

Office of Science Update

Advanced Scientific Computing Advisory Committee Meeting

Harriet Kung

Deputy Director for Science Programs
January 16, 2025



U.S. DEPARTMENT OF
ENERGY

Office of
Science

[Energy.gov/science](https://energy.gov/science)

Outline

- **SC Leadership & Organization Update**
- **2024 Accomplishments - A Year in Review**
- **Distinguished Honors and Awards**
- **DOE Research Security Framework**



Deputy Director for Science Programs
DDSP
Harriet Kung
Associate Deputy Director – Linda Horton

Office of Advanced Scientific Computing Research (ASCR)
Ceren Susut

Office of Basic Energy Sciences (BES)
Bindu Nair
Deputy Associate Director
Andrew Schwartz

Office of Biological & Environmental Research (BER)
Dorothy Koch

Office of Fusion Energy Sciences (FES)
Jean Paul Allain

Office of High Energy Physics (HEP)
Regina Rameika

Office of Nuclear Physics (NP)
Linda Horton (A)

Office of Energy Sciences Workforce Stewardship (ESWS)
Harriet Kung (A)

Office of Workforce Development for Teachers & Scientists (WDTS)
Ping Ge

Office of International Activities, Research Security, and Interagency Coordination (IRIC)
Sarah Staton

Office of Scientific Workforce and Integrity (SWI)
Tim Hallman (A)

Office of Communications & Public Affairs (OCPA)
Allison Eckhardt (A)

Office of Scientific & Technical Information (OSTI)
Brian Hitson

Office of Sponsored Activities (OSA)
Michael Zarkin

Office of SBIR/STTR Programs (SBIR/STTR)
Eileen Chant (A)



Chemical Sciences, Geosciences, & Biosciences (CSGB)
Gail McLean

Collaborative Research (CR)
Gail McLean (A)

Materials Sciences & Engineering (MSE)
Andrew Schwartz (A)

Scientific User Facilities (SUF)
Andrew Schwartz (A)

Earth & Environmental Systems Science (EESS)
Gerald Geernaert

Biological Systems Science (BSS)
Todd Anderson

Facilities & Projects (FPD)
Joseph May

Enabling Science and Partnerships (ESP)
Jean Paul Allain (A)

Research (RD)
Jean Paul Allain (A)



Research (RD)
Glen Crawford

Accelerator and Technology (ATD)
Regina Rameika (A)

Facilities (FD)
Michael Procaro

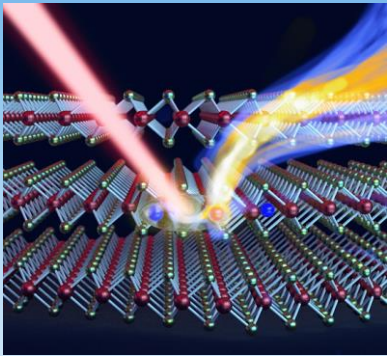
Physics Research (RD)
Sharon Stephenson

Facilities & Project Management (FD)
Paul Mantica

 **Leadership Change**
 **New Division**

2024: Major Scientific Discoveries and Breakthroughs

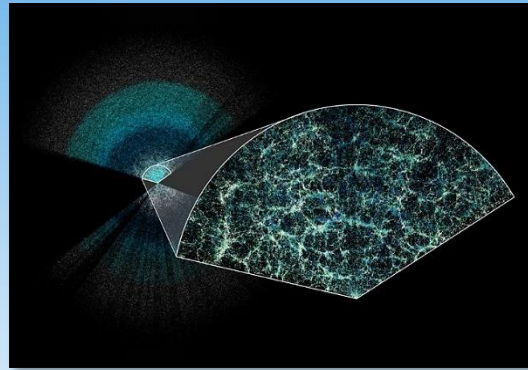
The Future of Telecom Is Atomically Thin



Using a small number of photons to process information, two-dimensional quantum materials can lead to secure, energy-efficient communications

