

ADVANCED ENERGY SYSTEMS DIVISION

EDITOR: Antonio Bula

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CHAIR'S MESSAGE Dr. Michael R. von Spakovsky



On July 1, 2010, while in Anzio, Italy southwest of Rome at the two-week Summer School on Thermodynamics where I taught a short course on the generalization of thermodynamics to the equilibrium and non-equilibrium aspects of microscopic systems, I took over as chair of the Advanced Energy Systems Division (AESD). Having spent many years as an active member of the division, it was my turn to take the helm and work with my long-time colleagues and friends and the many other volunteers within the division who help make sure that the division remains viable and relevant. The work of the division in encouraging and showcasing a host of new innovative ideas, methods, and technologies is of particular importance today because never before has there been a period during my lifetime when the urgency for solutions to the issues of energy resources, energy conversion, energy efficiency, and energy independence has been greater. Thus, the division's work

to provide venues for the presentation, discussion, and exchange of information and ideas for its members has never been, I believe, so paramount.

To accomplish this work, the division through the leadership of its Executive Committee (ExC) organizes its annual Energy Track symposiums at the IMECE each year and is involved in the organization and/or sponsorship of a host of other conferences of particular relevance to energy related issues such as the Energy Sustainability (ES) and Fuel Cell Science, Engineering, and Technology (FCSET) Conferences which will be co-located in Washington, D.C. in August of next year. In May of this year, the 4th annual ES conference was co-located in Phoenix with the American Solar Energy Society's (ASES's) annual conference while the 8th annual FCSET conference took place in Brooklyn, New York in June. Both the ES and the FCSET conferences have been very successful additions to AESD's IMECE activities. Other AESD sponsored conferences include the very successful annual International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems

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(ECOS) which was initiated by members of the AESD ExC in 1987 and has annually met in the summers typically in Europe but as well in Central and South America and Asia. In 2010, ECOS'10 was hosted by the Ecole Polytechnique Fédérale de Lausanne in Lausanne, Switzerland and next year ECOS'11 will take place in Novi Sad, Serbia in July. Additional conferences sponsored by the AESD include the International Colloquium on Environmentally Preferred Advanced Power Generation (ICEPAG) which in 2011 will be held in February in Costa Mesa, CA and the International Seminar on Organic Rankine Cycle Power Systems (ISORCPS) slated to take place in The Netherlands in the summer of 2011.

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AESD DIVISION AWARDS AND KEY NOTE LECTURE



This year at the IMECE 2011 in Vancouver, the AES Division presented the **Frank Kreith Energy Award**. This award has been dedicated to significant contributions to a secure energy future, emphasizing on innovations in conservation and/or renewable energy. This year, the award was presented to Professor **Byard**

Wood. Dr. Wood was recognized "for nearly four decades of leadership in alternative energy research resulting in significant contributions to the development of alternative energy technologies; and for contributions as one of the founding fathers of the Solar Rating and Certification Corporation." Dr. Wood gave a talk prior to the AESD reception entitled "Biofuels – A Sustainable Strategy for Renewable Energy?" Another prestigious award presented during the IMECE 2011 at Vancouver



was the ASME Obert Award. It was given to Prof. **Noam Lior** and Dr. **Na Zhang** for the paper entitled "Use of



Low/Mid Temperature Solar Heat for Thermochemical Upgrading of Energy, With Application to

a Novel Chemically-Recuperated Gas-Turbine Power Generation (SOLRGT) System."

At the AESD reception, the division also presented the following awards: AESD Best Paper Award and AESD Best Student Paper Award. The IMECE 2009 AESD Best Paper Award was presented to Sankaran Ramakrishnan, Kwee-Yan Teh, and Christopher F. Edwards for the paper entitled "Identification of Optimal Architecture for Efficient Simple-Cycle

Gas Turbine Engines." The IMECE 2009 AESD 2009 Best Student Paper Award was given to Katherine E. Bulgrin, Y. Sungtaek Ju, Greg P. Carman and Adrienne S. Lavine for "A Coupled Thermal and Mechanical Model of a Thermal Energy Harvesting Device."

In order to have a broader understanding of the issues surrounding global warming, the AESD invited Dr. **Roy W. Spencer**, who gave a talk entitled "Global Warming: Manmade



disaster or Natural Cycle?" Dr. Spencer is a co-developer of satellite method for precise monitoring of global temperatures from earth-orbiting satellites.

