



AICHE Sustainable Engineering Forum Newsletter

Vol. 3 No. 3

September 2009

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<http://aiche.org/sef/>



MESSAGE FROM CHAIR

One of the most important events in which the SEF was actively involved last summer was the First International Congress on Sustainability Science and Engineering (ICOSSE '09). The congress was very successfully held in Cincinnati, Ohio, Aug. 9-12, and attracted more than 200 people from many different countries. As you know, the SEF was one of the co-sponsors. The congress was chaired by Subhas Sikdar, the founding chair of SEF. To ensure the success of the congress, many SEF members made tremendous efforts in the past year on conference development, preparation, and organization. These include Martin Abraham of Youngstown State U., Mario Eden of Auburn U., Mahmoud El-Halwagi of Texas A&M, Herb Cabezas of EPA Cincinnati Lab, Bruce Hamilton of NSF, Yinlun Huang of Wayne State U., Helen Lou of Lamar U., Benson Pair of KBR, Cristina Piluso of BASF, and Darlene Schuster of IfS. Many other SEF members presented papers at the conference. One of the most encouraging aspects was the participation of more than 30 graduate or undergraduate students majoring in chemical engineering, civil engineering, environmental engineering, materials science and engineering, forestry and natural resources, chemistry, mechanical engineering, etc. In addition to co-sponsoring the conference, the SEF also sponsored the Best Student Poster Paper Competition. You can find more detailed reports on the conference and student activities in this newsletter.

As you may have known, the current leadership of the Forum is approaching the end of its two-year term. The Forum has therefore initiated the election process for establishing a new leadership team for the term of 2010-2011. Recently, a nomination committee was formed, which consists of the Forum's current and past chairs, the current vice chair, the executive director of the Institute for Sustainability, and an industrial leader. There are a total of 13 positions to be filled. There is an announcement about the election in this newsletter. We strongly encourage the SEF members to send nominations (including self-nominations) to the nomination committee. We plan to announce the election result at the end of October. The SEF has grown very rapidly. To ensure a further success of the Forum and to better serve the members in the future, we need to your ideas and voluntary service, and we also believe that you will enjoy your service very much.

In less than two months, the AIChE Annual National Meeting will be held in Nashville, Tennessee. During the meeting, there will be 43 sustainability-focused technical sessions that are sponsored or co-sponsored by the Forum, the highest number yet. The SEF sessions will start with the SEF Plenary Session on November 9, where four distinguished speakers will give talks. During the conference, the SEF will have various activities. In addition to the customary SEF Luncheon and business meeting, we will have a programming meeting for the first time. Beginning this year, the Forum's programming will be area-based and Forum-coordinated, and we will plan for technical session development for meetings in both 2010 and 2011. All those who are interested in developing and chairing sessions, please join us. Again, please see more information in the newsletter.

This newsletter contains much more information about SEF activities and I hope it is interesting to you. Again, we deeply appreciate your strong support in the past, which is crucial to the Forum's success.

Yinlun Huang
Chair, Sustainable Engineering Forum

ANNOUNCEMENTS

AICHE 2009 Annual Meeting – SEF Programming

The SEF will hold a luncheon on Wednesday, November 11th in the conference hotel. The ticket price is \$50.00.

Two meetings will be held:

SEF Leadership Meeting: Monday 5:00-6:00pm

SEF Programming Meeting: Tuesday 5:00-6:00 pm

In addition, the full SEF Annual Meeting programming is provided on the next couple pages.

Area 23b Sustainable Biorefineries Programming:

For the 2009 Annual Meeting in Nashville, Area 23b is offering an invited plenary session, ten technical sessions and a technical poster session. Topics covered include all aspects of biorefinery science and technology development, from feedstocks to chemical pretreatments, biochemical and thermochemical conversions, reactor engineering, downstream

processing, and sustainability and life cycle analysis. In addition, there are sessions covering biodiesel from algae and other sources.

The Sustainable Biorefineries Plenary Session, which offers visionary talks from industry, government, and academic representatives addressing the past, current, and future biorefinery landscape, will offer a distinguished lineup this year, including Dr. Bruce Dale (Michigan State University and the Great Lakes Bioenergy Center), Dr. Al Darzins (National Renewable Energy Laboratory), Dr. Randy Cortright (Virent Energy Systems), Dr. Robert Wooley (Abengoa Bioenergy), and Dr. Jay Keasling (UC Berkeley and Amyris Biotechnologies).