Image: University of Maryland

Dark Energy Spectroscopic Instrument Releases First Results



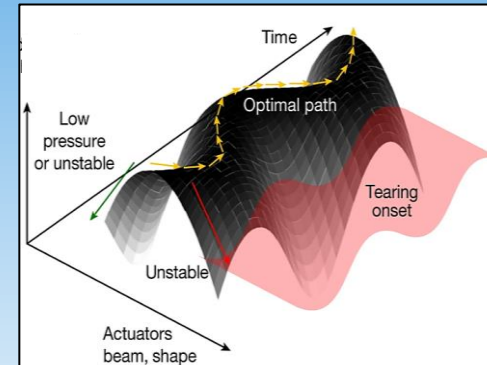
DESI has made the largest 3D map of our universe to date.

Earth is at the center of this thin slice of the full map.

In the magnified section, it is easy to see the underlying structure of matter in our universe

Image: Claire Lamman/DESI collaboration; custom colormap package by cmastro

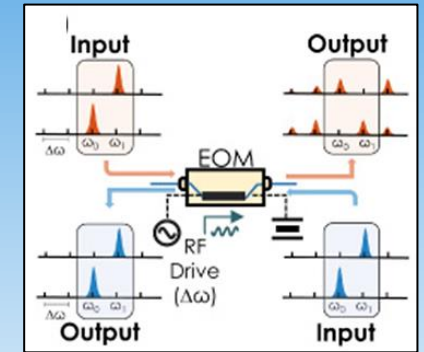
AI Tackles Disruptive Tearing Instability in Fusion Plasma



AI algorithm was used to integrate inputs from hundreds of sensors on a tokamak to provide adaptive control that maintained plasma stability near operational limits, eliminating the need for manual tuning of plasma controls

Image: Adam Healey and John Lovell/HudsonAlpha

Innovative Quantum Gate for Advanced Quantum Networking



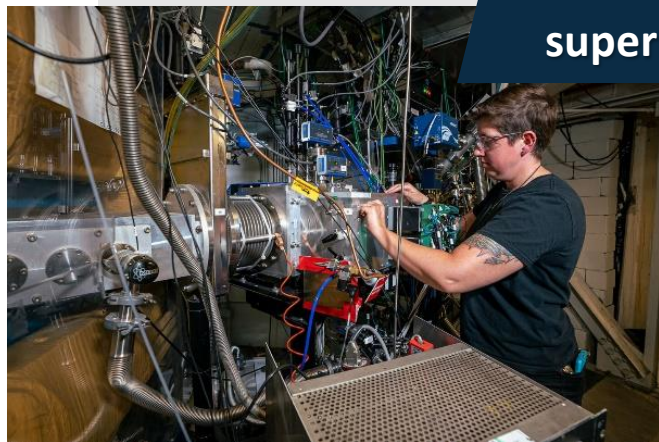
Opens up new possibilities for designing quantum networks.

A quantum “controlled not” gate, operates between two photonic degrees of freedom — polarization and frequency — and this new approach might enhance error resilience in future quantum communications

Image: ORNL

2024: Enabling Future Research and Technologies

A new way to produce superheavy elements



Scientist at the Berkeley Gas-filled Separator used to separate atoms of element 116, livermorium

Credit: Marilyn Sargent/LBNL

New technique to transfer beneficial genes



A plant that has been modified using the CRISPR gene editing system glows bright green under a light-based biosensor developed at ORNL

Credit: Genevieve Martin/ORNL

Using lidar to improve wind turbine estimates



Instruments deployed by the WFIP-3 team on the Massachusetts island of Nantucket, one of six land-based instrument sites in Massachusetts and Rhode Island

Credit: Raghavendra Krishnamurthy/PNNL

The 2024 Nobel Prize winner in Chemistry



David Baker used X-ray light and neutron sources, supercomputers, and Environmental Molecular Sciences Laboratory in his research on protein design and computational analysis

