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Fusion Energy Division  
December 2013 Newsletter**

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**Letter from the Chair**, Minami Yoda, Georgia Institute of Technology, Atlanta, GA.

Now that the US Federal government is back in business, and the national labs are no longer threatened with shutdowns, I suspect that many in the American fusion community are wondering what happens next. Will the results of the November elections usher in a more constructive Congress? Will Congress overcome their recent mistakes and agree on a long-term spending plan in the next few months? How will fusion research fare in the next phase of budget negotiations? Let's all hope the 2014-year is a big improvement, fusion-wise, over 2013.

Our Fusion Energy Division (FED) has recently updated our Tactical, Succession and Strategic Plans. Many thanks to our Vice-Chair, Susana Reyes, for taking the lead on this. We have also updated our Position Statement, which is currently under review by the American Nuclear Society (ANS) Board of Directors. I am also pleased to report that the proceeds from the 20<sup>th</sup> Topical Meeting on the Technology of Fusion Energy (TOFE-20) have added another \$8000 to our scholarship funds, thanks to all the hard work of Arnie Lumsdaine of Oak Ridge National Laboratory (ORNL) and his colleagues.

As part of our outreach activities, our FED provided introductory slides on fusion for the ANS Congressional Seminar Series for legislative staff members. Thanks to several people for their support including Hutch Neilson and Kitta McPherson at Princeton Plasma Physics Laboratory, Lynne Degitz and Brad Nelson at Oak Ridge National Laboratory, and Mike Dunne and Susana Reyes at Lawrence Livermore National Laboratory.

The 10<sup>th</sup> International Conference on Tritium Science and Technology (TRITIUM 2013) was just held in Nice, France, with about 200 attendees. The 11<sup>th</sup> conference will be chaired by Rob Addis of Savannah River National Laboratory in April 2016, and will be held in the US, most likely in Charleston, SC.

The Office of Fusion Energy Sciences has appointed a new Fusion Energy Sciences Advisory Council (FESAC) that includes Juergen Rapp of ORNL from our Executive Committee. Congratulations, Juergen!

On the magnetic fusion front, the ITER Council has just approved new recommendations from the ITER Science and Technology Advisory Committee to: 1) commence operation with a full tungsten divertor, *vs.* the carbon-coated divertor that had been proposed for the initial stages; and 2) incorporate a second set of internal coils to combat ELMs (edge-localized modes) in the baseline design. NIF also continues to make steady progress, achieving fusion gains of almost 0.8% in its most recent reported tests.

Finally, our new Honors and Awards Chair, Dr. Nermin Uckan of ORNL, is soliciting award nominations for the Outstanding Achievement and Technical Accomplishment Awards, which will both be presented at the 21<sup>st</sup> Topical Meeting on the Technology of Fusion Energy (TOFE-21) in early November 2014 in Anaheim, California.

**Slate of Candidates for the 2014 FED Election**, Lee Cadwallader, Idaho National Laboratory, Idaho Falls, ID.

ANS Headquarters will send an e-mail announcement about E-ballots to all ~900 members of the FED at the end of 2013 or beginning of 2014. Please remember to E-vote, or if you do not have access to E-mail, to return your ballot by postal mail. The outcome of the election will be announced before the next FED Executive Committee meeting in June 2014. The FED Nominating Committee is always looking for fusion professionals, like those listed here, who are willing to serve the division. If you are interested in becoming active in the division, please contact any Executive Committee member.

