



# AIChE Sustainable Engineering Forum Newsletter

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## MESSAGE FROM CHAIR

The Sustainable Engineering Forum has made great strides over the course of the last three months since our last publication. Our entire leadership team has continued their hard work in initiating new programs and improving upon existing initiatives.

I would like to first thank our Awards Committee Chair, Thomas Marrero and all the committee members for their work and dedication to selecting the inaugural awardees of our Research Excellence and Best Student Paper Awards. Dr. Subhas Sikdar was selected as the recipient of The Research Excellence in Sustainable Engineering Award for his scholarship and leadership among the sustainability community. Ms. Cristina Piluso, a Ph.D. student at Wayne State University, and Ms. Ana Carvalho, a Ph.D. student at the Technical University of Denmark and the Instituto Superior Técnico-Portugal, were selected as the winners of the Student Paper Awards. Congratulations to all three on their selection as recipients of these prestigious awards. As discussed later in the newsletter, the awards will be presented during the AIChE Annual Meeting in Philadelphia in November.

Furthermore, regarding the upcoming annual meeting in Philadelphia, we have four distinguished speakers lined up for the plenary session of the Topical Conference on Sustainability on November 18<sup>th</sup>. The SEF is sponsoring/co-sponsoring a total of over 30 sessions, in three Topicals, containing numerous leading edge sustainability related oral and poster presentations.

Additionally, the SEF is looking to initiate an industrial award program, to be awarded during the AIChE Spring 2009 Meeting, and is working on the development of sustainability related educational modules for use in undergraduate and graduate courses, an effort led by Dr. Robert Hesketh. In addition, the SEF will be co-sponsoring the First International Congress on Sustainability Science and Engineering along with the EPA, NIST, and NSF. The Congress will be held August 9 – 13, 2009 in Cincinnati, OH. As a benefit to our SEF membership, the SEF will support members for presenting a paper during the Congress by way of covering partially registration fee. Each of these activities is discussed in further detail later in the newsletter. Furthermore, as always, the SEF co-sponsors a series of virtual meetings, which cover a broad spectrum of sustainability topics. Please check the newsletter for a complete list of upcoming virtual meetings, we hope you find the topics interesting and that you participate in them.

I hope the information supplied in this newsletter is of interest to you. The entire SEF leadership committee thanks the membership for your support, as you are key in the success of the Forum.

Yinlun Huang  
Chair, Sustainable Engineering Forum

## ANNOUNCEMENTS

### AIChE 2008 Annual Meeting – SEF Programming

The AIChE 2008 Annual Meeting is quickly approaching, to be held November 16-21, 2008 in Philadelphia, PA. The SEF will sponsor three topical sessions, a Sustainability Topical (Topical E), which contains 9 oral and 1 poster session, a Sustainable Biorefineries Topical (Topical 4), which includes 13 oral and 1 poster session, and a Green Engineering and Sustainability in the Pharmaceutical Industry Topical (Topical 5). The SEF will sponsor this Topical in conjunction with the Pharmaceutical Division, which will include 6 oral sessions, a poster session, and a speaker luncheon. The full listing of SEF programming is provided in the tables below:

For more detailed information regarding all programming at the Annual meeting, please visit: <http://aiche.confex.com/aiche/2008/preliminaryprogram/index.html>

#### **Topical E: Sustainability**

##### **Tuesday, November 18, 2008**

3:15 PM-5:45 PM

#380 – Sustainability Plenary (TE003)

##### **Wednesday, November 19, 2008**

8:30 AM-11:00 AM

#449 – Sustainability Education (TE007)

12:30 PM-3:00 PM

#512 – Sustainable Energy (TE006)

3:15 PM-5:45 PM

#563 – Sustainable Fuels (TE004)

6:00 PM-8:30 PM

#573 – Poster Session: Sustainability & Sustainable Biorefineries (T4011)

##### **Thursday, November 20, 2008**

8:30 AM-11:00 AM

#586 – Design for Sustainability (TE001)

12:30 PM-3:00 PM

#663 – Practical Approaches to Sustainability & Business Success (TE002)