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In addition to the proceedings which are products of the conferences listed above, the AESD sponsors three ASME journals: the Journal of Energy Resources Technology, the Journal of Engineering for Gas Turbines and Power, and the Journal of Fuel Cell Science and Technology, giving its approval for nominations for Editor-in-Chief and nominating members of the division to be journal Associate Editors. These journals are important avenues for the archival publication and, thus, dissemination of many of the best papers presented at and published by the AESD sponsored conferences.

To recognize exceptional ideas and innovations for papers coming out of the AESD IMECE symposiums, the AESD annually seeks to award prizes for both best paper and best student paper. It also sponsors and evaluates papers for the prestigious ASME Obert Award in Thermodynamics which was won this year by Prof. Noam Lior and Dr. Na Zhang.

In addition, the division annually recognizes exceptional, time-tested bodies of work by sponsoring and

evaluating nominated persons for the very prestigious society-wide award, the ASME Frank Kreith Energy Award. This year's award goes to Prof. Byard Wood, who is department chair of Mechanical and Aerospace Engineering at Utah State University.

Another activity of the division is to bring its membership together and attract new members via its annual organization of a set of talks and a reception at which the winner of the Frank Kreith Award speaks. Also, typically featured is a second speaker talking on some topic of particular relevance to the issues of energy today. This year's talks and reception take place on Tuesday, November 16th. Prof. Wood's talk, "Biofuels – A Sustainable Strategy for Renewable Energy?", will begin at 4:30 pm followed by our second featured speaker, Dr. Roy Spencer, who is a former Senior Scientist for Climate Studies at NASA and now a Principal Research Scientist at the University of Alabama in Huntsville where he directs a variety of climate research projects. His talk, "Global Warming: Manmade Disaster, or Natural Cycle?", which begins at 5:30,

will be followed by our reception. I encourage you to come. It should prove to be a very interesting and worthwhile evening.

Finally, the state of our division both in terms of its membership and its financial health is good. Of the 5 divisions in the ASME's Energy Conversion Group, which includes our division and Internal Combustion Engines, Nuclear Engineering, Power, and Solar Energy, the AESD has the second highest number of members at 2,374, up from the 1900 the division had in 2007 and slightly above last year's 2,250. Furthermore, the custodial account for the division has also significantly increased (by 62%) over last year's due to our many successful conferences and journals. Thus, with a very healthy fiscal and membership base, I believe that we can all look forward with optimism to a very good year in which the AESD plays its small but important part in tackling the difficult issues of energy facing the nation and the world.

Michael von Spakovsky
October 12, 2010

NEW FELLOWS

This year, two members from the AES Executive Committee have been recognized by the ASME as Fellows, Abdi Zaltash and Andrea Lazzaretto.



Dr. Abdi Zaltash, is currently the principal researcher at Oak Ridge National Laboratory (ORNL) that is responsible for

conducting hot-box testing. He assisted in the rewrite of Chapter 7 of the 2008 ASHRAE Handbook on Cogeneration Systems, served on the ASME Advanced Energy Systems Division Executive Committee, is past chair of the ASME Heat Pump Technical Committee, and was Associate Editor for the ASME Journal of Energy Resources Technology.



Dr. Andrea Lazzaretto is currently an Associate professor at the University of Padova. He received his M.Sc in Mechanical Engineering in 1986, and his Ph.D. in Energetics in 1992. He teaches undergraduate courses related to "Energy Systems"

and “Design of Energy Conversion Machines” as well as “Internal Combustion Engines”. In 1999 he was awarded the ASME Edward F. Obert Award for the best paper on thermodynamics. His research activities

are mainly devoted to energy systems’ simulation, optimization and malfunction analysis (Steam power plants, simple cycle and HAT cycle gas turbines, natural gas-fired combined cycle and IGCC power plants, natural

gas depressurization plants with radial turbines and cogeneration engines). Part of his research activities are related to performance and design criteria evaluation of energy system components.

AESD CONFERENCE ACTIVITIES

The Advanced Energy Systems Division sponsored and organized Track 7 at the ASME International Mechanical Engineering Congress & Exposition for the 2010 Congress in Vancouver. This excellent track on Energy Systems: Analysis, Thermodynamics & Sustainability. It had 16 topics, divided into 39 sessions. 164 papers were accepted for presentation as well as 39 posters.

The AES division, continuing its collaboration with the Solar Energy Division, jointed efforts for the Fourth Energy Sustainability Conference, held in Phoenix. Dr. Mansour Zenouzi, new secretary for the AESD was the technical program chair. There were 55 sessions, withheld during three days with good participation and a total of about 220 papers, distributed among the tracks organized by the division.

