

# - CALL FOR PAPERS AND POSTERS - 13th Institute of Biological Engineering Meeting 2008 Annual Meeting of IBE



March 6-9, 2008 in *Chapel Hill, North Carolina*

## About IBE

IBE was established in 1995 to promote broad inquiry in the fundamentals of engineering sciences based on biology and to examine these at all scale levels – from molecular to organism to landscape scales. It encourages inquiry, application and interest in biological engineering in the broadest and most liberal manner and promotes the professional development of its members. IBE is striving to form a nexus of engineers and scientists, professional societies, and industries to inspire designs that capture remarkable features of living systems. IBE is bringing Engineering to Life through **Biology-Inspired™ Engineering**.

## Who Should Attend

Engineers and scientists interested in creating new knowledge that provides greater understanding of engineering principles founded from the understanding of biology and; that promote advances in design to capture remarkable features of living systems.

## Special Features in 2008

IBE meetings are unique because of the broad participation by scientists and engineers, working in the frontiers of Biology-Inspired Engineering. This meeting in Chapel Hill, North Carolina will build upon this tradition by offering opportunities to explore connections with the biotech industry in the Research Triangle. This includes a Bio-Business Nexus and industry partner tours. The IBE will also continue its traditional support for students in engineering and science with cash awards in the Student Poster Competition and in the Bioethics Essay Competition. Special event opportunities will include a workshop hosted by the BioMimicry Institute. Additional information about the meeting, tours, and student competitions can be found at [www.ibe.org](http://www.ibe.org).

-Dr. D. Marshall Porterfield  
Chair, Program Committee

## Session Topics for 2008:

- **Foundational Technologies in Synthetic Biology;** Contact: Christina Smolke, [smolke@cheme.caltech.edu](mailto:smolke@cheme.caltech.edu)
- **Advances in Engineered Biological Systems through Synthetic Biology;** Contact: Chris Voigt, [cavoigt@picasso.ucsf.edu](mailto:cavoigt@picasso.ucsf.edu)
- **iGEM Synthetic Biology;** Contact: Randy Rettburg, [rettburg@mit.edu](mailto:rettburg@mit.edu)
- **Biomimicry: Innovation Inspired by Nature;** Contact: Denise DeLuca, [denise@biomimicryinstitute.org](mailto:denise@biomimicryinstitute.org)
- **Advances in Biotechnology;** Contact: Albert Banas, [albert\\_banas@med.unc.edu](mailto:albert_banas@med.unc.edu)
- **Biology-Inspired™ Nanotechnology;** Contact: Jeff Catchmark, [JCatchmark@enr.psu.edu](mailto:JCatchmark@enr.psu.edu)
- **Biology-Inspired™ Molecular Engineering;** Contact: Jason Locklin, [jlocklin@chem.uga.edu](mailto:jlocklin@chem.uga.edu) & Bingqian Xu, [bxu@enr.uga.edu](mailto:bxu@enr.uga.edu)
- **Biology-Inspired™ Materials;** Contact: James Warnock, [jwarnock@abe.msstate.edu](mailto:jwarnock@abe.msstate.edu) & Guigen Zhang, [gzhang@enr.uga.edu](mailto:gzhang@enr.uga.edu)
- **Computational Modeling and Systems Biology;** Contact: Timothy S. Gardner, [tgardner@bu.edu](mailto:tgardner@bu.edu)
- **Biology-Inspired™ Informatics;** Contact: Morgan Giddings, [giddings@unc.edu](mailto:giddings@unc.edu)
- **Biology-Inspired™ Imaging;** Contact: Greg Bashford, [gbashford2@unlnotes.unl.edu](mailto:gbashford2@unlnotes.unl.edu)
- **Biology-Inspired™ Sensors;** Contact: Anhong Zhou, [azhou@cc.usu.edu](mailto:azhou@cc.usu.edu) & Marshall Porterfield, [porterf@purdue.edu](mailto:porterf@purdue.edu)
- **Engineering Microfabricated Biodevices;** Contact: Liju Yang, [lyang@nccu.edu](mailto:lyang@nccu.edu)
- **Biology-Inspired™ Tissue and Cellular Engineering;** Contact: Melissa Moss, [mossme@enr.sc.edu](mailto:mossme@enr.sc.edu)
- **Biofuels and Bioproducts;** Contact: Nathan Mosier, [mosiern@purdue.edu](mailto:mosiern@purdue.edu)
- **Bioprocessing & Natural Products;** Contact: Czarena Crofcheck, [ccrofche@bae.uky.edu](mailto:ccrofche@bae.uky.edu)
- **Advances in Engineering Microbial Metabolism;** Contact: Patrick Cirino, [cirino@enr.psu.edu](mailto:cirino@enr.psu.edu) & Mark Eiteman, [eiteman@enr.uga.edu](mailto:eiteman@enr.uga.edu)
- **Ecological and Environmental Engineering;** Contact: Stacy Hutchinson, [sllhutch@ksu.edu](mailto:sllhutch@ksu.edu) & Sybil Sharvelle, [ssharvel@purdue.edu](mailto:ssharvel@purdue.edu)
- **Biological Engineering Education;** Contact: Jenna Rickus, [rickus@ecn.purdue.edu](mailto:rickus@ecn.purdue.edu)
- **Biological Engineering Design;** Contact: Joel Cuello, [jcuello@ag.arizona.edu](mailto:jcuello@ag.arizona.edu)
- **Bioethics;** Contact: Jerry Gilbert, [jgilbert@provost.msstate.edu](mailto:jgilbert@provost.msstate.edu)
- **Biological Engineering Poster Session & Student Competition;** Contact: Sabrina Jedlicka, [sjedlick@purdue.edu](mailto:sjedlick@purdue.edu)