3:15 PM-5:45 PM

#713 – Prediction of Sustainability Performance by Computation (TE008)

#### **Topical E: Sustainability (cont'd)**

##### **Friday, November 21, 2008**

8:00 AM-10:30 AM

#747 – Towards Sustainable Processes (TE009)

10:30 AM-1:00 PM

#750 – Systems Analysis of Sustainability (TE005)

#### **Topical 4: Sustainable Biorefineries**

##### **Wednesday, November 19, 2008**

8:30 AM-11:00 AM

#450 – Sustainable Biorefineries Plenary (T4001)

12:30 PM-3:00 PM

#460 – Biological Conversions & Processes for Renewable Feedstocks (T4006)

#511 – Sustainable Biomass Feedstock Production & Supply for the Emerging Biorefinery Industry (T4002)

3:15 PM-5:45 PM

#542 – Life Cycle Analysis of Renewable Feedstock – Based Processes & Products (T4010)

6:00 PM-8:30 PM

#573 – Poster Session: Sustainability & Sustainable Biorefineries (T4011)

##### **Thursday, November 20, 2008**

8:30 AM-11:00 AM

#584 – Chemical & Catalytic Conversions & Processes for Renewable Feedstocks I (T4007)

#617 – Pretreatment of Lignocellulosic Biomass & Interactions with Other Processing Steps I (T4004)

12:30 PM-3:00 PM

#636 – Chemical & Catalytic Conversions & Processes for Renewable Feedstocks II (T4012)

#639 – Developments in Biobased Alternative Fuels I (T4009)

#664 – Pretreatment of Lignocellulosic Biomass & Interactions with Other Processing Steps II (T4013)

#### Topical 4: Sustainable Biorefineries (cont'd)

Thursday, November 20, 2008

3:15 PM-5:45 PM

#689 – Developments in Biobased Alternative Fuels II (T4000)

#696 – Integrated Processes for Biochemical Conversion of Renewable Feedstocks to Fuels & Chemicals (T4008)

Friday, November 21, 2008

8:00 AM-10:30 AM

#743 – Reactor Engineering for Biomass Feedstocks (T4005)

10:45 AM-1:15 PM

#757 – Catalytic Conversion of Renewable Resources to Synthesis Gases & Pyrolysis Oils (T4003)

#636 – Chemical & Catalytic Conversions & Processes for Renewable Feedstocks II (T4012)

#639 – Developments in Biobased Alternative Fuels I (T4009)

#664 – Pretreatment of Lignocellulosic Biomass & Interactions with Other Processing Steps II (T4013)

#### Topical 5: Green Engineering & Sustainability in the Pharmaceutical Industry

Monday, November 17, 2008

8:30 AM-11:00 AM

#13 – Benign / Safer Solvents in Pharmaceutical Processing (T5002)

12:30 PM-3:00 PM

#107 – Pharmaceutical Environmental Metrics – LCA (T5003)

3:15 PM-5:45 PM

#134 – Batch to Continuous Pharmaceutical Processing Challenges (T5007)

Tuesday, November 18, 2008

8:30 AM-11:00 AM

#223 – Green Reactions in the Pharmaceutical Industry (T5004)

12:30 PM-3:00 PM

#290 – Green Separations in the Pharmaceutical Industry (T5008)

3:15 PM-5:45 PM

#351 – Government Programs & Partnerships (T5006)

#### Topical 5: Green Engineering & Sustainability in the Pharmaceutical Industry (cont'd)

Wednesday, November 19, 2008

3:00 PM-5:30 PM

#517 – Poster Session: Green Engineering & Sustainability in the Pharmaceutical Industry (T5001)

#### AIChE 2008 Annual Meeting – Sustainable Engineering Forum and Green Engineering in the Pharmaceutical Industry Luncheon

The SEF will co-sponsor a luncheon, together with the ACS GCI Pharmaceutical Roundtable, during the AIChE Annual Meeting in Philadelphia. The event is organized and arranged as part of the SEF Topical 5: Green Engineering and Sustainability in the Pharmaceutical Industry.

