

Fusion Energy Sciences Perspective

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U.S. DEPARTMENT OF
ENERGY

Office of Science

Fusion Energy Sciences Advisory Committee Meeting
August 24, 2020



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ENERGY

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Welcome to newest FESAC members



Prof. Carolyn Kuranz

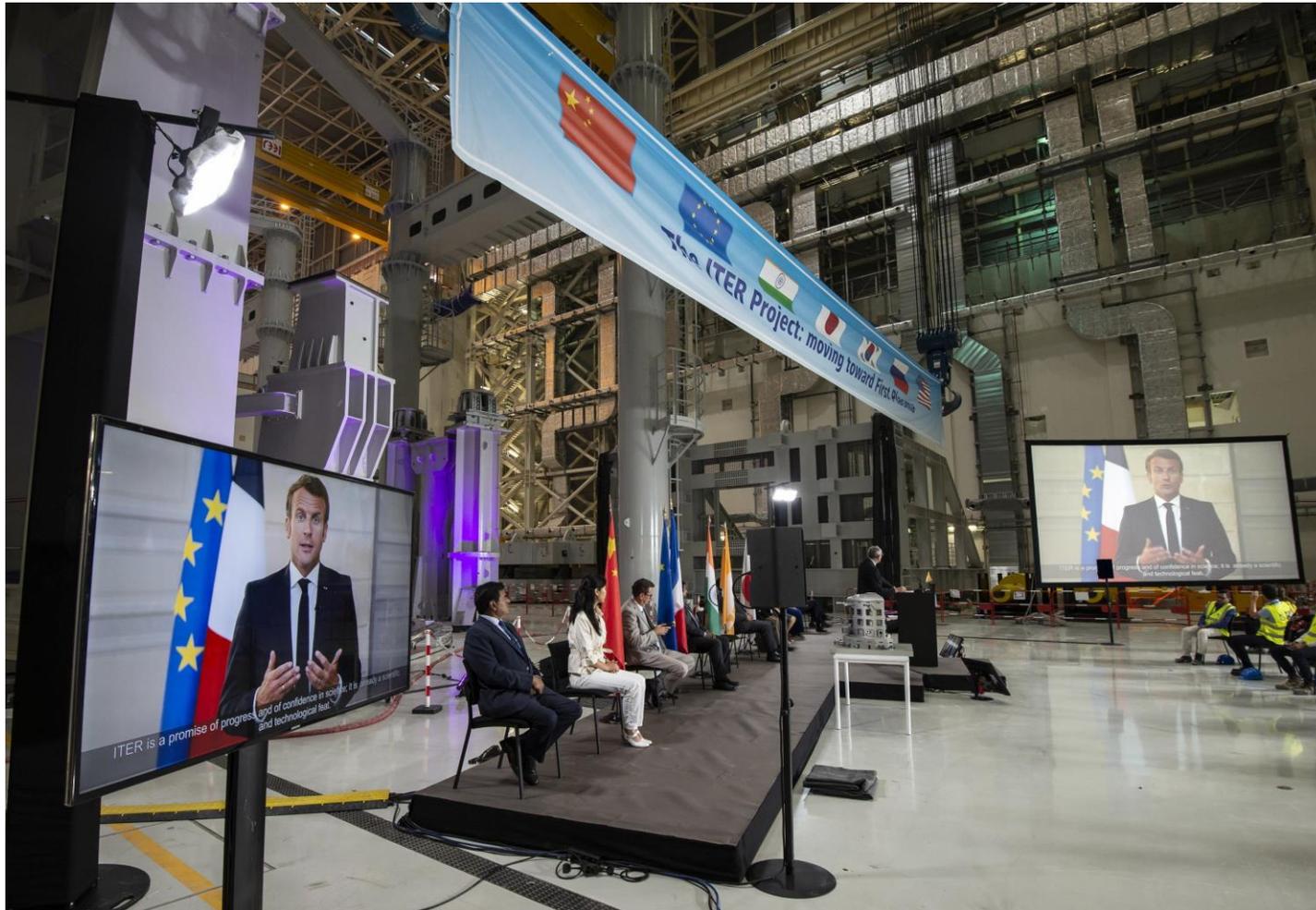
Dept of Nuclear Engineering and Radiological Sciences
University of Michigan



