

# TECHNICAL SESSIONS IN BIOLOGICAL ENGINEERING

**NOVEMBER 8-13, 2009**  
**PROGRAM GUIDE**





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**ESTABLISHED BY AIChE, THE SOCIETY FOR BIOLOGICAL ENGINEERING IS A TECHNOLOGICAL COMMUNITY FOR ENGINEERS AND APPLIED SCIENTISTS INTEGRATING BIOLOGY WITH ENGINEERING.**

**MEMBERSHIP**

Our members come from a broad spectrum of industries and disciplines and work on bioprocessing, biomedical and biomolecular applications.

**SBE OFFERS ITS MEMBERS:**

- An international professional network—share ideas and experience with your peers and colleagues from around the world.
- Discounts on the leading biological engineering conferences— SBE members are eligible for substantial discounts on society sponsored meetings and conferences.
- News that is relevant and what you need to know—members receive SBE's monthly e-newsletter and semi-annual supplement to *Chemical Engineering Progress*.
- A voice in education, employment and technology advancement topics. Visit our posting of job opportunities on our website <http://bio.aiche.org>
- Free periodic webinars will be coming shortly. Visit us at [www.aiche.org/sbe](http://www.aiche.org/sbe) for updated information.

**SBE PROVIDES ITS MEMBERS WITH A PROFESSIONAL NETWORK WITH BROAD PERSPECTIVES, RELEVANT INFORMATION, AND HORIZON-EXPANDING OPPORTUNITIES. WE INVITE YOU TO JOIN TODAY.**

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**ANNUAL DUES IS JUST \$75 FOR PROFESSIONALS OR \$25 FOR GRADUATE STUDENTS.**

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## SBE ACKNOWLEDGEMENTS

AIChE's Annual Meeting could not happen without the support of its volunteers. Leaders of and within the divisions and forums all have worked tirelessly to provide the bio-programming. SBE would like to recognize not only these divisions but also their program chairs (when possible) as follows. Please excuse any omissions as they were unintentional.

- **Sanjeev Katti** and **Dhinakar Kompala** of the Catalysis and Reaction Engineering Division.
- **Lorenz Biegler** of the Computing and Systems Technology Division
- **Vasilios Manousiouthakis** of the Environmental Division
- **Qixin Zhong, Jennifer Kuehne, John Morgan** and **Daniel Pack** of the Food, Pharmaceutical and Bio-Engineering Division
- **Dr. B.V. Ramarao** of the Forest Products Division
- **Rick Mallinson** and **Galen Suppes** of the Fuel and Petrochemicals Division
- **Jack Hipple** of the Management Division
- **Donald Baird** of the Materials Engineering and Sciences Division
- **Ron Denney** of the Nuclear Engineering Division
- **Annette Johnston, Joe Powell** and **Shawna Berg** of the Process Development Division
- **David Clark** and **Jack Chosnek** of the Safety and Health Division
- **Daniela Mainardi** of the Transport and Energy Processes Division
- **Clare McCabe** of the Computational Molecular Science and Engineering Forum
- **Venkat Bhethanabotla** of the Nanoscale Science and Engineering Forum
- **Gary Patterson** of the North American Mixing Forum
- **Dr. Benson Pair** of the Sustainability Engineering Forum and **David Thompson** and **Bruce Dien** for their tireless work developing the Sustainable Biorefineries Program
- **Dr. Manuk Colakyan** of the Particle Technology Forum

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## SPECIAL BIO-PROGRAMS AT THE 2009 AIChE ANNUAL MEETING

BE SURE TO ATTEND THESE CONFERENCE HIGHLIGHTS:

### CELL CULTURE ENGINEERING - DRIVING INNOVATION AND EXTENDING THE HORIZON IN BIOTECHNOLOGY

Wei-Shou Hu, University of Minnesota

During the Food, Pharmaceutical and Bioengineering Division Plenary Session

Monday, November 9, 2009: 8:30 AM – 11:00 AM

Gaylord Opryland Hotel Bayou C

### SBE'S BIOENERGY SYMPOSIUM: TRANSPORTATION FUELS FROM COAL AND BIOMASS: REVIEW OF AN NRC REPORT

Chairs:

- Michael P. Ramage, ExxonMobil Research and Engineering
- Gregory N. Stephanopoulos, W.H. Dow Professor, Department of Chemical Engineering, MIT
- James Katzer, Executive Director, MIT Coal Study
- James L. Sweeney, Department of Management Science and Engineering, Stanford University

Monday, November 9th from 3:15-5:45 pm

Gaylord Opryland Hotel Delta Ballroom A

This session will explore the technological status, costs, and environmental impacts of coal and biomass conversion.