**Submit abstract through IBE**

**Website [www.ibe.org](http://www.ibe.org)**

**Deadline: December 1, 2007**

## 2008 Meeting Information:

**Conference Hotel:** Sheraton Chapel Hill, 1 Europa Drive, Chapel Hill, NC 27517. Reservations can be made by calling (919) 968-4900. When making reservations be advised to mention that you are with the IBE 2008 Annual Meeting to receive the preferred group rate of \$129.00. Reservations must be secured before February 2, 2008 in order to receive the guaranteed group rate. The Sheraton Chapel Hill Hotel is conveniently located just off I-40, on highway 15/501, minutes from Raleigh/Durham International Airport, the Research Triangle Park and the campuses of the University of North Carolina, Duke University, and NCCU.

**Conference Tour:** Thursday, March 6, 2008. Biogen IDEC: Research Triangle Park, North Carolina. The company is one of a handful of biotechnology/pharmaceutical companies that has three licensed and dedicated biological bulk-manufacturing facilities, including its large-scale manufacturing plant in Research Triangle Park, NC, which is one of the world's largest cell culture facilities. More details about the tour will be made available on the IBE web page ([www.ibe.org](http://www.ibe.org)).

## 2008 Session Details:

**Foundational Technologies in Synthetic Biology (Podium)** This session will focus on recent advances in the development of foundational technologies (new platform technologies and molecular tools – parts, devices, and systems) that support the design and construction of new and modified engineered biological systems.

*Session organizer: Christina Smolke, [smolke@cheme.caltech.edu](mailto:smolke@cheme.caltech.edu), California Institute of Technology.*

**Advances in Engineered Biological Systems through Synthetic Biology (Podium)** This session will focus on the application of synthetic biology to the design and construction of engineered biological systems that can provide solutions to real world problems.

*Session organizer: Chris Voigt, [cavoigt@picasso.ucsf.edu](mailto:cavoigt@picasso.ucsf.edu), Univ. of California-San Francisco.*

**iGEM Synthetic Biology (Podium)** This session will focus on team projects for the most recent iGEM competition and will highlight student involvement in the development of biological parts, devices, and systems for the international competition.