Dr. Simona Murph

Scientific Fellow, Savannah River National Laboratory
Adjunct Professor, Dept of Physics and Astronomy,
University of Georgia

Historic milestone: ITER Start of Machine Assembly

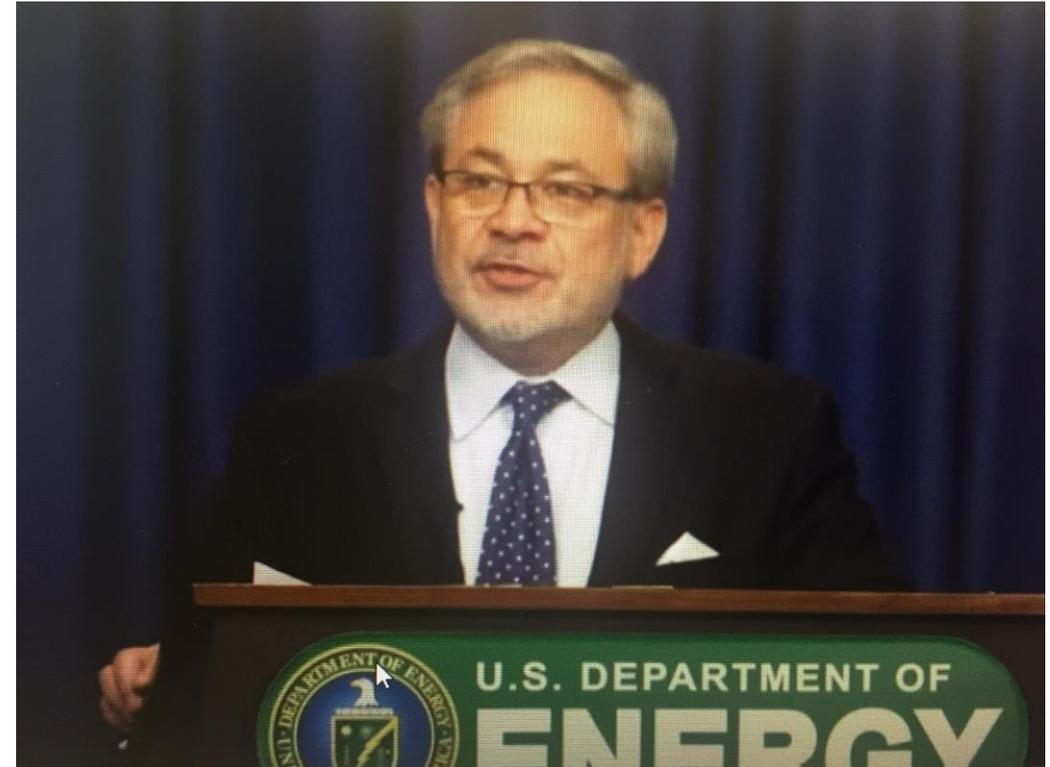


- International virtual celebration on July 28: site tour, ceremony, press conference
 - Ten years after start of construction (Aug 2010)
- Speeches by dignitaries from all ITER Members, including US Sec of Energy
 - Event is archived on YouTube (190,000 views)
 - Media coverage (1,250 articles)

<https://www.youtube.com/watch?v=2-7GyVLKE6A>

ITER Start of Machine Assembly: Secretary of Energy remarks

“It is a pleasure and honor to join you for such an important event taking place during extraordinary times. This year has been full of challenges for all of us, so I appreciate the opportunity to be with you in celebrating this significant milestone for the ITER project and the future of energy.... It’s an incredible engineering achievement to consider.... It is a profound story of human endeavor, and the best is yet to come.... The ITER effort has also helped to renew enthusiasm and optimism about the commercial promise of fusion energy.... We in the United States are hopeful about a bright future for fusion energy, and we look forward to the assembly of the reactor and to the promise of what we will learn soon from the testing after First Plasma....”