The luncheon speaker will be Dr. Karen Klimas, Vice-President of Global Safety and the Environment with Merck & Co., Inc. Her talk will discuss “The Road to a Sustainable Future for the Pharmaceutical Industry.” Advanced registration is required.

Date: Wednesday, November 19<sup>th</sup>, 2008

Time: 11:15 a.m. - 12:15 p.m.

Location: Philadelphia Marriott/Pennsylvania Convention Center, Room: TBD

Cost: \$15/person

#### Additional Sustainability Events in Philadelphia

In addition to the excellent sustainability technical programming at the Annual Meeting in Philadelphia, there are a number of associated events that members of the SEF should consider attending.

**Monday, November 17: 12:30 pm - 3 pm.** Student Poster Session: Excellence in Addressing Societal Issues with Engineering Expertise

The poster session is sponsored by the Youth Council on Sustainable Science and Engineering, the Sustainable Engineering Forum, the Government Relations Committee, and the AIChE Energy Initiative.

Posters will include:

- The award winning effort from Rowan University Chemical Engineers on Green Engineering Research
- Lafayette College's project on biofuels and the CSTP Sustainability Roadmap

- EPA P3 winners from MIT on Energy sustainability
- University of Idaho YCOSST EPA P3 Winners on sustainable design
- The 2008 Sustainable Engineering Forum's Outstanding Student Paper
- The three 2008 Washington Interns for Students of Engineering projects (two are energy policy, one on bio research policy)
- Perspectives of Barclay Satterfield, recent Chemical Engineering Ph.D. working as a fellow with the US Congress in 2008

**Tuesday, November 18: 2 pm.** Robert Sylvester of DuPont will present the Sustainability 101: "Sustainability Actions an Individual Can Take." Contact [ifs@aiche.org](mailto:ifs@aiche.org) for registration information. This short course is offered free of charge; register when you sign up for the conference. In addition, even if you can't attend the Philadelphia meeting, the course will also be available via live webcast from Philadelphia as an SEF virtual meeting.

**Wednesday, November 19: 12:00 pm.** Pharmaceutical Topical and SEF Luncheon

**Wednesday, November 19: 4:30 pm - 7:30 pm.** Center for Sustainable Technology Practices Annual Meeting

CSTP will meet on Wednesday November 19 from 4:30 to 7:30 pm to discuss project plans for 2008. They will also be issuing the CSTP Sustainability Guide at the meeting.

**Friday, November 21: 8 am – 5 pm.** IfS Total Cost Assessment Users Meeting and Workshop

In this workshop, which consists of the one day Short Course, followed by a web meeting, we will conduct a total cost assessment using the expertise of the assembled group. In addition to preparatory exercises, the group will have the opportunity to participate in the TCA with an experienced facilitator. We will explore what works well and what are stumbling blocks to success.

The Total Cost Assessment (TCA) methodology relies on interdisciplinary expertise combined with advanced computing power to determine the risks associated with a decision. This financial analysis goes beyond traditional cost accounting to show the various possible futures: worst case, blue sky, and most probable results. The Total Cost Assessment process produces valuable insight into a decision, such as areas where risks can and should be

minimized, and where costs associated with intangibles: morale, community relations, and/or brand value; are significant enough to counterbalance traditional financial analysis. Businesses have used TCA to analyze environmental and health management systems, investment in new technologies, and mergers and acquisitions among others.

After class, the instructor will use a TCA tool to crunch the scenarios defined during the workshop. The participants will get an e-mailed copy of the model in about two weeks. Participants will then have the opportunity to assemble the final report using the results obtained from the tool. We will conclude with a presentation of the results during a web conference (scheduled to include as many participants as possible) including a discussion of sensitivity analysis, results achieved, and how to present the results to others.

You should attend if you are: looking to connect the triple bottom line to your company's profitability, facing a decision with considerable risk but an apparently high payback from a conventional accounting approach, interested in converting environmental and social impacts or the results of your risk analysis into monetary value.

To register or for additional information, contact [ifs@aiche.org](mailto:ifs@aiche.org). There is a fee for this workshop.

### SEF Announces Award Program Winners

This past summer, the AIChE Sustainable Engineering Forum initiated two new award programs – a Research Excellence Award and a Student Paper Award.