### JAMES E. BAILEY AWARD LECTURE: "A TALE OF TWO ENERGY PROBLEMS: FUEL SHORTAGE AND OBESITY"

James C. Liao, University of California, Los Angeles

Tuesday, November 10th, 6:00-7:00 pm

Gaylord Opryland Hotel Tennessee Ballroom C

This award has been endowed by Cytos Biotechnology

### SBE'S HOSPITALITY SUITE

Free to SBE members. You can become a member at the door and join us for a fun evening.

Tuesday, November 10th, 9:00-11:00pm

LOCATION? TBD WAITING ON ILIA

### STUDENT POSTER SESSION – PHARMACEUTICALS, BIOENGINEERING, ENGINEERING FUNDAMENTALS IN LIFE SCIENCES. FOOD SCIENCE AND ENGINEERING

Cosponsored with Food, Pharmaceutical and Biotechnology Division (15)

Wednesday, November 11, 2009: 6:00 PM

Gaylord Opryland Hotel Ryman Hall B1/B2

SBE strives to encourage and recognize undergraduate and graduate students in biological engineering and related fields. SBE is currently sponsoring a \$1000 award for the Best Use of a Biological Reaction to Power a Car during this year's Chem-E-Car Competition held on November 7 and 8.

Connect with a global technological community  
Join SBE now at <http://bio.aiche.org>

## UPCOMING SBE CONFERENCES

# SBE'S 2ND INTERNATIONAL CONFERENCE ON STEM CELL ENGINEERING

**December 2-5, 2010**  
**Hyatt Harborside Hotel**  
**Boston, MA**

Biologists and engineers must work together to combine basic and translational research in fields that will impact health care in the coming years, particularly the promising field of stem cells. This Gordon-style conference emphasizes how basic and applied efforts in stem cell biology and engineering can combine to aid in the development of stem cell therapeutics and bioprocesses. By bringing together the bioengineering and stem cell biology communities we will be able to accelerate progress towards innovative solutions to basic and translation problems in regenerative medicine. Topics emphasize how quantitative approaches can yield an increased understanding of the biological mechanisms that underlie these stem cell fate choices, cancer stem cells, iPS cells, technologies to study stem cell function, and the development of bioprocesses to culture stem cells for commercial applications.

Reflective of the interdisciplinary approach central to this meeting, the International Society for Stem Cell Research (ISSCR) has signed on as a co-sponsor of this event.



### Conference Co-Chairs:

- **George Daley**, Children's Hospital, Harvard Medical School
- **Peter Zandstra**, University of Toronto

### Invited Speakers:

- **Daniel Anderson**, Massachusetts Institute of Technology
- **Kristi Anseth**, University of Colorado
- **James Collins**, Boston University
- **Dennis Disher**, University of Pennsylvania
- **Connie Eaves**, BC Cancer Agency
- **Paul Frenette**, Mount Sinai School of Medicine
- **Wei-Shou Hu**, University of Minnesota
- **Gordon Keller**, University Health Network
- **Hang Lu**, Georgia Institute of Technology
- **Doug Melton**, Harvard University
- **David Mooney**, Harvard University
- **Charles Murry**, University of Washington
- **Ingo Roeder**, Leipzig University
- **Lee Rubin**, Harvard University
- **David Schaffer**, University of California, Berkeley
- **Austin Smith**, Cambridge University
- **Gordana Vunjak-Novakovic**, Columbia University
- **Amy Wagers**, Harvard University

To find out more and register, go to <http://www.aiche.org/StemCellEng>

## UPCOMING SBE CONFERENCES

### THE 5TH INTERNATIONAL CONFERENCE ON BIOENGINEERING AND NANOTECHNOLOGY

August 1-4, 2010  
Biopolis, Singapore

Co-organized by SBE and the A\*STAR Institute for Bioengineering and Nanotechnology

Join us in Singapore for the world's leading cross-disciplinary forum on bioengineering and nanotechnology, and find out more about the latest advances in science, engineering and medicine.

