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28th IEEE Symposium on Fusion Engineering SOFE 2019 Sawgrass Marriott Golf Resort and Spa Jacksonville, Florida, June 2nd–6th, 2019



The 28th Symposium on Fusion Engineering (SOFE) will be held June 2nd–6th, 2019 near Jacksonville, Florida at the Sawgrass Marriott Golf Resort and Spa at Ponte Vedra Beach. The conference has an outstanding technical program addressing many aspects of nuclear fusion engineering research and technology development. It is sponsored by the IEEE Nuclear and Plasma Sciences Society and hosted at a world-class PGA Golf and beach resort on the east coast of the United States. This is the 28th conference spanning over 56 years of IEEE sponsorship. SOFE has evolved to an international conference with over 300 attendees and is complete with four days of parallel technical sessions, a vendor exhibition, and two minicourses.

Early registration is now open on the conference web site. The early registration deadline is April 15th, 2019. The abstract submission deadline was January 15th, 2019, and the remaining acceptance notifications were issued shortly after February 1st, 2019. The hotel room block at a reduced conference rate is available until May 6th, 2019. The number of rooms is limited, and participants are encouraged to book early.

The hotel is a short 51 km (~32 miles) drive southeast toward the coast from Jacksonville. Ponte Vedra Beach is synonymous with golf—although it offers many other allures. The PGA Tour and The Players Championship are played at TPC Sawgrass, home of the famous 17th-hole island green. But don't forget that the word "beach" is part of the name. Ponte Vedra Beach's 40-foot sand dunes are among the highest in Florida. From their peak,

they race down to white sand beaches made from Appalachian quartz and ancient coquina. Seaside resorts and private escapes can be found in the twisted oaks and hammocks of the wild palmettos. Miles of fresh-water streams, creeks and lagoons course through the natural area of Ponte Vedra Beach. Elegant shopping and fine dining are widely available. The average high temperature in June is 31° C with lows of 22° C. In addition to your golf clubs, bring your sun glasses and beachwear as well. And, don't forget your family. There's plenty for them to do, while you are enjoying this remarkable retreat into fusion engineering. Check out the Sawgrass Marriott website for more information. Links for the Marriott, travel and registration can be found on the conference website.

The technical program will emphasize the theme of the conference, which is The Future of Fusion—Transitioning to Energy Production. Presentations will be distributed among four plenary sessions, fourteen oral sessions and three poster sessions. Topics include Experimental Devices, Next-step Devices and Power Plants, MFE and IFE Alternate Concepts, Innovative and Disruptive Technologies, Diverters and High Heat Flux Components, Chambers, Blankets, and Shields, Fueling, Exhaust, and Vacuum Systems, IFE Fusion Studies and Technologies, Plasma-facing Materials and Surface Engineering, Diagnostics Engineering and Integration, Safety and Neutronics Materials, Heating and Current Drive, Disruption Mitigation and Control, Operation and Maintenance, Remote Handling and RAMI, Magnet Engineering, Power and



Dennis Youchison
General Chair

Control, Process Simulation and Plant Simulators, Systems Engineering and Large Scale Integration.

The plenary sessions will include presentations by the leaders of each of the ITER partners (China, the European Union, India, Japan, Korea, the Russian Federation, and the United States) as well as presentations by key persons from the ITER project site. ITER is the premiere fusion project in the world and will be the first large-scale fusion reactor. Other presentations will include the U.S. Department of Energy perspective and progress and status of demonstration reactor designs. These sessions will provide the context for an evening town hall meeting where various roadmaps or development plans for key power reactor technologies will be proposed and discussed.

All authors of SOFE-2019 presentations, whether oral or poster, will have the opportunity to publish their work in a special issue of IEEE

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Brad Nelson
Program Chair

Transactions on Plasma Science (TPS), a peer-reviewed journal. Submitted manuscripts will be reviewed anonymously by two or more peer reviewers and must meet the journal's normal standards to be accepted. Please see the publication policy on the conference website for more details.

The SOFE 2019 conference will include an exciting social program in which all conference attendees will be invited to participate. In addition to the opening reception (Sunday evening) and the conference banquet (Wednesday evening), SOFE 2019 attendees are encouraged to join the Women in Engineering luncheon on Monday, and the Young Professionals reception on Tuesday.



Ankita Jariwala
Events Chair

For the Women in Engineering luncheon, we have invited Dr. Valeria Riccardo (Head of Engineering, Princeton Plasma Physics Laboratory) as the speaker. She is the first female Head of Engineering at PPPL and has been in the fusion field for more than 20 years. A Question and Answer event with Dr. Riccardo is planned following her talk. We will also have a panel discussion to exchange ideas and provoke discussion within the community.