Point your browser to the following link at the 2009 Annual Meeting's Technical Program for more information on sessions sponsored and co-sponsored by Area 23b:

<http://aiche.confex.com/aiche/2009/webprogram/Symposium1491.html>

SEF Programming – General Area (23a)

| Session | Session Chair | Session CoChair |
|--|----------------------------|-----------------------------|
| Design for Sustainability | Mahmoud El-Halwagi | Jeffrey R. Seay |
| Green Engineering In the Pharmaceutical And Fine Chemical Industry | C. Stewart Slater | Concepcion Jimenez-Gonzalez |
| Innovation In Sustainable Process Engineering | Helen H. Lou | Tom R. Marrero |
| Interface of Water And Energy Use | William M. Barrett Jr. | Geoffrey A. Prentice |
| Sustainability Education | David R. Shonnard | Dr. Robert Hesketh |
| Sustainability Metrics, Assessment and Performance Prediction by Computation | Raymond L. Smith | Paul Blowers |
| Sustainability of Water Use | Jeff Yang | Bruce Hamilton |
| Sustainability Plenary | Subhas Sikdar | Yinlun Huang |
| Sustainability Under Uncertainty | Li Sun | Zheng Liu |
| Sustainable Energy Plenary | Martin A. Abraham | William M. Barrett Jr. |
| Sustainable Value Chain | Cristina Piluso | Xiang Li |
| Sustainable Water | Urmila Diwekar | Xiaoxia Lu |
| Systems Analysis of Sustainability | Arunprakash T. Karunanithi | Bhavik R. Bakshi |

SEF Programming – Sustainable Biorefineries Area (23b)

| Session | Session Chair | Session CoChair |
|---|------------------|-----------------------|
| Advances in Algal Biorefineries | Rakesh K. Bajpai | Bruce S. Dien |
| Biological Conversions and Processes for Renewable Feedstocks | Nasib Qureshi | Mohammed Moniruzzaman |
| Biomass Pretreatment Cafi Developments | Richard Elander | Charles E. Wyman |
| Catalytic Conversion of Renewable Resources to Synthesis Gases and Pyrolysis Oils | Thomas D. Foust | Rick Knight |

SEF Programming – Sustainable Biorefineries Area (23b) – (cont'd)

| Session | Session Chair | Session CoChair |
|--|----------------------|---|
| Chemical and Catalytic Conversions and Processes for Renewable Feedstocks | Susan Stagg-Williams | Dennis J. Miller |
| Developments in Biobased Alternative Fuels | Brian Duff | Marcus Rajchel |
| Developments in the Pretreatment of Lignocellulosics for Bioconversion | Tae Hyun Kim | R. Eric Berson |
| Integrated Processes for Biochemical Conversion of Renewable Feedstocks to Fuels and Chemicals | Katherine A. Taconi | Nathan S. Mosier |
| Life Cycle Analysis of Renewable Feedstock-Based Processes and Products | Carina Maria Alles | David R. Shonnard |
| Poster Session: Sustainability and Sustainable Biorefineries | Daniel S. Wendt | David Hodge |
| Reactor Engineering for Biomass Feedstocks | Michael J. Antal Jr. | Yukihiko Matsumura, Kazuhiro Mochidzuki |
| Sustainable Biomass Feedstock Production and Supply for the Emerging Biorefinery Industry | Tom L. Richard | J. Richard Hess |
| Sustainable Biorefineries Plenary Session (Invited Papers) | David N. Thompson | Bruce S. Dien |

SEF Programming – Sustainable Energy Area (23c)

| Session | Session Chair | Session CoChair |
|--|-------------------|--------------------|
| Increasing Efficiency from Petrochemical Resources | Martin A. Abraham | DongShik Kim |
| Sustainable Electricity: Generation and Storage | Stephen E. Zitney | Martin A. Abraham |
| Sustainable Fuel from Renewable Resources | Ralph W. Pike | Toshikuni Yonemoto |

SEF Award Programs

The AIChE Sustainable Engineering Forum has initiated a new award program – an Industrial Practice in Sustainable Engineering Award. The award recognizes individuals or teams who have made outstanding contributions over a long-term basis pertinent to sustainable engineering development in the practice of chemical process/product design or manufacturing. The award is geared towards applicants from small, medium, or large companies. The applicant's achievements will be based on both publications (articles, patents, and internal reports) and reputation substantiated by at least three (3) written recommendations. The selection of the awardees for a given year will be based on their continued contributions to the development, implementation and dissemination of sustainable engineering practice in the chemical process industry and related fields. Contributions may include paradigms for sustainable development and/or general application of new practices. The awardees need not necessarily be a chemical engineer; however the applicant or at least one member of the team must be a member of the AIChE Sustainable Engineering Forum at the time of application. The Industrial Practice Award is sponsored by the Albemarle Corporation.

