U.S. product share fallen to 9%
- Opportunity lies in small businesses
  - Innovative ideas are 2.5 times more likely
  - Federal funding is 3 times less likely



## Innovation Requires

- Basic understanding of the effects of
  - defects
  - dislocations
  - impurities
  - grain boundaries
  - manufacturing process parameters
- Accurate measurement of thin film properties
- Process optimization and modeling



## ORNL Expertise and Capabilities

- Nation's largest energy laboratory
- DOE flagship center for materials research
- 1 of 5 DOE Nanoscale Science Research Centers
- National user center for advanced materials (HTML)
- One-of-a-kind instruments for characterization
- Award winning, experienced research staff
- Proven track record of technology transfer



## Center for Advanced Thin Film Solar Cells

Leverages ORNL's vast resources for materials research

- High Temperature Materials Laboratory
- Solar Technologies Laboratory
- Nanoscale Science & Technology Laboratory
- Materials Processing Group
- Photonics Laboratory

Strategic investment in specific photovoltaic equipment  
State-of-the-art facility for thin film solar cell technology



**OAK RIDGE NATIONAL LABORATORY**  
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

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