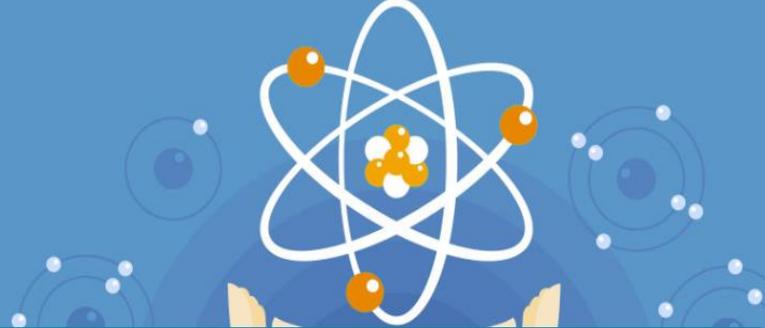
U.S. Secretary of Energy Dan Brouillette



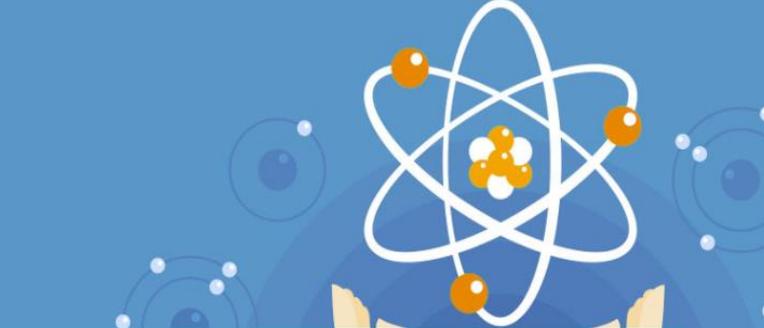
FOA Title	Status
Collaborative NSTX-U Diagnostics	Completed
Collaborative Research on International and Domestic Spherical Tokamaks	Completed
High-Energy-Density Laboratory Plasma Science	Completed
Scientific Machine Learning and Artificial Intelligence for Fusion Energy Sciences	Completed
Measurement Innovations for Magnetic Fusion Systems	Completed
Opportunities in Frontier Plasma Science	Completed
Quantum Information Science Research for Fusion Energy Sciences	In progress
Theoretical Research in Magnetic Fusion Energy Science	Completed
Early Career Research Program	Completed
Galvanizing Advances in Market-Aligned Fusion for an Overabundance of Watts (joint ARPA-E / FES; led by ARPA-E)	In progress
Quantum Information Science Research Centers (announce on Aug 26)	In progress

List of awards can be found at: <https://science.osti.gov/fes>

The image shows three overlapping screenshots of the U.S. Department of Energy website. The top screenshot is titled "Department of Energy Announces \$13.3 Million for Plasma Research" dated August 10, 2020. The middle screenshot is titled "Department of Energy Announces \$21 Million for Fusion Energy Instrumentation" dated August 3, 2020. The bottom screenshot is titled "Department of Energy to Provide \$21 Million for Artificial Intelligence and Machine Learning Research on Fusion Energy" dated August 19, 2020. Each screenshot shows the "ENERGY.GOV" logo, navigation menus, and social media icons.



First round 2020 INFUSE award selections



Second 2020 RFA Call announced

Innovation Network for Fusion Energy (INFUSE)

- Two Request for Assistance (RFA) calls in FY 2020
 - First RFA call: Ten awards were made from 25 applications
 - Second RFA call opened on July 27
 - Webinar was held on August 6
 - RFA applications due on **September 4**

INFUSE Leadership

- Dennis Youchison (ORNL) & Ahmed Diallo (PPPL)