#### Conference Topics:

- Drug, protein and gene delivery systems
- Cell therapy, tissue engineering and regenerative medicine
- Artificial organs and implants
- Bio-MEMS, microbioreactors and biological devices
- Biosensors and molecular diagnostics
- Drug screening and pharmaceuticals synthesis
- Biofuel and energy conversion and sustainable technology
- Biological and biomedical imaging
- Biomimetic and self-assembled materials
- Nanoparticles, nanocomposites and nanoporous materials for bio-applications

#### Conference Chair:

Professor Jackie Y. Ying, Executive Director, Institute of Bioengineering and Nanotechnology

[www.icbn2010.com](http://www.icbn2010.com)

### SBE'S 3RD INTERNATIONAL CONFERENCE ON BIOMOLECULAR ENGINEERING

January 16-20, 2011  
Grand Hyatt San Francisco  
San Francisco, CA

**How can biomolecular engineering address grand challenges in healthcare and the environment?**

SBE's 3rd International Conference on Biomolecular Engineering brings together researchers using quantitative approaches to advance the understanding and application of biology at the molecular level. These approaches are contributing to the development of analytical, diagnostic, and therapeutic strategies that are directly relevant to public health.

#### Conference Co-Chairs:

Kurt Deshayes, Genentech  
Jeff Varner, Cornell University

#### Keynote speakers include the following experts:

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Learn more at <http://www.aiche.org/ICBE>

**For more information, a complete program is available at**  
<http://www.aiche.org/sbe/events/national.aspx>

# MONDAY, NOVEMBER 9, 2009

TIME	SESSION #	SESSION TITLE	ROOM	
8:30am-11:00am	8	Advances in Biomaterial Evaluation	Jackson F	
	11	Agglomeration and Granulation Processes	Governor's Chamber D	
	12	Best Practices in Process Development	Jackson E	
	13	Bio-Based Composites	Cheekwood G	
	14	Biobased Materials - I	Cheekwood H	
	15	Biomaterial Scaffolds for Tissue Engineering	Jackson B	
	16	Chemical Looping Processes - I	Ryman A	
	23	Education Issues in Nanotechnology	Lincoln A	
	24	Environmental Applications of Nanotechnology and Nanomaterials	Governor's Chamber C	
	26	Food, Pharmaceutical and Bioengineering Plenary Session "Cell Culture Engineering - Driving Innovation and Extending the Horizon in Biotechnology", Wei-Shou Hu, University of Minnesota	Bayou C	
	27	Fundamentals of Environmental Biotechnology	Bayou E	
	34	Intracellular Processes	Ryman F	
	37	Mathematical Modeling of Transport Processes	Hermitage E	
	38	Micro- and Nanodevices for Targeted Therapeutics	Presidential Boardroom B	
	41	Nanofabrication and Nanoscale Processing	Bayou D	
	42	Nanomaterials for Energy Storage I	Delta Ballroom D	
	43	Nanoscale Structure in Polymers I	Cheekwood C	
	47	Paradigms in Systems Biology - Invited Session	Bayou B	
	50	Polymer Processing and Rheology I	Tennessee D	
	56	Solids Handling and Processing	Governor's Chamber A	
	58	Student Poster Session: Computing and Process Control	Ryman Hall B1/B2	
	62	Student Poster Session: Food, Pharmaceutical, and Biotechnology	Ryman Hall B1/B2	
	12:30pm-3:00pm	71	Advances in Biocatalysis and Biosynthesis I	Bayou C
		72	Advances in Electrokinetics and Electrophoresis - Particles and Biomolecules	Canal A
		75	Biobased Materials - II	Cheekwood H
		76	Biomass Pretreatment Cafi Developments	Governor's Chamber C
		77	Biomimetic Materials	Jackson F
		80	Catalytic Biofuel Refining	Ryman C
		83	Characterization and Measurement in Powder Processing	Governor's Chamber D
		90	Fundamental Research in Transport Processes	Hermitage E
		93	Gene Delivery From Tissue Engineering Scaffolds	Jackson B
		94	In Silico Systems Biology: Cellular and Organismal Models	Canal C
95		Interfacial Aspects in Nanosensors	Governor's Chamber B	
96		Intracellular Processes II	Ryman F	
98		Micro and Nanofabricated Sensors. In Honor of CC Liu I	Belle Meade C/D	
101	Modeling and Optimization for Manufacturing and Process Development	Jackson E		
102	Molecular Modeling of Biophysical Processes I	Bayou A		
103	T5000 Nanomaterials for Energy Storage II	Delta Ballroom D		
104	Nanoscale Materials as Catalysts I	Lincoln C		
105	Nanoscale Structure in Polymers II	Cheekwood C		

