

# ENERGY AND GLOBAL SECURITY INITIATIVES AT ARGONNE NATIONAL LABORATORY



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CHIEF OPERATIONS OFFICER



# A VITAL PART OF THE DEPARTMENT OF ENERGY NATIONAL LABORATORY SYSTEM



# ARGONNE BY THE NUMBERS (FY17)

**\$750 M**

**OPERATING  
BUDGET**

**3,200**

**EMPLOYEES**

**1,320**

**SCIENTISTS &  
ENGINEERS**

**270**

**POSTDOCTORAL  
RESEARCHERS**

**8,200**

**FACILITY  
USERS**

**106**

**NON-FEDERAL  
RESEARCH PARTNERS**

# ACROSS THE VALUE CHAIN



# ARGONNE DELIVERS HIGH-IMPACT SCIENCE

## Broad capabilities ...

Discovery in materials,  
chemistry, physics  
and biology

Engineering of  
advanced energy systems

Computation  
and analysis

Scientific  
user facilities

## ... enable transformational research initiatives

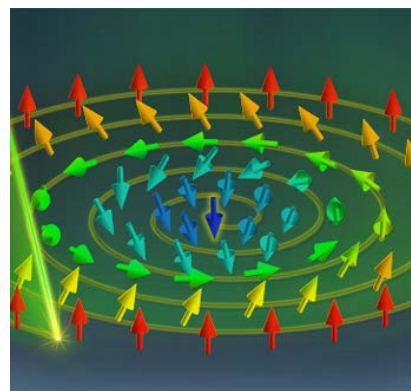
Hard x-ray sciences

Advanced  
computing

Materials and  
chemistry

Energy  
manufacturing  
science and  
engineering

The universe as our  
laboratory



# OUR INITIATIVES WILL MAKE A DIFFERENCE IN THE WORLD

Hard x-ray sciences



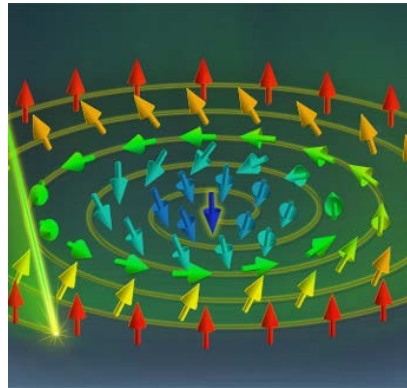
An upgraded APS to revolutionize knowledge of materials' structures and propel progress in science, medicine and technology

Advanced computing



The most powerful supercomputers, to overcome the biggest challenges in energy, materials, climate, cancer and more

Materials and chemistry



Unprecedented ability to manipulate matter to optimize advanced batteries, catalysts, quantum materials and clean water systems

Energy manufacturing science and engineering



Breakthroughs to boost American industrial success in producing innovative materials for energy technologies of the future

The universe as our laboratory

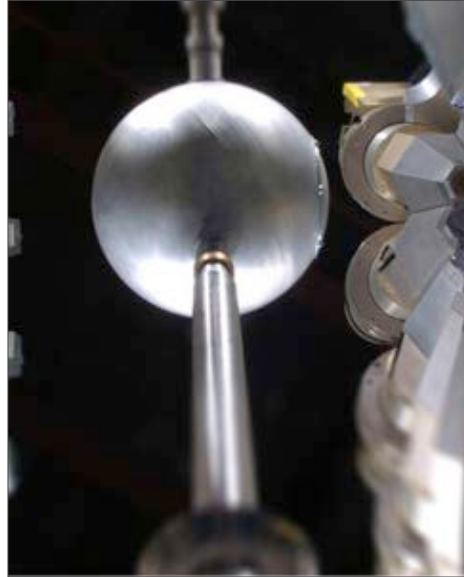


Pioneering techniques to simulate the universe and detect elementary particles, to unlock mysteries of the cosmos

# USER FACILITIES



**Advanced Photon Source**



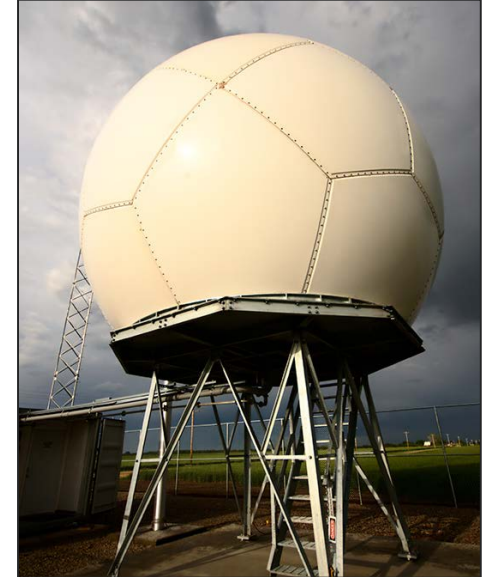
**Argonne Tandem Linear Accelerator System**