Credit: University of Washington

2024: Building Essential New Tools for Discovery

- Completed the LSST Camera, the world's largest digital camera for astrophysics
- Delivered Aurora, a new exascale supercomputer
- Upgraded the Advanced Photon Source with new capabilities



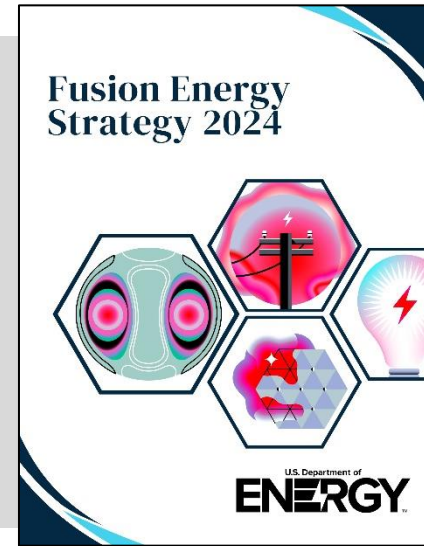
2024: Fostering Partnerships and the Scientific Workforce

Established new partnerships in fusion

- Eight teams selected for Milestone-Based Fusion Development Program
- Announced Funding for Fusion Innovation Research Engine Collaboratives

Launched apprenticeship programs and continued internships

- Program will support the development of a new generation of technicians with unique and sought-after skills



Coming Soon: Basic2Breakthrough



Basic2Breakthrough (B2B) shares stories about the value of research funded by DOE and conducted by scientists at the national labs

Aims to cover the complete range of DOE Office of Science research.

Consists of approximately 700-word stories and 2 to 3-minute videos.

Targets a range of audiences, including:

- The general public
- Legislators
- Partners interested in DOE programs, objectives, and funding directions

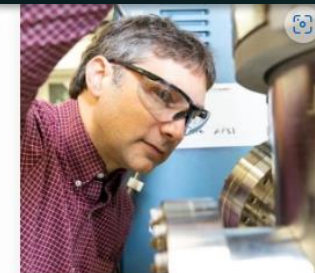
Basic2Breakthrough Stories



A Dentist's Journey to Sav...

Fewer trips to the dentist, anyone? Researchers...

[Learn More](#)



Making Batteries Better

Lithium-ion batteries in electric vehicles and...

[Learn More](#)



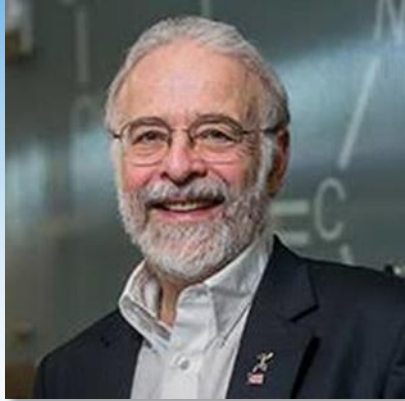
The Science Behind the Shot

The COVID-19 response drew on decades of...

[Learn More](#)

2024 Fermi Awards

Héctor D. Abruña



Emile M. Chamot Professor in the Department of Chemistry and Chemical Biology at Cornell University

For revolutionizing the fundamental understanding of electroanalytical chemistry and innovating characterization for development of batteries, fuel cells, and energy materials that have led to advancements for the electrical power grid and energy transformation and creation.

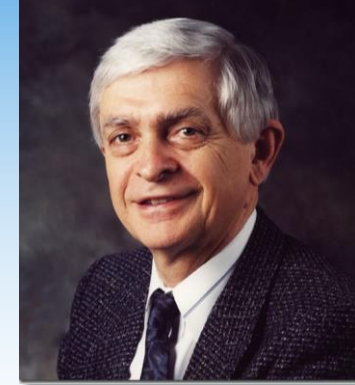
Paul Alivisatos



President of the University of Chicago and John D. MacArthur Distinguished Service Professor in the Department of Chemistry and the Pritzker School of Molecular Engineering

For developing the foundational materials and physical chemistry to produce beneficial nanocrystals and polymers with controlled size, shape, connectivity, and topology that underpin energy-efficient technology, optical devices, and medical diagnostic technology.