The **Research Excellence Award** is designed to recognize one who has made significant technical contributions to the advancement of sustainable engineering in research, teaching, and development activities.

Dr. Subhas K. Sikdar was selected as the first winner of The Research Excellence in Sustainable Engineering Award, 2008. Dr. Sikdar has had a long and productive career



with the Environmental Protection Agency in directing programs in Sustainable Technology and

related research. Currently, Dr. Sikdar is Associate Director for Science at the National Risk Management Research Laboratory, Office of Research and Development (ORD), U.S. EPA, in Cincinnati.

Prior to joining the EPA, Dr. Sikdar was a Section chief with NIST, Boulder, CO for technology development of various transport processes and a manager of process technology for Corporate R&D, General Electric in plastics and silicone businesses. He also helped engineer new manufacturing processes for the Occidental Research Corporation. Dr. Sikdar's career in industry and government started in 1975 after earning his doctorate from the University of Arizona, Tucson.

Dr. Sikdar has received many significant Honors and Awards during his exemplary career.

The **Student Paper Award** is presented to full-time undergraduate or graduate students who prepare the best technical papers that describe results related to engineering and sustainability. The SEF Awards Committee has selected two graduate students as the inaugural 2008 Sustainable Engineering Forum Student Paper Award winners, Ms. Ana Carvalho and Ms. Cristina Piluso.

Ms. Ana Carvalho is a graduate student at the Technical University of Denmark and the Instituto Superior Técnico-Portugal. The basis for Ana's selection by the Awards Committee was her published paper entitled, "Design of Sustainable Chemical Processes: Systematic Retrofit Analysis Generation and Evaluation of Alternatives." This paper was co-authored by R. Gani and H. Matos, and published in *Process Safety and Environment Protection* 86 (2008) 328-346. Ms. Carvalho's, *et al.*, paper determines a set of mass and energy indicators from steady-state process data that are used to identify design alternatives. The indicators are also able to set safety indicators, in certain cases. The methodology can be used to define design targets and to generate sustainable process alternatives. This new methodology was illustrated by evaluation of vinyl chloride monomer, production.



Ms. Cristina Piluso is a graduate student at Wayne State University, Detroit, MI. The Awards Committee selected Ms. Piluso on the basis of her



publication, "Ecological Input-Output Analysis-Based Sustainability Analysis of Industrial Systems," which was published in *Industrial and Engineering Chemistry Research* 47 (2008) 1955-1966. This paper was co-authored by Y. L. Huang and H. H. Lou. Ms. Piluso's, *et al.*, creates a systematic analysis methodology capable of evaluating various decisions related to improving sustainable industrial development at a plant, industry, and region. The systematic analysis utilizes an extended Ecological Input-Output Analysis (EIOA) method. Ms. Piluso's systematic methodology allows industrial entities to understand their current status of sustainable development and to evaluate various potential future production schedules that provide a best route toward improved industrial sustainable development.

The awards will be presented during the SEF and Green Engineering in the Pharmaceutical Industry Luncheon during the AIChE Annual Meeting in Philadelphia on Wednesday, November 19, 2008.

### Upcoming SEF Virtual Meetings

The AIChE Institute for Sustainability (IFS) and Sustainable Engineering Forum (SEF) invite participation in their upcoming webcasts on sustainability.



The standing call in number for all meetings is (303) 928-2693, meeting number 3329706.

- Tuesday October 21<sup>st</sup>, 2008, 2 pm ET: "Sustainability and the Olympics"
- Tuesday November 18<sup>th</sup>, 2008, 2 pm ET: "Sustainability Actions an Individual Can Take." Hosted by Robert Sylvester of DuPont during the AIChE Annual Meeting in Philadelphia.
- Tuesday December 16<sup>th</sup>, 2008, 2 pm ET: Sustainability and the Packaging Industry

For the most up-to-date and current listing of upcoming SEF Virtual Meetings, please visit: <http://www.aiche.org/IFS/Products/Virtual.aspx>.

For more information regarding each virtual meeting or to register, contact [ifs@aiche.org](mailto:ifs@aiche.org).