**Argonne Leadership Computing Facility**



**Center for Nanoscale Materials**



**Atmospheric Radiation Measurement – The Southern Great Plains**



# KEY DIRECTORATE LEVEL EMPLOYEES

**Balendra Sutharshan**  
*Chief Operations Officer*



**Keith Bradley**  
*National Security Program*

**Santanu Chaudhuri**  
*Manufacturing Science and Engineering*



**Pete Chupas**  
*Argonne Design Works*

U.S. DEPARTMENT OF ENERGY  
Argonne National Laboratory

# DIVISION NAMES AND LEADERSHIP

Applied Materials

*Greg Krumdick, Interim Division Director*

Strategic Security Sciences

*Kirsten Laurin-Kovitz, Interim Division Director*

Nuclear Science and Engineering

*Jordi Roglans-Ribas, Division Director*

Chemical and Fuel Cycle Technology

*Jordi Roglans-Ribas, Interim Division Director*

Energy Systems

*Don Hillebrand, Division Director*

Decision and Infrastructure Science

*Dave Brannegan, Interim Division Director*

Experimental Operations and Facilities

*George Vukovich, Interim Division Director*



# Industrial & Scalable Technology

## Secure Energy Future

Cyber Security, Connected Autonomous Transportation  
Future Electrical Grid

## Energy Science and Technology

Applied Materials, Manufacturing Science,  
Energy Storage

## Science Programs

Materials, Chemistry, Physics, HEP, NP, IME

### Capabilities

APS, ALCF, CNM, MERF, EDL

### Major Lab Initiatives

Hard X-ray Science, Advanced Computing,  
Advanced Materials & Chemistry

**Energy and Global Security  
Strategic Initiatives**

**Energy Manufacturing Science  
and Engineering**

**Nuclear Energy Science  
and Technology**

**National Security Programs**

**Securing Energy and Critical Resources**

# ENERGY MANUFACTURING SCIENCE AND ENGINEERING MAJOR INITIATIVE

Create science-based approaches to accelerate the scaling of manufacturing processes for energy technologies



Provide national leadership in restoring American preeminence in manufacturing by applying science-based methods



Create Midwest manufacturing facility leveraging Argonne's basic science infrastructure in a major economic, academic, and industrial center of the country



Expand MERF capabilities and develop the Midwest Transformative Energy Manufacturing (MTEM) facility



Develop and scale new energy storage and energy transfer materials and devices

# SECURING ENERGY AND CRITICAL RESOURCES

## EXAMPLES OF OUTCOME:

Connected and Autonomous Vehicles, Distributed Electric Grid, Energy Security, Cyber Security

Information to support sound policy decisions

Disruptive technology impacts to industry and society

Information to support sound investment decisions

Sponsors: DOE, DoD, Utilities, Insurance Companies, Transportation industry, Municipalities

## Integrated Argonne Capabilities

Objective: Providing Scientific Expertise and technological Capabilities that focuses on infrastructure interdependencies and interconnected energy technologies

Understanding Infrastructure Interdependencies

Advanced Sensors/Control Systems

Big Data/ AI / Machine Learning

Understanding Cyber & Physical systems

Energy Storage and Fuel Cells

Environmental Science & Biology

# Our partnerships

Manufacturing	Energy	Information Technology	Pharmaceuticals
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ADSC  
 TOYOTA  
 GM  
 CHEVROLET VOLT  
 MOXTEK  
 CYMER  
 GLOBALFOUNDRIES  
 TELEDYNE SCIENTIFIC & IMAGING, LLC  
 inpria  
 SEMATECH P&G  
 SCHOTT  
 MDC  
 xradia BRUKER  
 Ford  
 TOYOTA CENTRAL R&D LABS., INC.

Chevron  
 DOW  
 NUSCALE POWER  
 Schneider Electric  
 SUNPOWER  
 GE  
 Black Pak inc.  
 AutoGrid  
 BALDOR  
 ARKANSAS POWER ELECTRONICS APE INTERNATIONAL  
 AMBRI  
 EaglePicher Technologies, LLC

EMC<sup>2</sup> intel  
 EY CISCO  
 AXSUN a Volcano company  
 IBM Panoramic Technology  
 SAMSUNG  
 Honeywell  
 ELECTRONIC MATERIALS  
 HITACHI ShinEtsu  
 ASML  
 hp  
 TE connectivity  
 UES Excellence in Science & Technology

MannKind Corporation Abbott A Promise for Life  
 Pfizer Lilly  
 AMGEN  
 MedImmune  
 Plexxikon  
 ARRAY BIOPHARMA  
 AstraZeneca  
 CALITHERA BIOSCIENCES  
 NOVARTIS  
 illumina  
 PIONEER A DUPONT BUSINESS  
 Structure Based Design, Inc.  
 Celgene CALISA PHARMA  
 EMERALD BIOSTRUCTURES  
 Takeda  
 GILEAD  
 genzyme  
 Trius Therapeutics  
 Genentech  
 ZENOBIA THERAPEUTICS  
 gsk GlaxoSmithKline  
 Roche  
 VERTEX

# Argonne



NATIONAL LABORATORY