## MONDAY CONTINUED

TIME	SESSION #	SESSION TITLE	ROOM
	110	Polymer Processing and Rheology II	Tennessee D
	114	Self-Assembled Biomaterials	Cheekwood B
	117	Stem Cells in Tissue Engineering	Bayou D
	119	Sustainable Biomass Feedstock Production and Supply for the Emerging Biorefinery Industry	Lincoln A
3:15pm-5:45pm	125	Advances in Algal Biorefineries	Lincoln A
	126	Advances in API Process Development	Bayou B
	127	Advances in Biocatalysis and Biosynthesis II	Hermitage C
	130	Biobased Materials - III	Cheekwood H
	131	Biomimetic Materials II	Jackson F
	132	Catalytic Biomass Conversion to Chemicals	Canal D
	135	Catalytic Processing of Fossil and Biorenewable Feedstocks: Chemicals	Tennessee D
	136	Chemical Engineering Advances in the Processing of Radioactive Waste	Ryman C
	141	DNA Analysis in Microfluidic & Nanofluidic Devices	Canal A
	144	Environmental Aspects of Biofuels: III-Soil/Biomass Pyrolysis	Delta Ballroom C
	148	Fundamental Research in Transport Processes II	Hermitage E
	151	In Silico Systems Biology: Intracellular Signaling and Gene Regulation	Canal C
	154	Micro and Nanofabricated Sensors. in Honor of CC Liu II	Belle Meade C/D
	156	Molecular Modeling of Biophysical Processes II	Bayou A
	157	Nanomaterials for Hydrogen Production and Fuel Cells I	Delta Ballroom D
	158	Nanoscale Materials as Catalysts II	Lincoln C
	159	Nanoscale Structure in Polymers III	Cheekwood C
	160	Nanostructured Biomaterials	Cheekwood B
	164	PAT Applications in Pharmaceuticals and Biopharmaceuticals	Bayou C
170	Stem Cells in Tissue Engineering II	Bayou D	
173	Systems Biology	Jackson C	
176	SBE's Bioenergy Symposium: Transportation Fuels From Coal and Biomass: Review of An NRC Report	Delta Ballroom A	
		<b>Chairs:</b> <b>Michael P. Ramage</b> , ExxonMobil Research and Engineering <b>Gregory N. Stephanopoulos</b> , W.H. Dow Professor, Department of Chemical Engineering, MIT <b>James Katzer</b> , Executive Director, MIT Coal Study <b>James L. Sweeney</b> , Department of Management Science and Engineering, Stanford University	

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# TUESDAY, NOVEMBER 10, 2009