Topical Areas

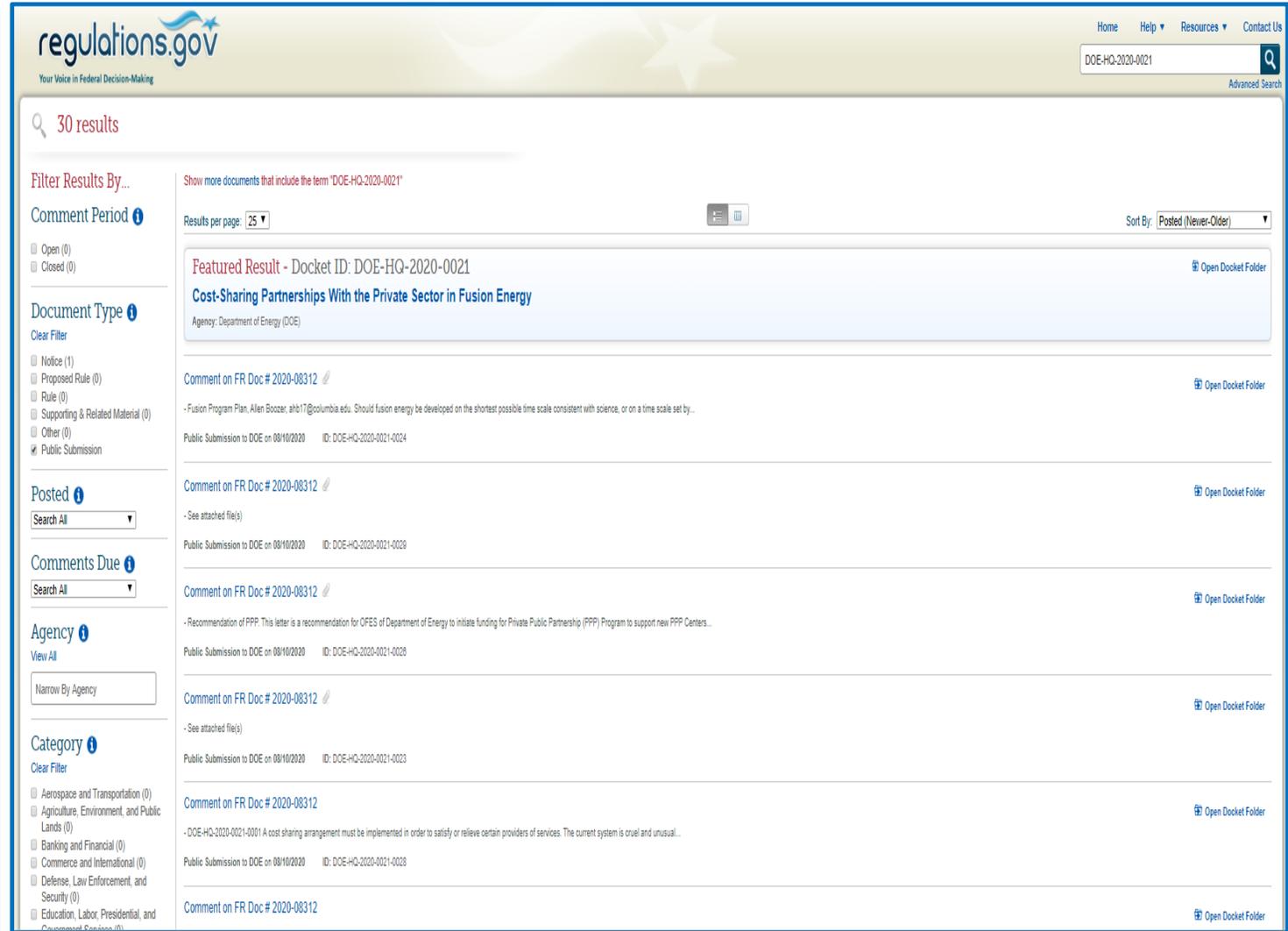
- Enabling Technologies
- Materials
- Diagnostics
- Modelling and Simulation
- Experimental Capabilities

Participating Laboratories:

- BNL, INL, LANL, LBNL, LLNL, ORNL, PNNL, PPPL, SNL, SRNL

More information at: <https://infuse.ornl.gov/>

- FES published a **Request for Information (RFI)** in the Federal Register on “**Cost-Sharing Partnerships With the Private Sector in Fusion Energy**”
- The input is now publicly available. To view the posted comments, follow these steps:
 - Visit <https://www.regulations.gov/>
 - For "Select Document Type", select **Public Submission** from the dropdown menu
 - For "Enter Keyword or ID", enter Docket ID (**DOE-HQ-2020-0021**) and click "Search"
- **Thirty comments were submitted**
 - 10 from private fusion and energy companies, including venture capital groups
 - 15 from individuals or groups of individuals (including one from university fusion leaders)
 - 5 from organizations (FIA, EPRI, etc.)