We would like to thank the ExCo members who are completing their terms in June 2014: Yuati Katoh (ORNL), Arnie Lumsdaine (ORNL), and Rene Raffray (ITER). We have an excellent set of fusion researchers running for officer positions and for three executive committee seats in this election. Their willingness to contribute their time and talents to the division is appreciated by the FED. The current Vice Chair/Chair Elect, Susana Reyes, from LLNL, will become the FED Chair at the end of the ANS national meeting in June 2014. Our Secretary/Treasurer, Stephen Combs, from ORNL, will complete his two-year term in June 2014 as well, and we thank him for his conscientious service to the division. The Past Chair, Lee Cadwallader (INL), completes his term in June 2014, making way for the new Past Chair, Minami Yoda (GIT). She also becomes the new Nominating Committee chair. The list of candidates for the coming election is:

Vice-Chair/Chair-Elect:        Arnie Lumsdaine (ORNL)

Secretary-Treasurer:        Paul Humrickhouse (INL)

ExCo seats:                    Blair Bromley (AECL)  
                                      Ahmad Ibrahim (ORNL)  
                                      Paul Rosso (LLNL)  
                                      Craig Taylor (LANL)  
                                      Neill Taylor (CCFE).

**Plans for the 21<sup>st</sup> Topical Meeting on the Technology of Fusion Energy (TOFE)**, Brian D. Wirth, University of Tennessee, Knoxville, TN.

I am pleased to announce that the 21<sup>st</sup> TOFE meeting will be held during the week of 9-13 November 2014, as an embedded topical meeting at the 2014 ANS Winter meeting. The meeting will be held in Anaheim, CA at the Disney Resort and Hotel. At this time, we are still working to finalize the organizing committee and plans for special sessions to be held at the meeting, in preparation for widely soliciting a call for abstracts. We anticipate the first call for papers will occur shortly after January 1, 2014.

I will serve as the General Chairman for the 21<sup>st</sup> TOFE, and will be assisted by Rajesh Maingi (Princeton Plasma Physics Laboratory), Vincent Chan (General Atomics), Jacob Leachman (Washington State University), and Lee Cadwallader (Idaho National Laboratory). The technical program committee will be co-chaired by Rajesh Maingi and Vincent Chan. Jacob Leachman and Lee Cadwallader will serve as co-chairs of the publication committee. We have already made arrangements to have the conference proceedings published as two special issues of the Fusion Science and Technology journal, as in past TOFE meetings.

At present, we are planning to offer a tutorial on fusion materials, including plasma surface interactions and plasma facing component materials issues, which will be organized by Juergen Rapp. A second tutorial on inertial fusion energy is also being discussed.

Special sessions that are currently planned for the 21<sup>st</sup> TOFE meeting include the perspectives on a potential fusion nuclear science facility (FNSF) – an interim facility between ITER and DEMO, which will be organized by Laila El-Guebaly (University of Wisconsin) and Chuck Kessel (Princeton Plasma Physics Laboratory) and the safety and environmental impact of fusion that will be organized by Lee Cadwallader (Idaho National Laboratory). These special sessions will be in addition to regular thematic sessions around the progress of major facilities, including the NSTX upgrade, power plant studies, plasma engineering and plasma materials interactions.

In summary, I look forward to a successful meeting with the fusion energy community in Anaheim next November. If you are interested in volunteering to participate in the organization of the meeting, please let me know by email ([bdwirth@utk.edu](mailto:bdwirth@utk.edu)).

**Call for Nominations – ANS-FED Awards**, Nermin A. Uckan, FED/ANS Honors and Awards Chair, Oak Ridge National Laboratory, Oak Ridge, TN

The Honors and Awards Committee of the Fusion Energy Division of the American Nuclear Society [FED/ANS] is seeking nominations for two FED/ANS awards:

- **Outstanding Achievement Awards:** This award is for recognition of a continued history of exemplary individual achievement requiring professional excellence and leadership of a high caliber in the fusion science and engineering area.
- **Technical Accomplishment Award:** This award is for recognition of a specific exemplary individual technical accomplishment requiring professional excellence and leadership of a high caliber in the fusion science and engineering area.

Detailed descriptions of the awards (purpose, criteria, and procedure) and past recipients can be found at <http://fed.ans.org/awards.shtml>.

Note that the nominees will only be considered for the particular award for which they are nominated.

- **Nomination deadline is July 1, 2014**

The awards will be presented at the 21<sup>st</sup> ANS Topical Meeting on the Technology of Fusion Energy (21<sup>st</sup> TOFE), embedded in the ANS Winter Meeting and Nuclear Technology Expo to be held Nov. 9-13, 2014 in Anaheim, CA.