*Session organizer: Randy Rettberg, [rettberg@mit.edu](mailto:rettberg@mit.edu), Massachusetts Institute of Technology*

**Biomimicry: Innovation Inspired by Nature (Podium).** Biomimicry is a new science that studies nature's best ideas and then imitates these designs and processes to solve human problems. The core idea is that animals, plants, and microbes have already solved many of the problems we are grappling with. They have found what works, what is appropriate, and most important, what lasts here on Earth. This session will explore the formalized emergence of the field of Biomimicry, in terms of science, engineering, research and education.

*Session Organizer: Denise DeLuca, [denise@biomimicryinstitute.org](mailto:denise@biomimicryinstitute.org), The Biomimicry Institute.*

**Advances in Biotechnology (Podium)** This session will feature results in the field of cytomechanics, the application of physical forces to cells such as fluid shear stress, tension and compression by manipulation of magnetic beads on cells as well as forces applied to growth substrates and controlled fluid shear stress and gross forces applies to tissues. Advances in nanotechnology applied to cells, particularly nanoparticles and nanotubes, cell printing, microfluidics and cell shape control by culture on micro and nanotextured surfaces.

*Session Organizer: Albert Banes, [albert\\_banes@med.unc.edu](mailto:albert_banes@med.unc.edu), Univ. North Carolina.*

**Biology-Inspired™ Nanotechnology (Podium)** This session will include papers on nanoscale devices, methods, and approaches which have been inspired and derived from recent developments in our understanding of biology at smaller scales.

*Session organizer: Jeff Catchmark, [JCatchmark@engr.psu.edu](mailto:JCatchmark@engr.psu.edu), Penn. State Univ.*

**Biology-Inspired™ Molecular Engineering (Podium).** This session will focus on advances in theoretical and experimental studies on design, synthesis, and characterization of biomolecules and

biosystems. The topics include, but not limited to research methods development, rationally designed molecular architectures, and applications.

Contact: Jason Locklin, [jlocklin@chem.uga.edu](mailto:jlocklin@chem.uga.edu) & Bingqian Xu, [bxu@engr.uga.edu](mailto:bxu@engr.uga.edu), Univ. of Georgia.

**Biology-Inspired™ Materials (Podium)** This session will focus on the development of technologies that utilize biological materials or biological functions as a design element. Papers describing the use of these technologies in nanotechnology, medicine, agriculture, sensors, chemical processing, and other engineering and science problems are invited.

Session organizer: Contact: James Warnock, [jwarnock@abe.msstate.edu](mailto:jwarnock@abe.msstate.edu), Miss. State Univ. & Guigen Zhang, [gzhang@engr.uga.edu](mailto:gzhang@engr.uga.edu), Univ. Georgia.

**Computational Modeling and Systems Biology (Podium)** This session will address biological modeling and computing approaches that quantitatively characterize structure/function relationships in biological molecules and investigate the principles of computation found in biological systems. Topics include DNA computing, self-assembly of nanostructures, biological networks, metabolic modeling, genomics, and proteomics.

Session organizer: Timothy S. Gardner, [tgardner@bu.edu](mailto:tgardner@bu.edu), Boston Univ.

**Biology-Inspired™ Informatics (Podium)** The session will focus on recent developments in the application of information sciences and software engineering to biological data analysis and management. Topic areas include: pattern recognition and/or signal processing in DNA, RNA, and protein sequences; microarray, proteomic, and metabolomic data analysis and integration for systems biology; biological and clinical data management; and software engineering approaches for the biological sciences.

Session Organizer: Morgan Giddings, [giddings@unc.edu](mailto:giddings@unc.edu), Univ. of N. Carolina.