TIME	SESSION #	SESSION TITLE	ROOM	
8:30am-11:00am	184	Advances in Process Intensification I	Jackson E	
	185	Advances in Protein Expression and Post-Translational Modification	Jackson A	
	188	Biomass and Biorenewables Processing Under Pressure	Cheekwood C	
	189	Bionanotechnology: Plenary Session I	Tennessee C	
	190	Biosensor Devices I	Governor's Chamber D	
	191	Catalytic Conversion of Oxygenates	Delta Ballroom C	
	193	Catalytic Processing of Fossil and Biorenewable Feedstocks: Fuels I	Tennessee D	
	196	Chemical and Biological Processes for Woody Biomass Conversion to Fuels and Chemicals - I	Cheekwood F	
	197	Chemical Looping Processes - II	Lincoln C	
	201	Continuous Processing in the Chemical and Pharmaceutical Industry	Bayou C	
	203	Dynamics, Design and Control of Sustainable Processes and Technologies and Associated Waste Management Principles	Belle Meade A/B	
	205	Fluid-Particle Interactions and Processing	Lincoln E	
	208	Gene Delivery - I	Cheekwood B	
	210	Mathematical Approaches in Systems Biology I: Genome Scale Models	Cheekwood H	
	226	Sustainable Biorefineries Plenary Session (Invited Papers)	Delta Ballroom B	
	227	Sustainable Energy Plenary	Bayou E	
	230	Thermodynamics of Protein Folding and Aggregation	Presidential Boardroom A	
	11:15pm-12:15pm	231	Professional Progress Award Lecture	Delta Ballroom A
		12:30pm-3:00pm	233	13 QbD in Bio Process Development and Operation
	234		Advances in Metabolic Engineering for Biofuels	Jackson A
	237		Advances in Process Intensification II	Jackson E
	239		Biological Conversions and Processes for Renewable Feedstocks I	Governor's Chamber A
	240		Biomems and Microfluidics: Cell and Biomolecule Analysis	Canal A
241	Biosensor Devices II		Governor's Chamber D	
243	Catalytic Processing of Fossil and Biorenewable Feedstocks: Fuels II		Tennessee D	
245	Chemical and Biological Processes for Woody Biomass Conversion to Fuels and Chemicals - II		Cheekwood F	
248	Complex-Fluid and Bio-Fluid Dynamics I		Jackson D	
250	Continuous Processing in the Chemical and Pharmaceutical Industry - II		Bayou C	
252	Crystallization of Pharmaceutical and Biological Molecules I		Canal D	
257	Gene Delivery - II		Cheekwood B	
261	Mathematical and Computational Biosystems Engineering		Lincoln A	
262	Mathematical Approaches in Systems Biology II: Probabilistic Processes		Cheekwood H	
264	Networked Process Control		Jackson C	
267	Oxycombustion of Coal - Needs, Opportunities, and Challenges - II		Belle Meade C/D	
275	Sustainable Biofuels and the Impact in the Southeast		Governor's Chamber E	
277	Synthetic Systems Biology I		Delta Ballroom B	
278	Systems Biotechnology		Tennessee C	

## TUESDAY CONTINUED

TIME	SESSION #	SESSION TITLE	ROOM
12:30pm-5:30pm	282	Honorary Series in Biomaterials	Washington B
3:15pm-5:34pm	286	Fundamentals of Interfacial Phenomena III - Biological and Organic Molecules at Interfaces	Governor's Chamber B
3:15pm-5:45pm	290	Biological Conversions and Processes for Renewable Feedstocks II	Governor's Chamber A
	291	Biomacromolecules: Formulation and Delivery	Bayou C
	292	Bionanotechnology Graduate Student Award Session	Tennessee C
	293	Biosensor Devices III	Governor's Chamber D
	295	Catalytic Biomass Pyrolysis and Gasification II	Lincoln C
	297	Catalytic Processing of Fossil and Biorenewable Feedstocks: Fuels III	Tennessee D
	300	Complex-Fluid and Bio-Fluid Dynamics II	Presidential Boardroom A
	303	Crystallization of Pharmaceutical and Biological Molecules II	Canal D
	309	Extraction for Bioseparations	Canal E
	310	Gene Delivery - III	Cheekwood B
	311	Industrial Innovation in Process Design & Operation	Lincoln D
	315	Materials Synthesis and Processing with Compressed or Supercritical Fluids II: Polymers	Cheekwood C
	316	Mathematical Approaches in Systems Biology III: Kinetics and Dynamic Processes	Cheekwood H
	317	Mixing in the Pharmaceutical Industry	Bayou A
	322	Process Control Applications	Lincoln E
	323	Production of Fungible Biofuels From Lignocellulose	Cheekwood F
326	Separations in Biopharmaceutical Downstream Processing	Jackson A	
328	Synthetic Systems Biology II	Delta Ballroom B	
6:00pm-7:00pm	333	<b>James E. Bailey Award Lecture "A Tale of Two Energy Problems: Fuel Shortage and Obesity"</b> James C. Liao, University of California, Los Angeles	Tennessee C
7:00pm-9:00pm		<b>SBE's Hospitality Suite</b> Free to SBE Members You can become a member at the door for \$10 to join us for a fun evening.	TBD

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# WEDNESDAY, NOVEMBER 11, 2009