The fourth International Conference on Energy Sustainability will be held in Washington from August 7 to 10, 2011.

For IMECE 2011, the conference will be held in Denver from November 11 to 17, 2011. The call for papers is given below.

TECHNICAL COMMITTEES

The Technical Committees are the heart of the Advanced Energy Systems Division. Focusing on specific technical areas, they organize technical meetings and educational courses, stimulate the publication of technical information, formulate ASME's technical policy, recommend industry standards and recognize achievement in the field.

Systems Analysis

The activities of the Systems Analysis Committee (SATC) includes the design and application of cogeneration, hydrogen technologies, environmental impact of energy systems, application of micro- and nanotechnologies in energy systems, and realistic optimization of complex energy systems. These activities reflect the committee's continuing work in the areas of fundamental thermodynamics, system

design, analysis, and optimization; and also the application of these concepts in some of the most interesting and promising areas of research and technology development. The current chair is Andrea Lazzaretto, Ph.D., from the University of Padua.

Fuel Cell and Hydrogen Energy

The activities of this committee include the design and application of fuel cells, as well as hydrogen storage. This committee has been very active, and they have been holding their conference on Fuel Cells as well as contributing to the ASME Journal of Fuel Cell Science and Technology. The current chair is Michael Ellis, Ph.D., from Virginia Tech.

Renewable Energy and Energy Efficiency

Energy efficiency is as important & complimentary to the solution of the

present day energy issues as the development of new & renewable energy sources. This new Technical Committee was formed to deal with both aspects. It will provide a forum and resource for all engineers and researchers interested in helping solve the energy problem by working towards improving the efficiency of all types of energy systems and processes in addition to developing efficient systems for the production of energy from renewable sources. The current chair is Dr. Shiva Prasad, Ph.D., from Wright State University.

Energy Systems Miniaturization

The primary activities of this committee include providing a forum for the dissemination of research and development results in energy systems miniaturization from the nanoscale to the macroscale.. The current chair is Julie Hao, from Old Dominion University.

ASME 5th International Conference on Energy Sustainability
and
9th Fuel Cell Science, Engineering and Technology Conference.
ASME Advanced Energy Systems Division
August 7-10 2011
Grand Hyatt Washington, Washington DC

If you work in the new energy economy as a researcher, engineer, scientist architect, consultant or policy-maker please participate in this exciting conference for the exchange of innovative ideas, leading edge concepts, new technologies and devices, ongoing R&D efforts, prototype and demonstration projects, commercialization technologies and projects, and visions of the future related to the theme of Energy Sustainability. New technologies and systems-thinking offer a path forward from environmental and economic catastrophe to a clean energy future. At this critical time, it is essential for universities, industries, R&D laboratories & government agencies to cooperate and share information to propel clean energy technology into the future. The conference will consist of plenary talks, invited talks, panel discussions, technical sessions, poster presentations and exhibitions, thus providing a unique opportunity for communication and collaboration between academia, industry and planners in the areas of Solar and other Renewable Energy, Energy Efficiency, Fuel Cells and Advanced Energy Technologies. The Conference will feature a day of workshops and tutorials as well as special activities for students interested in solar and energy efficiency. Thanks to the ASME staff for securing the award-winning conference facilities at the Grand Hyatt in downtown Washington, D.C.: great rooms, restaurants and amenities - and close to Washington, D.C.'s fine museums and art galleries.

Papers published in the conference proceedings may be submitted for dual-review for referral to the ASME Journal of Solar Energy Engineering, the ASME Journal of Energy Resources Technology, or the ASME Journal of Fuel Cell Science and Technology.

<http://www.asmeconferences.org/ESFuelCell2011/index.cfm>

INTERNATIONAL MECHANICAL ENGINEERING CONGRESS AND EXPOSITION
ASME Advanced Energy Systems Division
November 11- - 17, Denver
Hyatt Regency Hotel, Denver, Colorado

The AES Division is sponsoring track 7 at IMECE 2011 on a variety of energy related topics. The papers scheduled in these sessions include numerous contributions from outside the U.S. and from industry, demonstrating the wide-ranging and global appeal of the technical topics being addressed by the AES Division. Sessions include:

7-1 Fundamentals of Thermodynamics and Thermo economics
 Wind Energy
 Design of Energy Systems
 Alternative Energy and Sustainable Energy Systems
 Low and High Temperature Fuel Cell Systems Analysis
 Hydrogen Energy Technologies
 Low/Zero Emission Power Plants
Education in Thermodynamics, Energy Systems, and Sustainability
 Energy Systems Miniaturization
 Direct Energy Conversion
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