Daniel Andruczyk
Minicourse Chair

For the Young Professionals reception, experienced staff will share their instrumental experiences to inspire and encourage young professionals to continue in fusion engineering and research. Dr. Richard Nygren of Sandia National Labs will present his findings on the changing demographics of personnel in the US fusion program, and discuss new opportunities for young people and the importance of mentoring young staff.

A Town Hall meeting on the topic of "Accelerating the Development of Fusion Power" will follow immediately after the Young Professionals reception on Tuesday evening. We are pleased to have Dr. Dale Meade, retired from PPPL, lead the discussion on pathways to a pilot fusion power plant. We hope to foster input from the engineering community to a strategic planning exercise currently underway by APS for the Fusion Energy Science Advisory Committee. Input from and comparison to current plans in Europe, Japan and China are welcome.



Kevin Freudenberg
Exhibits Chair

The SOFE awards banquet will be held on Wednesday evening. Participants can enjoy dinner with colleagues involved in fusion from around the world. At this event we will thank four retiring Fusion Technology Standing Committee (FTC) members for their years of service, and the FTC chair will welcome

four newly elected committee members. Two Fusion Technology awards, those for 2018 and 2019, will be presented to recognize outstanding individual contributions to research and development in the field of Fusion Technology. Finalists in the SOFE2019 student paper competition will also be recognized, and a student award will be presented.

Two Short Courses will be held at SOFE 2019. Conference participants can take advantage of this opportunity to learn about emerging subfields of fusion engineering and science. If you are a student or someone who is switching to a new subfield within fusion and want to learn from the experts, then one of the offered mini courses is for you! The course instructors include leading researchers in the areas of experimental and computational plasma-material interactions and neutronics. The courses run in parallel and are IEEE certified as continuing education units with certificates being given to participants completing the short course.

One course is on Plasma Material Interactions (PMI). The aim of the mini course is to provide a comprehensive introduction to plasma-material interactions with an emphasis on fusion plasmas. This mini course will address rising interest in the area of plasma material interactions and will in part introduce the breadth and depth of the subject including: plasma surface interactions in fusion edge plasmas, plasma diagnostics for PMI and modeling of the plasma edge and materials, where the plasma/material interface plays a crucial role in materials performance and behavior. A unique aspect of this mini course is to bring instructors who not only have expertise in plasma-material interactions, but also extensive experience both in PMI experiments and atomistic/multiscale computational PMI modeling. The course will describe uniquely the challenges of PMI experiments and computational modeling and the areas in which these two thrusts can complement each other. Topics include: PMI fundamentals, the plasma sheath, plasma facing components, PMI diagnostics, computational PMI, PMI of the divertor, PMI of the SOL and pedestal. The course instructors include leading researchers in the areas of experimental and computational plasma-material interactions.

The other is a neutronics minicourse that provides a quick overview of the state-of-the-art nuclear assessment. It targets students and new researchers in the fusion field to bring them up to speed on the basics and pertinent topics over the course of one day. The nuclear assessment is an essential element for the success of any fusion device and has been used as a design tool at early stages of

all fusion designs, covering three closely related areas (neutronics, shielding, and activation) and calling for measures to enhance the physics and engineering aspects of each design. Such an integral assessment identifies the nuclear parameters and addresses key issues related to tritium breeding ratio (TBR), neutron wall loadings on first wall and divertor, selection of low-activation materials, radial/vertical build optimization and definition, magnet protection, shielding of vital components, survivability of structural materials in 14-MeV neutron environment, and handling of radioactive materials during operation and after decommissioning. This minicourse covers the basics of fusion neutronics, nuclear assessment approaches, latest design philosophy, and applications for ITER experimental facility, conceptual magnetic (tokamak/spherical tokamak/stellarator) and inertial fusion power plants as well as the next-step facilities before DEMO. High fidelity in nuclear results of such fusion devices mandates performing state-of-the-art nuclear analyses that have been achieved through coupling the computer-aided design (CAD) system with the three-dimensional neutronics codes to preserve all geometrically complex features of fusion systems. As such, CAD-based neutronics approaches and potential applications will be outlined in detail.

SOFE will also host a vendor exhibit for companies engaged in fusion technology. It will allow for one-on-one discussions between conference attendees and exhibitors on the latest developments in the scientific, technological and engineering issues of fusion energy research, facilities, and equipment. On Sunday evening, attendees and their companions are invited to a reception that showcases the vendor exhibits. Please drop by the vendor booths during the conference to learn about their latest innovations and contributions to the advancement of fusion. Being a conference exhibitor or sponsor is a tremendous way to expose your company to a broad spectrum of industrial, government, and university organizations and a way to further immediate and future business goals. Exhibitors also have the option of placing advertising in the program book and to have their logo displayed on signage throughout the conference venue. An IEEE membership table will provide information about IEEE and NPSS, the benefits of society membership, and offer six months of free membership to new applicants. For further information about the exhibit, booth sizes and locations, please visit <https://sofe2019.utk.edu/sponsors.html>.

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General Chair, can be reached by
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