TIME	SESSION #	SESSION TITLE	ROOM
8:30am-11:00am	346	Biobased Fuels and Chemicals I	Bayou B
	347	Biomaterial-Cell Interactions in Tissue Engineering	Bayou A
	348	Bionanotechnology for Gene and Drug Delivery I	Delta Ballroom D
	355	Developments in the Pretreatment of Lignocellulosics for Bioconversion I	Belle Meade C/D
	363	Innovation in Sustainable Process Engineering	Bayou E
	364	Innovations in Energy Processes	Jackson E
	365	Integrated Biorefineries for Lignocellulosic Biomass	Cheekwood F
	370	Membranes for Bioseparations	Canal C
	372	Mixing in the Biotechnology Industry	Delta Ballroom C
	373	Modeling and Control of Biomedical Systems I	Jackson C
	376	Multiscale Systems Biology	Tennessee D
	378	Plasma Science and Processing	Magnolia Boardroom B
	380	Process Design I	Lincoln D
	381	Protein Engineering I - Therapeutics	Bayou D
12:30pm-3:00pm	389	Advances in Process Control I	Jackson C
	390	Biobased Fuels and Chemicals II	Bayou B
	391	Biomems and Microfluidics: Biomedical Diagnostics I	Canal D
	392	Bionanotechnology for Gene and Drug Delivery II	Delta Ballroom D
	393	Bioreactors in Tissue Engineering	Bayou A
	396	Chemical and Catalytic Conversions and Processes for Renewable Feedstocks	Lincoln C
	406	Developments in the Pretreatment of Lignocellulosics for Bioconversion II	Belle Meade C/D
	410	Genomic Approaches to Systems Biology	Tennessee D
	416	Microfluidics and Small-Scale Flows II: Biological Applications	Presidential Boardroom A
	427	Protein Engineering II - Techniques	Bayou D
	429	Scale-up Issues in Bio/Pharmaceutical Formulation Development	Bayou C
	430	Scale-up Issues in Bio/Pharmaceutical Process Development	Jackson B
	434	Thermochemical Biorefineries I	Cheekwood F
	3:15pm-5:45pm	436	Advances in Bioseparations
438		Advances in Process Control II	Bayou C
440		Biobased Fuels and Chemicals III	Bayou B
441		Biomems and Microfluidics: Biomedical Diagnostics II	Canal D
442		Bionanotechnology for Gene and Drug Delivery III	Delta Ballroom D
443		Bioreactors in Tissue Engineering -II	Bayou A
452		Developments in the Pretreatment of Lignocellulosics for Bioconversion III	Belle Meade C/D
473		Process and Product Development for Sustainability II	Jackson E
474		Protein Engineering III - Applications	Bayou D
475		Proteomics & Metabolomic Approaches to Systems Biology	Tennessee D
476		Reaction Engineering for Biomass Conversion	Jackson D
477		Reactor Engineering for Biomass Feedstocks	Lincoln C
481		Thermochemical Biorefineries II	Cheekwood F

## WEDNESDAY CONTINUED

TIME	SESSION #	SESSION TITLE	ROOM
6:00pm-8:00pm	485	Poster Session: Bioengineering Reception co-sponsored by SBE and Division 15	Ryman Hall B1/B2
	490	Poster Session: Sustainability and Sustainable Biorefineries	Ryman Hall B1/B2
	491	Poster Session: Systems and Process Design	Ryman Hall B1/B2
	493	Poster Session: Pharmaceutical Engineering	Ryman Hall B1/B2

## THURSDAY, NOVEMBER 12, 2009

TIME	SESSION #	SESSION TITLE	ROOM
8:30am-11:00am	500	Biomaterials for Drug Delivery	Tennessee A
	501	Biomems and Microfluidics: Novel Applications	Canal D
	502	Biomolecules at Interfaces I	Governor's Chamber D
	509	Developments in Biobased Alternative Fuels I	Governor's Chamber E
	519	Magnetic Nanoparticles in Biotechnology and Biomedicine I	Delta Ballroom D
	526	Nanotechnology for Biotechnology and Pharmaceuticals I	Hermitage C
	529	Particle Formation in Supercritical Fluids for Food and Pharmaceuticals	Magnolia Boardroom B
	531	Polymers From Renewable Resources & Green Processing	Tennessee C
	534	Protein Engineering IV - Techniques	Congress B Room
	12:30pm-3:00pm	548	Biomaterials for Drug Delivery II
549		Biomaterials I	Tennessee C
550		Biomolecules at Interfaces II	Governor's Chamber D
555		Developments in Biobased Alternative Fuels II	Governor's Chamber E
556		Downstream Processing: Purification/Polishing	Delta Ballroom B
559		Fluidization and Fluid-Particle Systems for Gasification and Biomass Utilization	Jackson F
564		Integrated Processes for Biochemical Conversion of Renewable Feedstocks to Fuels and Chemicals	Bayou E
566		Magnetic Nanoparticles in Biotechnology and Biomedicine II	Delta Ballroom D
577		Nanotechnology for Biotechnology and Pharmaceuticals II	Hermitage C
586		Solar Biofuels I	Belle Meade A/B
3:00pm-5:30pm	589	Thermophysical Properties of Biological Systems	Cheekwood A
	592	Environmental Biotechnology: Green Bioprocessing	Delta Ballroom B
3:15pm-5:45pm	597	Advances in Protein Structure, Function, and Stability - II	Bayou D
	598	Bioimaging & Diagnostics	Cheekwood F
	599	Biomass Refining: Unit Operations, Processes, and Optimization	Ryman D
	600	Biomaterials for Drug Delivery III	Tennessee A
	601	Biomaterials II	Tennessee C
	602	Biomolecules at Interfaces III	Governor's Chamber D