The addition of the Industrial Practice Award brings the total number of SEF awards offered to three, including the Student Paper and Research Excellence in Sustainable Engineering Awards, which were initiated in 2008.

The deadline for applications/nominations is September 15, 2009, however late submissions will be accepted depending on the circumstances of the submission.

The awardees for all awards will be announced during the 2009 AIChE Annual Meeting.

For more information regarding how to apply, along with the official award announcements, please visit the "Awards" section of the SEF website (<http://www.aiche.org/sef>).

SEF Leadership Election

As you may have known, the current leadership team will finish its term at the end of the year. This means that the Forum will have a new leadership team for the term of 2010-2011.

According to the Bylaws, the current vice chair of the Forum will automatically succeed to the chair. Thus, the Forum will have the following positions open for

nomination: (i) vice chair, (ii) treasurer, (iii) secretary, (iv) programming chair, (v) award chair, (vi) membership chair, (vii) technical advisor, and (viii) industrial liaison. Note that the current education chair is finishing the first year of service of the two year term, so this position is currently not up for election. In addition to the positions listed above, the chair and vice chair positions of all the three technical areas, Sustainability General, Sustainable Biorefinery, and Sustainable Energy, are open. In total, we will have 13 positions to fill.

Recently, a nomination committee was formed, composed of the Forum's current and past chairs and current vice chair, the executive director of the Institute for Sustainability, and an industrial leader. The committee encourages the SEF members to send nominations (including self-nominations) to Prof. Yinlun Huang via e-mail (yhuang@wayne.edu) by October 7, 2009. Each nomination should include the following information: the nominee's name, affiliation and job function, contact information, the position(s) suitable for the nominee, and the nominee's experience relevant to the position(s). The election result will be announced in late October.

Upcoming SEF Virtual Meetings

Plan to participate in the upcoming virtual meetings for the Renewable Fuels Metrics Roundtable. Their scheduled meetings include:

Date: Wednesday, October 7, 2009

Time: 3:00 pm, EDT

<https://aiche.webex.com/aiche/j.php?ED=111246267&UID=0>

Date: Wednesday, November 4, 2009

Time: 3:00 pm, EDT

<https://aiche.webex.com/aiche/j.php?ED=111246552&UID=0>

Date: Tuesday, November 10, 2009

Time: 4:00 pm – 6:00 pm, CDT

<https://aiche.webex.com/aiche/j.php?ED=111246582&UID=0>

NOTE: This meeting will also be held in person at the AIChE Annual Meeting in Nashville, TN.

Date: Wednesday, December 2, 2009

Time: 3:00 pm, EDT

<https://aiche.webex.com/aiche/j.php?ED=111246797&UID=0>

Date: Wednesday, January 6, 2010

Time: 3:00 pm, EDT

<https://aiche.webex.com/aiche/j.php?ED=111246812&UID=0>

What would you like to learn about in 2010? Please provide your ideas for virtual meetings to Earl Beaver at erbeav@aol.com. Additionally, if you would like to volunteer yourself or a colleague as a presenter, please contact Earl Beaver directly.

Past SEF Virtual Meetings

For additional information regarding past and upcoming virtual meetings, please visit the "Events" → "Virtual Meetings" section of the SEF website (<http://www.aiche.org/sef>).



Please contact Earl Beaver if you are interested in a detailed summary of the main discussion points from these previous virtual meetings or for suggestions for future virtual meeting topics.

SEF ACTIVITIES

1st International Congress on Sustainability Science & Engineering: Where Science & Engineered Technologies Meet the Needs of Society – Meeting Recap

The 1st International Congress on Sustainability Science and Engineering (ICOSSE Aug 09) was held at the Kingsgate Marriott Hotel in Cincinnati, Ohio on August 9 – 12, 2009. The Congress looked to address the multidisciplinary nature of industrial sustainability along the supply chain. This was accomplished by discussing the scientific and technological aspects of sustainability, particularly in the industrial setting.