John H. Nuckolls



Physicist who spent his career at the Lawrence Livermore National Laboratory, serving as the lab's director from 1988 until 1994.

For seminal leadership in inertial confinement fusion and high energy density physics, outstanding contributions to national security, and visionary leadership of Lawrence Livermore National Laboratory at the end of the Cold War.

2024 DOE Office of Science Distinguished Scientist Fellows



Mary Raafat Mikhail Bishai, Ph.D. Brookhaven National Laboratory

Honored for enduring contributions at the intensity frontier of high energy physics in unraveling fundamental properties of neutrinos, extraordinary leadership and service to the particle physics community, and deep commitment to broadening participation through mentoring next generation scientists



Lois Curfman McInnes, Ph.D. Argonne National Laboratory

Honored for exceptional accomplishments in innovative algorithms and software, leadership in major projects, including SciDAC and ECP, and in promotion of scientific productivity and software sustainability, and for outstanding efforts to broaden participation in high-performance computing and related science and engineering



Kristin Persson, Ph.D. Lawrence Berkeley National Laboratory

Honored for pioneering advancements in data-driven materials design and discovery through first-principles based computations and analysis algorithms that yield materials with optimal properties for engineers and scientists worldwide to accelerate innovation, and for her management and outreach skills that promote DOE's missions



Gerald A. Tuskan, Ph.D. Oak Ridge National Laboratory

Honored for foundational scientific advances in the development of resilient bioenergy feedstock crops, for excellence in leading large, multi-institutional science teams toward a robust, sustainable bioeconomy, and for supporting the next generation of diverse scientists

<https://science.osti.gov/fellows/Ceremony-Lecture-Series>

Recent PECASE Awardees

SC ASCR	Peter	Bosler	Sandia National Laboratories
SC ASCR	Katherine	Isaacs	University of Utah
SC ASCR	Joseph	Lukens	Oak Ridge National Laboratory
SC ASCR	Bei	Wang Phillips	University of Utah
SC ASCR	Stefan	Wild	Lawrence Berkeley National Laboratory
SC BER	Melissa	Cregger	Oak Ridge National Laboratory
SC BER	Emily	Graham	Pacific Northwest National Laboratory
SC BER	Ruben	Rellan-Alvarez	North Carolina State University
SC BER	James	Stegen	Pacific Northwest National Laboratory
SC BER	Daniel	Amador-Noguez	University of Wisconsin-Madison
SC BER	Susannah	Burrows	Pacific Northwest National Laboratory
SC BER	Joanne	Emerson	University of California at Davis
SC BES	Rajamani	Gounder	Purdue University
SC BES	Vedika	Khemani	Stanford University
SC BES	Cara	Lubner	National Renewable Energy Laboratory
SC BES	Gary	Moore	Arizona State University
SC BES	James	Letts	University of California, Davis
SC BES	Aeriel	Leonard	Ohio State University
SC BES	Diana	Qiu	Yale University
SC FES	Nathaniel	Ferraro	Princeton Plasma Physics Laboratory
SC FES	Kevin	Field	University of Michigan
SC FES	Arianna	Gleason	SLAC National Accelerator Laboratory
SC FES	Lorenzo	Sironi	Columbia University
SC FES	Petros	Tzeferacos	University of Rochester
SC HEP	Kavin	Ammigan	Fermi National Accelerator Laboratory
SC HEP	Netta	Engelhardt	Massachusetts Institute of Technology
SC HEP	Laura	Fields	University of Notre Dame
SC HEP	Xiao	Luo	University of California, Santa Barbara
SC HEP	Douglas	Stanford	Stanford University
SC HEP	Nhan	Tran	Fermi National Accelerator Laboratory