The screenshot shows the regulations.gov website interface. At the top, the logo reads "regulations.gov" with the tagline "Your Voice in Federal Decision-Making". A search bar in the top right contains the text "DOE-HQ-2020-0021" and shows "30 results".

On the left side, there are several filter sections:

- Filter Results By...**: Includes a "Comment Period" section with "Open (0)" and "Closed (0)" options.
- Document Type**: Includes a "Clear Filter" button and a list of document types: "Notice (1)", "Proposed Rule (0)", "Rule (0)", "Supporting & Related Material (0)", "Other (0)", and "Public Submission" (which is selected).
- Posted**: Includes a "Search All" dropdown menu.
- Comments Due**: Includes a "Search All" dropdown menu.
- Agency**: Includes a "View All" button and a "Narrow By Agency" input field.
- Category**: Includes a "Clear Filter" button and a list of categories: "Aerospace and Transportation (0)", "Agriculture, Environment, and Public Lands (0)", "Banking and Financial (0)", "Commerce and International (0)", "Defense, Law Enforcement, and Security (0)", and "Education, Labor, Presidential, and Government Services (0)".

The main content area displays a "Featured Result" for Docket ID: DOE-HQ-2020-0021, titled "Cost-Sharing Partnerships With the Private Sector in Fusion Energy" from the Department of Energy (DOE). Below this, a list of comments is shown, each with a "Comment on FR Doc # 2020-08312" link and an "Open Docket Folder" button. The comments include:

- A comment from "Fusion Program Plan, Allen Booczar, aho11@columbia.edu" regarding the development of fusion energy.
- A "Public Submission to DOE on 08/10/2020" with ID: DOE-HQ-2020-0021-0024.
- A comment stating "See attached file(s)".
- A "Public Submission to DOE on 08/10/2020" with ID: DOE-HQ-2020-0021-0029.
- A comment titled "Recommendation of PPP: This letter is a recommendation for OFES of Department of Energy to initiate funding for Private Public Partnership (PPP) Program to support new PPP Centers..."
- A "Public Submission to DOE on 08/10/2020" with ID: DOE-HQ-2020-0021-0028.
- A comment stating "See attached file(s)".
- A "Public Submission to DOE on 08/10/2020" with ID: DOE-HQ-2020-0021-0023.
- A comment titled "DOE-HQ-2020-0021-0001 A cost sharing arrangement must be implemented in order to satisfy or relieve certain providers of services. The current system is cruel and unusual..."
- A "Public Submission to DOE on 08/10/2020" with ID: DOE-HQ-2020-0021-0028.
- A comment on FR Doc # 2020-08312.

- With the Nuclear Energy Innovation and Modernization Act (NEIMA), Congress directed the NRC to develop a new regulatory framework for advanced nuclear reactors including fusion
- An DOE-NRC working group, including the Fusion Industry Association, have organized a one-day ***Public Forum on Regulatory Framework for Fusion***
 - Originally planned for March 18, it has now been converted into a virtual meeting, to be held October 6; details will be available soon