The Congress, which was very well attended, consisted of 11 sessions, including a plenary session with speakers from the University of Surrey, BASF Corporation, Procter & Gamble, Hewlett Packard, and General Motors. Also included were special sessions by NIST and CSTP as well as judged student and general poster sessions.

The Congress officially ended during the closing banquet on August 12th and was followed by a one day Workshop on Water Resources on August 13, 2009.

The Congress was sponsored by the U.S. EPA, NSF, NIST, the University of Kentucky, and AIChE's

Sustainable Engineering Forum, and supported by ASME, ACS Green Chemistry Institute, IChemE, and AIME. Corporate sponsors to date include Lexmark, Proctor & Gamble, and Toyota

Select presentations from the Congress will be posted at:

<http://www.aiche.org/IFS/Conferences/ICOSSE09.aspx>

Look for future publications from the Congress. If you want to engage in the participation or Sponsorship of ICOSSE'11, contact ifs@aiche.org.

Thank you to all participants and we look forward to seeing you all at the next Congress!

Student Poster Paper Competition in ICOSSE '09

During the ICOSSE conference, a short award ceremony was held in the poster session area. Each winner was recognized with a plaque. The Institute for Sustainability also generously provided a cash award of \$300 to each winner. Moreover, each winner will receive a travel grant of \$300, if attending the SEF sessions of the AIChE Annual National Meeting in Nashville, TN this year. More information regarding the winners can be found below in the Education Column.

The four winning posters can also be viewed at the SEF website: <http://www.aiche.org/sef> (see the News section).



Student poster awardees with judges and conference organizers.



ICOSSE student attendees gathered at a local restaurant after the poster competition.

SEF to Co-sponsor Second Sustainability-Focused International Conference

The 2nd International Symposium on Sustainable Chemical Product and Process Engineering will be held in Hangzhou, China, May 9-12, 2010. This symposium is sponsored by the China National Science Foundation and the U.S. National Science Foundation. SEF is one of the co-sponsors.

The symposium will provide a unique forum for researchers, scientists, and practitioners to assess and critique the current status and future directions of research and development in integrating sustainability into chemical product and process systems engineering. The theme for the symposium will be Design for Sustainability. Key thrust areas of the symposium include:

- Green chemistry and engineering in product design
- Emerging technologies (nanotech, biotech, and IT) in product design
- Multiscale systems science and engineering in sustainability
- Integrated material, product, and process design
- Alternative and renewable energy and systems
- LCA and systems analysis and decision making for sustainability
- Sustainable chemical processing
- Green reaction engineering & separation
- Value/supply chain and large scale system sustainability

Please visit the conference website for more detailed information:

<http://www.gct.zjut.edu.cn/>

The host city, Hangzhou, is one of the most beautiful cities in China, and is located in the Yangtze River delta approximately 120 miles southwest of Shanghai. Throughout its long history, Hangzhou has been famed both for its attractiveness and prosperity, and has occupied a very unique place in China's cultural landscape, attracting millions of visitors a year.



EDUCATION COLUMN

Jeffrey Seay
Chair, Education Committee
jseay@engr.uky.edu

Student involvement in sustainability science and engineering across disciplines is a vital part of increasing the awareness of the importance of this growing field. Moving forward, engineers must be versed in incorporating the needs of society and the environment along with the traditional economical considerations. Therefore, it is important to not only introduce students to the latest research in sustainability science and engineering, but also encourage their further participation by recognizing outstanding student achievement in this area.

Last month, the 1st International Congress on Sustainability Science and Engineering was held in Cincinnati, Ohio. This congress was co-sponsored by the SEF, along with the Institute for Sustainability, the National Science Foundation, the National Institute for Standards and Technology, the U.S.

Environmental Protection Agency and the University of Kentucky. More than 200 participants from industry, academia and government attended the congress.



Student and faculty involvement was encouraged through numerous travel grants funded by the National Science Foundation. A special student poster competition was held to give participating students the opportunity to showcase their research. Competition judges, Jane Bare from the U.S. EPA, Cristina Piluso from BASF Corporation and Mario Eden, from Auburn University judged the entries for creativity, presentation and research contribution. Awards for Best Poster were given in Undergraduate and Graduate categories.