SC NP	Raul	Briceno	Old Dominion University
SC NP	Katerina	Chatziioannou	California Institute of Technology
SC NP	Zohreh	Davoudi	University of Maryland
SC NP	Christine	Duval	Case Western Reserve University
SC NP	Andrew	Jayich	University of California, Santa Barbara

Other DOE Programs

EERE	Ahmet	Kusoglu	Lawrence Berkeley National Laboratory
EERE	Juan-Pablo	Correa-Baena	Georgia Institute of Technology
FE	Jennifer	Bauer	National Energy Technology Laboratory
FECM	Christina	Wildfire	National Energy Technology Laboratory
NE	Ahmad	Al Rashdan	Idaho National Laboratory
NE	Katya	Le Blanc	Idaho National Laboratory
NE	Alexander	Lindsay	Idaho National Laboratory
NE	Cheng	Sun	Clemson University
NE	Bjorn	Vaagensmith	Idaho National Laboratory
NE	Andrea	Jokisaari	Idaho National Laboratory
NNSA	Holly	Carlton	Lawrence Livermore National Laboratory
NNSA	Amber	Guckes	Nevada National Security Site
NNSA	Kelli	Humbird	Lawrence Livermore National Laboratory
NNSA	Daniel	Ruiz	Sandia National Laboratories
NNSA	Gwendolyn	Voskuilen	Sandia National Laboratories
NNSA	Ryan	Wollaeger	Los Alamos National Laboratory
NNSA	Amy	Lovell	Los Alamos National Laboratory
NNSA	Oluwatomi	Akindele	Lawrence Livermore National Laboratory
NNSA	Caroline	Winters	Sandia National Laboratories
OE	William	Balliet	Idaho National Laboratory

How does DOE approach RTES today?

- In November 2024, the Deputy Secretary for Energy issued a memo outlining DOE's RTES Framework, describing how the Department approaches risks in financial assistance and loan activities. The memo details:

**DOE RTES Goals,
Background &
Commitment to
Nondiscrimination**

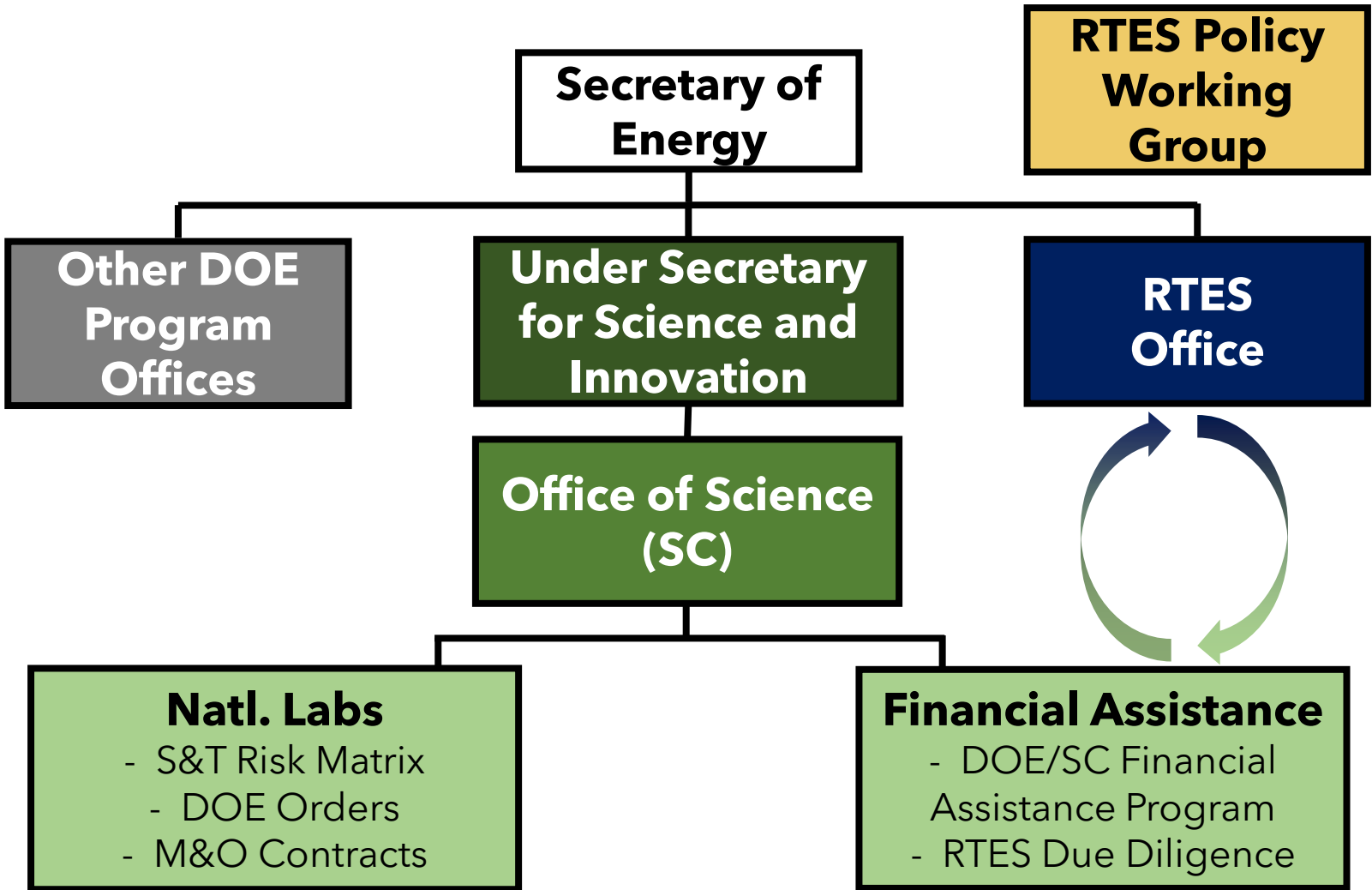
**Risk Factors &
Risk-Based
Review Process**

**Risk Mitigation
Process &
Clarification/
Reconsideration
Process**

- [Memo: Department of Energy Research, Technology, and Economic Security Framework for Financial Assistance and Loan Activities](#)

Research Security Policy and the Office of Science

- **RTES Policy Working Group:** Responsible for RTES policy development for financial assistance and National Laboratories
- **RTES Office:** Conducts due diligence risk reviews for financial assistance
- **Program Offices (e.g., SC):** Procurement and decision-making authority for laboratory and financial assistance awards



SC-Funded R&D: Engagement with RTES Due Diligence

SC Proposal Review and Mitigation

- SC participation in the RTES due diligence process is driven by key principles:
 - Reviews and mitigations must be informed by the science, risk-based, and performed on a case-by-case basis.
 - Focus on behaviors and their timeliness.
 - Characterized by fairness, transparency, and non-discrimination.

Phases of RTES Due Diligence Review

Phase 1: Review of solicitations prior to publication

Phase 2: Pre-selection, projects undergo RTES due diligence review; mitigation is possible

Phase 3: Additional RTES review may be triggered when there are changes to the project, personnel, or ownership/control throughout the life of a project

Update: Financial Assistance

- Office of Science (SC) **recommends**:
 - Universal disclosure (sources of support, positions and appointments)
 - Use of SciENcv to reduce administrative burden by allowing the use of digital persistent identifiers
- SC **will continue to**:
 - Leverage interagency common formats for current and pending support and bio-sketches
 - Designate covered individuals as senior/key personnel (excludes postdocs and graduate students)
 - Require applicants to certify the completion of research security training
 - Not impose any citizenship or residency requirement on personnel working under its awards (though anyone working must have the legal right to do so!)
- SC does not require university PIs to seek prior approval for foreign travel
 - However, this may be incorporated into a mitigation plan as appropriate

THANK YOU!

