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Building Bridges: A Bold Vision for the DOE Fusion Energy Sciences Program

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ABSTRACT:

The mission of the Fusion Energy Sciences (FES) program is to expand the fundamental understanding of matter at very high temperatures and densities and to build the scientific foundation needed to develop a fusion energy source. In addition, the FES mission includes advancing the basic research needed to solve fundamental science and technology (S&T) gaps towards the development of fusion power as a clean energy source in the U.S using diverse set of tools and strategic approaches. The 2020 Fusion Energy Sciences Advisory Committee (FESAC) Long-Range Plan (LRP) report entitled "Powering the Future: Fusion and Plasmas" as well as reports from the National Academies of Sciences, Engineering, and Medicine (NASEM) and community workshops inform FES program directions and activities. This "Building Bridges" approach includes fulfilling the fusion energy mission by a shift in the balance of research toward the LRP's Fusion Materials and Technology (FM&T) gaps, which connects the three science drivers: Sustain a Burning Plasma, Engineer for Extreme Conditions, and Harness Fusion Power.

BIOGRAPHY:

Dr. Jean Paul Allain is the Associate Director of Science for Fusion Energy Sciences (FES) in the Department of Energy (DOE) Office of Science (SC). With an annual budget of approximately $800M, Dr. Allain leads the FES with multiple areas including enabling and foundational burning plasma science including advanced tokamaks, theoretical and simulations, and long-pulse fusion plasmas. In addition, FES supports research in fusion materials and nuclear science, discovery plasma science and plasma technology, high-energy density plasmas and inertial fusion energy. FES also supports the US participation in ITER and public-private partnerships. Prior to joining FES in July 2023, Dr. Allain was Professor and Head of the Department of Nuclear Engineering at Pennsylvania State University. He was associate head in the Department of Nuclear, Plasma, and Radiological Engineering at the University of Illinois Urbana-Champaign, and associate professor at Purdue University. Dr. Allain led the Radiation Surface Science and Engineering Laboratory (RSSEL) conducting research in plasma-material interactions and authored over 350 peer-reviewed and proceedings papers in experimental and computational modeling work in particle and plasma-surface interactions with high-temperature materials in nuclear fusion, plasma medicine and nanomaterials. Dr Allain was also Faculty Entrepreneurial Fellow at UIUC with over 10 patents in advanced materials, founder of Editekk Inc, Energy Driven Technologies LLC, and a Fulbright fellowship in tech innovation.