Undergraduate awardees were:

Luke Richardson, from the University of Kentucky, for his poster titled: "Optimizing the Catalytic Cycle for the Dehydration of Biobased Glycerol to Economically Viable C3 Compounds".

Michaelangelo Tabone, from the University of Pittsburgh, for his poster titled: "Useful Metrics for Evaluating Energy Legislation in U.S. Congress".

Graduate awardees were:

Zheng Liu, from Wayne State University, for his poster titled: "A Fuzzy-Logic Based Triple-A Template for Industrial Sustainability Enhancement".

Fernando Merida-Figueroa, from the University of Puerto Rico at Mayagüez, for his poster titled: "Kinetics and Modeling of co-Fermentation Using *Saccharomyces Cerevisiae* and *Ipichia Stipitis* in Glucose and Xylose Media for Bioethanol Production".

Congratulations to all the participants for their excellent research work.

Any correspondence with regard to this column should be sent by e-mail to Jeff Seay, Education Committee Chair, at the following address: "jseay@engr.uky.edu". As always, we look forward to hearing from you.

MEMBER COMMUNICATIONS

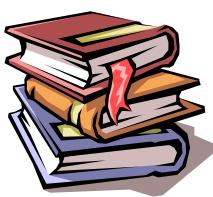
Not Yet a Member of SEF?

Not a member of AIChE or the Sustainable Engineering Forum? In order to guarantee that you are on the current email list and will have access to all existing SEF materials, please follow the link and make sure that you join the SEF!

<https://www2.aiche.org/SolutionSite/default.aspx?tabid=168&action=MBRProductDetails&args=35&aicheskin=aiche>.

Sustainability Readings

Lists of valuable sustainability related reading materials, as assembled by Earl Beaver, are available on the SEF website. Anyone interested in learning more regarding the areas of sustainability, global climate change, and how sustainable companies make decisions, please visit the "Readings" section of the SEF website (<http://www.aiche.org/sef>).



IfS UPDATES

CSTP Updates

The Center for Sustainable Technology Practices 2009 projects of relevance to industry include the

Supply Chain Management Roundtable, Renewable Fuels Metrics Roundtable, Carbon Measurement, and Total Cost Assessment. For additional information, contact ifs@aiche.org.

Other Upcoming Events:

Plan to participate in the upcoming AIChE Sustainable Index Roundtable at the AIChE Annual Meeting in Nashville on Wednesday November 11, 2009 from 3 – 7 pm.

The Founder Society Technologies for Carbon Management Project is hosting two workshops this fall with the ASCE, ASME, IEEE, and AIME. The workshops are:

Carbon Management: Gaps and Barriers
October 21-22, 2009
Baltimore, MD

Green House Gas Measurement
December 7-8 , 2009
Scottsdale, AZ

To learn more, visit the Founder Society Carbon Management Website.

If you are interested in participating in any of the above events or are interested in more information, please contact ifs@aiche.org.



We've Graduated!!
From a Topical



Beginning in 2009 we will permanently join
Division 23: Sustainable Engineering Forum
as:

Area 23b: Sustainable Biorefineries

Thank you for your past support of the Topical and please participate in **Area 23b** sessions at the Annual Meeting in Nashville this year!!

SEF LEADERSHIP (2008-2009)

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|------------------------------------|--|
| Chair | Yinlun Huang, Professor Dept. of Chem. Eng. & Mat. Sci. Wayne State University Detroit, MI 48202 E-mail: yhuang@wayne.edu |
| Vice Chair | Helen Lou, Associate Professor Dept. of Chem. Eng. Lamar University Beaumont, TX 77710 E-mail: Helen.Lou@lamar.edu |
| Treasurer | Robert Hesketh, Professor and Chair Dept. of Chem. Eng. Rowan University Glassboro, NJ 08028 E-mail: hesketh@rowan.edu |
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| Membership Committee Chair | Raymond Smith National Risk Management Research Lab/USEPA Cincinnati, OH 45268 E-mail: Smith.Raymond@epamail.epa.gov |

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|---|--|
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| General Area | Benson Pair, Chief Technology Engineer KBR Houston, TX 77002 E-mail: Benson.Pair@kbr.com |
| Sustainable Energy Area | Martin Abraham, Dean College of Sci., Tech., Eng. and Math. Youngstown State University Youngstown, OH 44555 E-mail: martin.abraham@ysu.edu |
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