Update on NASEM Fusion Pilot Plant study

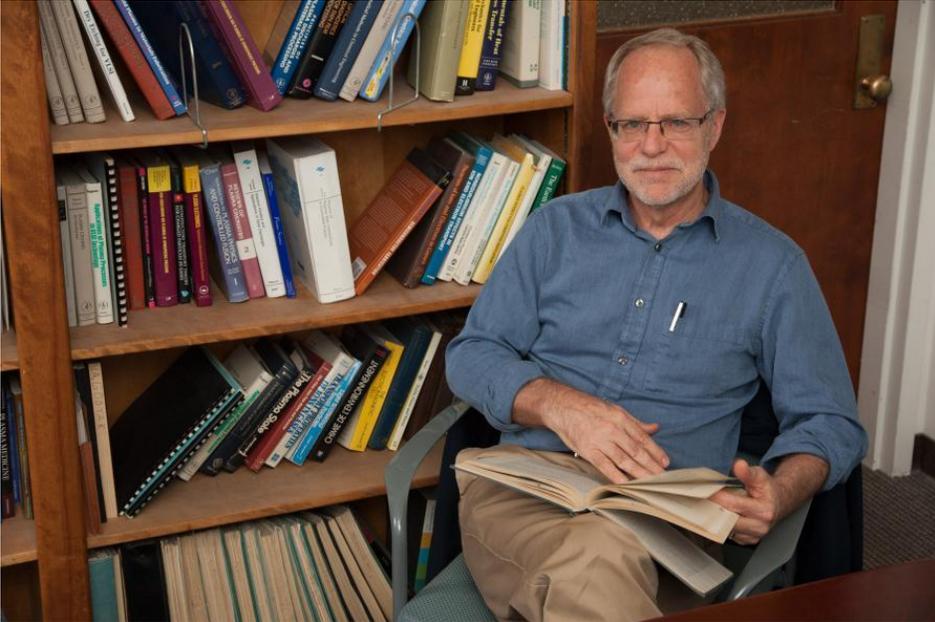
- **“Key Goals and Innovations Needed for a U.S. Fusion Pilot Plant”**
 - In developing and carrying out a plan for building a Pilot Plant, key goals need to be established for all critical aspects of the Pilot Plant. Identify those key goals, independent of confinement concept, which a Pilot Plant must demonstrate during each of its anticipated phases of operation.
 - List the principal innovations needed for the private sector to address, perhaps in concert with efforts by DOE, to meet the key goals identified in the first bullet.
- First meeting (virtual) is August 26—open and closed sessions
 - More information at:
<https://www.nationalacademies.org/event/08-26-2020/key-goals-and-innovations-needed-for-a-us-fusion-pilot-plant-virtual-meeting-1-august-2020>



Committee chair:
Dr. Richard Hawryluk (PPPL)

Call for nominations: 2020 E. O. Lawrence Awards

- **Recognizes:** mid-career U.S. scientists and engineers for exceptional contributions and achievements in research, technical, and engineering supporting the broad missions of DOE and its programs to advance national, economic, and energy security of the U.S.
- **Awards considered in nine categories:**
 - Atomic, Molecular, and Chemical Sciences
 - Biological and Environmental Sciences
 - Computer, Information, and Knowledge Sciences
 - Condensed Matter and Materials Sciences
 - Energy Science and Innovation
 - Fusion and Plasma Sciences
 - High Energy Physics
 - National Security and Nonproliferation
 - Nuclear Physics
- **Eligibility:**
 - Mid-career, defined as within 20 years of earning highest degree;
 - United States citizen;
 - Recognized for achievement in research principally funded by DOE; and
 - Recognized primarily on the scientific impact and technical significance of their work relative to its discipline and/or related mission.
- **Deadline for nominations: Thursday, October 1, 2020, 5:00 PM (ET)**
 - Nominations made online: <https://apps.ornl.gov/Award/Lawrence>
 - Additional information (eligibility, category descriptions, review process): <https://science.osti.gov/lawrence>
 - Contact: SCLawrence.Award@science.doe.gov



New Associate Laboratory Director for Low Temperature Plasma-Surface Interactions

Prof. David Graves

Dept of Chemical and Biological Engineering,
Princeton University



New Associate Laboratory Director for Computational Science

Prof. William Dorland

Dept of Physics and Astronomy, University of
Maryland—College Park



FES staffing needs

- FES is currently recruiting for three program manager positions:
 - stellarators/international collaborations
 - public-private partnerships
 - project management
- Opportunities for Intergovernmental Personnel Act (IPA) or detailee assignments may also be available.