Nominations can be made by individuals and submitted anytime to the FED/ANS Honors and Awards Chair electronically at [uckanna@ornl.gov](mailto:uckanna@ornl.gov). Nomination package must include

1. Nominee's CV
2. A description of exemplary achievement(s)
3. Support letter(s) and/or co-signature on the nomination form.

Incomplete submissions will not be considered. Details are available at <http://fed.ans.org/awards.shtml>.

Please send inquiries and nominations electronically to:

**Nermin A. Uckan**  
**FED Honors & Awards Chair**  
**uckanna@ornl.gov**

Nominators of 2010 and 2012 nominees are encouraged to update their 2010 and 2012 nomination packages and re-submit.

The **Outstanding Student Paper Award** will also be given at the 21<sup>st</sup> TOFE meeting through a separate process under the auspices of 21<sup>st</sup> TOFE. Details will be forthcoming in conjunction with the meeting announcement.

**Fusion Award Recipients**, Laila El-Guebaly, Fusion Technology Institute, University of Wisconsin-Madison, Madison, WI.

Fusion awards have been established to formally recognize outstanding contributions to fusion development made by members of the fusion community. The following awards (listed in alphabetical order) were available to the newsletter editor at the time of publishing this newsletter. We encourage all members of the fusion community to submit information on future honorees to the editor ([elguebaly@engr.wisc.edu](mailto:elguebaly@engr.wisc.edu)) to be included in future issues. The ANS-FED officers and executive committee members congratulate the honored recipients of the 2013 fusion awards on this well-deserved recognition and our kudos to all of them.

#### **ANS Awards**

**Ahmad Ibrahim** (ORNL; graduate student of University of Wisconsin-Madison) is the recipient of the ANS Radiation Protection and Shielding Division Student Paper Award for his paper "Automatic Mesh Adaptivity for Hybrid Monte Carlo/Deterministic Neutronics Modeling of Difficult Shielding Problems," with co-authors Paul P. Wilson, Mohamed E. Sawan (University of Wisconsin-Madison), Douglas E. Peplow, John C.

Wagner, Scott W. Mosher, and Thomas M. Evans (ORNL). The paper was presented at the 2012 ANS Winter Meeting. The award certificate was presented to Dr. **Ibrahim** at the 2013 ANS Winter Meeting.

### APS-DPP Awards

The American Physical Society (APS), Division of Plasma Physics (DPP) has selected:

- **J. Ferron, T. Osborne, P. Snyder** (General Atomics) and **H. Wilson** (York Univ.) to receive the 2013 John Dawson Award for Excellence in Plasma Physics Research for experiments and theory that explained the limiting edge instabilities of high performance tokamak plasmas, including the key role of peeling-ballooning modes, thus enabling quantitative predictions of the edge pressure in fusion plasmas.
- Dr. **C. Paz-Soldan** (General Atomics) to receive the Marshall N. Rosenbluth Outstanding Doctoral Thesis Award.

### EPS Award

The 2013 European Physical Society (EPS) award for Outstanding Contributions to Plasma Physics was presented to Prof. **Miklos Porkolab** (Director of the Massachusetts Institute of Technology Plasma Science and Fusion Center and professor in the MIT Department of Physics). Prof. **Porkolab** received the 2013 Hannes Alfvén Prize at a ceremony held in Espoo (Helsinki), Finland in July 2013. The Hannes Alfvén Prize recognizes outstanding work in the field of plasma science and fusion research. Prof. **Porkolab** was cited for his seminal contributions to the physics of plasma waves and his key role in the development of fusion energy. Noting additional areas of his research (that include magnetic reconnection, laser-plasma interaction, and inertial confinement fusion), the citation concludes “With such a broad scientific expertise in plasma physics, unique contributions to first-rate theories, exciting and novel experiments and development of innovative diagnostic techniques, as well as with a great devotion to science education and service, **Miklos Porkolab** has a strong impact on fusion energy research worldwide.”