## THURSDAY CONTINUED

TIME	SESSION #	SESSION TITLE	ROOM
3:15pm-5:45pm	603	Biosensors, Bioprocess Monitoring and Control	Lincoln D
	615	Innovations in Pharmaceutical and Biopharmaceutical Process Development	Hermitage D
	616	Interfacial Phenomena in Pharmaceutics	Governor's Chamber C
	619	Magnetic Nanoparticles in Biotechnology and Biomedicine III	Delta Ballroom D
	624	Nanostructured Biomimetic and Biohybrid Materials and Devices	Ryman A
	627	Polymeric Biomaterials	Cheekwood B
	632	Reaction Engineering in Pharmaceuticals and Fine Chemicals	Bayou C
	633	Sensors and Bio-Imaging Contrast Agents at the Cellular Level	Governor's Chamber A
	634	Solar Biofuels II	Belle Meade A/B
	636	Systems Engineering Approaches in Biology and Biomedicine	Lincoln E
	638	Systems Engineering Approaches in Biology and Biomedicine	Cheekwood A

## FRIDAY, NOVEMBER 13, 2009

TIME	SESSION #	SESSION TITLE	ROOM	
8:00am-11:00am	640	Adsorption of Biomolecules	Canal A	
	643	Advances in Fermentation and Biological Conversion	Bayou B	
	645	Biomaterials for Drug Delivery IV	Tennessee A	
	646	Biomaterials III	Tennessee C	
	647	Biosensors	Cheekwood F	
	656	Green Engineering in the Pharmaceutical and Fine Chemical Industry	Bayou E	
	660	MEMS and Biosensors	Jackson B	
	664	Modeling and Control of Biomedical Systems II	Lincoln D	
	12:30pm-3:00pm	683	Biodiesel From Microorganisms	Tennessee B
		684	Biomaterial Scaffolds for Tissue Engineering II	Magnolia Boardroom B
685		Biomaterials for Stem Cell Expansion and Differentiation	Hermitage A	
686		Biomaterials IV	Tennessee C	
687		Biomolecules at Interfaces	Cheekwood F	
694		Engineering Biomolecules	Jackson B	
696		Injectable Biomaterials	Hermitage D	
711		Self-Assembled Biomaterials II	Lincoln E	
712	Solid Liquid Separations Processes in Refining and Bio-Refining Systems	Canal C		

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**Raise your profile in the biological engineering community and gain access to physical property data for biomass and biofuels.**

Biological engineering is taking on increased importance as biomass and biofuels begin to mature. And many companies that have traditionally used fossil fuels are finding they need to recast their operations to incorporate these alternatives. But the availability of physical property data for biomass and biofuels poses its own challenge.

Be at the forefront of physical property development for biomass and biofuels with an SBE Green Membership

**Join SBE as a Green Member today and get these valuable benefits:**

- Subscription to the DIPPR 801 database—providing access to rigorously evaluated physical property data for more than 2000 compounds
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- Voting rights to help determine which compounds will be evaluated—providing you a voice in shaping future research efforts.
- Listing on the SBE website as an SBE Green Member--listing raises your firm's profile in the biological engineering community
- Three individual memberships for identified staff members—so your employees can take advantage of the information and contacts available to SBE members

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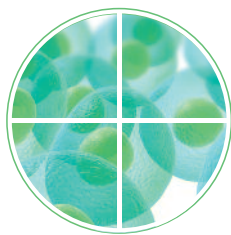
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