### FPA Awards

The Fusion Power Associates (FPA) Board of Directors has selected:

- Dr. **David Crandall** (recently retired from the US Department of Energy) to receive the 2013 Distinguished Career Award. In selecting Dr. **Crandall**, the FPA Board recognizes his decades of high quality contributions to fusion research and development at the US Department of Energy in both the Office of Science and the National Nuclear Security Administration in both the magnetic and inertial fusion programs. The Board especially notes his important contributions to establishing the recent National Academies’ assessment of the energy potential of inertial fusion and to the assessment of the ignition effort on the National Ignition Facility.
- Dr. **David Meyerhofer** (University of Rochester Laboratory for Laser Energetics) to receive the 2013 FPA Leadership Award. In selecting Dr. **Meyerhofer**, the FPA Board recognizes his many scientific and technical contributions to fusion development and the leadership he has been providing to the US and world inertial fusion and high energy density plasma physics efforts. The Board

especially notes his leadership of cryogenic direct drive experiments on the OMEGA laser facility and his participation in Academy and FESAC reviews of inertial fusion.

- Dr. **Eric Hollmann** (University of California, San Diego) to receive the 2013 Excellence in Fusion Engineering Award. In selecting Dr. **Hollmann**, the FPA Board recognizes his technical contributions to understanding and mitigating disruption events in tokamak devices – a critical feasibility requirement for tokamak-based fusion power plants, his leadership of experiments in this regard on the DIII-D experiment at General Atomics, and his many other contributions to fusion research.

### **IEEE Awards**

The Institute of Electrical and Electronics Engineers (IEEE) Council on Superconductivity has selected:

- Dr. **Robert Aymar** (former director of the ITER project (1993-2003) and director-general of CERN (2004-2008)) to receive the 2013 IEEE Max Swerdlow Award for sustained service to the applied superconductivity community, for his technical and managerial leadership at CERN and ITER, and for the use of superconducting magnet technology in high energy physics and fusion energy projects. The award citation recognizes Dr. **Aymar** for sustained service to the applied superconductivity community that has had a lasting influence on the advancement of the technology and for leadership in the development of many large-scale superconducting magnet systems such as Tore Supra, the Large Hadron Collider (LHC) and ITER. The award also recognizes his role in directing research for the next-generation devices beyond the LHC and ITER, in chairing numerous committees for the promotion of academic research, and in organizing workshops related to applied superconductivity and large-scale superconducting magnets.
- Dr. **Joseph V. Minervini** (Massachusetts Institute of Technology Plasma Science and Fusion Center) to receive the 2013 IEEE Award for continuing and significant contributions in the field of large-scale applications of superconductivity. Dr. **Minervini** was recognized for his many significant contributions in the field of large scale applications of superconductivity, in particular, for his contributions to numerous magnet systems for fusion energy, magnetic levitation, energy storage, power generation and transmission, magnetic separation, high energy and nuclear physics, medical applications, and for his contributions as the US Principal Investigator for the International Reactor (ITER) project which resulted in the design, fabrication and testing of the Central Solenoid Model Coil, then the world's largest and most powerful pulsed superconducting magnet.

### **Secretary of Energy's Appreciation Award**

Dr. **Rich Hawryluk** (a former deputy director of PPPL) received the US Secretary of Energy's Appreciation Award after completing a two-year assignment at ITER in April 2013 where he served as Deputy Director-General for the ITER Organization and Director of the ITER Administration Department. The award cited Dr. **Hawryluk** for

applying his wealth of big-science project management experience to enable the ITER project to make the transition from design phase to construction, thus helping ensure that this important international project will successfully move toward demonstrating the feasibility of fusion as a future energy source.

**News from Fusion Science and Technology (FS&T) Journal**, Nermin A. Uckan, FS&T Editor, Oak Ridge National Laboratory, Oak Ridge, TN.

During the past 12 months (from October 1, 2012 to September 30, 2013), FS&T received a total of 294 manuscripts (184 online submissions plus 110 camera-ready papers accepted from the 2012 Open Magnetic Systems & Plasma Materials Interactions).

The following dedicated issues were published during the period 10/1/12 to 9/30/13:

- Selected papers from 7<sup>th</sup> Fusion Data Validation– FS&T Nov. 2012 & Jan. 2013
- Selected papers from 20<sup>th</sup> IFE Target Fabrication 2012 – FS&T Mar./Apr. 2013
- Open Systems & Plasma Materials Interactions 2012 – FS&T Trans. May 2013
- IAEA-NFRI Atomic/Molecular Data and PMI in Fusion – FS&T May 2013
- Selected papers from 20<sup>th</sup> TOFE 2012 – FS&T Aug. 2013 & Sept. 2013.

The following issues are scheduled/planned for the remainder of 2015 and beyond:

- Selected lectures from 6<sup>th</sup> Int. ITER School 2012 – FS&T Jan. 2014
- Selected papers from 2<sup>nd</sup> IAEA-ITER Materials Technol. – FS&T Mar./Apr. 2014
- Selected papers from ICFRM-16 2013 – FS&T regular issues (mid/late 2014)
- Selected papers from Tritium 2013 – FS&T regular issues (late 2014)
- JA-EU Broader Approach – FS&T regular issues (in planning)
- KSTAR (Korea) – FS&T regular issue (in planning)
- Physics & Technology for Steady-State Operation – FS&T regular issue (in planning).

**New with FS&T in 2014:** ANS will begin assigning digital object identifier (DOI) numbers to articles starting with the January 2014 issue. There is no timetable yet for historical/back issue DOI assignments. Also, FS&T will be introducing article-based publishing – papers will be published online as soon as possible without waiting for a full issue to be compiled. This will make the final citable articles available faster.

Electronic access to FS&T is available from 1997-to-current. ANS has completed scans of pre-1997 back issues and will soon start adding these issues as soon as they determine subscription protocols related to back issues. As always, tables of contents and abstracts of papers can be accessed at <http://www.ans.org/pubs/journals/fst/>. Individual and library subscribers can access the full text articles at <http://epubs.ans.org/>.

Please send your comments on FS&T contents and coverage as well as suggestions for potential future topical areas that are timely and of interest to [fst@ans.org](mailto:fst@ans.org).



## **INTERNATIONAL ACTIVITIES**

**US ITER Report**, Ned Sauthoff, US ITER Project Office, Oak Ridge National Laboratory, Oak Ridge, TN.

Building construction at the ITER site is making progress as is fabrication of major hardware components in the seven Domestic Agencies. On the ITER site, all the formwork for the lowest basement has been completed, and placement of the reinforcement steel for the 1.5-meter-thick slab is underway. The slab for the Assembly Hall has been poured, and preparations for the cranes has started as has construction of the cryostat workshop to be used by the Indian team assembling that major structure.

Nearly all the toroidal field magnet strand has been procured and the TF conductors are half complete. Production of the poloidal field conductors is accelerating, with about half the strands having been fabricated. Multiple vendors for Central Solenoid strand have qualified in SULTAN (significantly reducing previous concerns about lifetime of the CS magnets) and qualification of production lengths of the CS conductor is in process.

An ITER Test Convoy carried a large load along the 104-kilometer itinerary from the Mediterranean port to the ITER site.

The project has experienced schedule delays and, correspondingly, there is extreme focus on:

- (a) The development of a reliable ITER schedule leading to First Plasma and Start of D-T Operation
- (b) Implementation of schedule-recovery actions.

Systems near the critical path include the Buildings (especially the Tokamak Complex), vacuum vessel sectors, toroidal field coils, poloidal field coils, and cryostat. In December 2013, there will be a review of the assembly plan, aimed at assuring that the plan and schedule for assembly is reliable.

For further information, please visit the ITER website: [www.iter.org](http://www.iter.org).

**The content of this newsletter represents the views of the authors and the ANS-FED Board and does not constitute an official position of any US governmental department or international agency.**