**Biology-Inspired Imaging (Podium)** Bioimaging is a process allowing one to obtain an object's structure or composition in a spatially resolved representation or picture, prominently used for medical diagnosis. The session on biologically inspired imaging will include papers on all aspects from advances in conventional clinical modalities over new technologies, such as optical tomography, to advanced imaging applications in the biomedical, bioenvironmental, and bioprocessing areas. Session organizer: Greg Bashford, [gbashford2@unlnotes.unl.edu](mailto:gbashford2@unlnotes.unl.edu), Univ. Nebraska-Lincoln

**Biology-Inspired™ Sensors (Podium)** This session will address the development and application of a broad range biological sensor technology for applications relating to agriculture, biological sciences, the environment, and medicine. Session organizers: Anhong Zhou, [azhou@cc.usu.edu](mailto:azhou@cc.usu.edu), Utah State Univ. & Marshall Porterfield, [porterf@purdue.edu](mailto:porterf@purdue.edu), Purdue Univ.

**Engineering Microfabricated Biodevices (Podium)** This session will focus on the development of engineering microfabricated devices, sensors, microfluidic systems, lab on a chip devices at the micro- and nano-scale and their wide applications in biomedical diagnostics, environmental monitoring, global security, food safety, bioprocessing, and drug discovery.

Session organizer: Liju Yang, [lyang@nccu.edu](mailto:lyang@nccu.edu), North Carolina Central Univ.

**Biology-Inspired™ Tissue and Cellular Engineering (Podium)** Papers are invited on applications of engineering principles to the study and utilization of cellular systems spanning from genetic and molecular to tissue constructs. Example topics include gene and drug delivery, cell-substrate interactions, tissue engineering and biomaterials, and cell-based biosensors.

Session organizer: Melissa Moss, [mossme@engr.sc.edu](mailto:mossme@engr.sc.edu), Univ. South Carolina.

**Biofuels and Bioproducts (Podium)** This session will address the processing of biobased raw materials for industrial and food applications and renewable energy production from biomass.

Session organizer: Nathan Mosier, [mosiern@purdue.edu](mailto:mosiern@purdue.edu), Purdue Univ.

**Bioprocessing & Natural Products (Podium)** Papers are invited on fermentation products and natural products used as pharmaceuticals, agrochemicals, additives, and biomaterials, including production, selection and downstream processing.

*Session Organizer: Czarena Crofcheck, [ccrofche@bae.uky.edu](mailto:ccrofche@bae.uky.edu), Univ. of Kentucky*

**Advances in Engineering Microbial Metabolism (Podium)** This session will highlight recent advances in engineering microbial metabolism to improve or aid in the understanding of biological production of fuels and chemicals. Topics include novel microbial systems, strain modeling, increasing flux through both native and heterologous pathways, and altering genetic or allosteric regulation of pathway components.

*Session organizers: Patrick Cirino, [cirino@enr.psu.edu](mailto:cirino@enr.psu.edu), Penn. State Univ. & Mark Eiteman, [eiteman@enr.uga.edu](mailto:eiteman@enr.uga.edu), Univ. of Georgia.*

**Ecological and Environmental Engineering (Podium)** This session will focus on advances in theory and principles for developing a sustainable relationship between human society and the natural world. Topics will include quantitative systems ecology, mathematical biology, network analysis, quantitative methods for analyzing and understanding environmental systems and diversity.

*Session Organizers: Stacy Hutchinson, [sllhutch@ksu.edu](mailto:sllhutch@ksu.edu), Kansas State Univ. & Sybil Sharvelle, [ssharvel@purdue.edu](mailto:ssharvel@purdue.edu), Colorado State Univ.*

**Biological Engineering Education (Podium)** This session will present new and well developed methods in education of biological engineers with perspectives from teaching engineering to education of biological scientists and biological educators.

*Session organizer: Jenna Rickus, [rickus@ecn.purdue.edu](mailto:rickus@ecn.purdue.edu), Purdue Univ.*

**Biological Engineering Design (Podium)** Participants in this session will present current research and case studies about design methodologies, optimization techniques and design validation for engineering problems in biological and ecological engineering.

*Session Organizer: Joel Cuello, [jcuello@ag.arizona.edu](mailto:jcuello@ag.arizona.edu), Univ. of Arizona.*

**Bioethics (Podium)** This session will feature the results of a student competition and selected presentations on bioethics as it relates to biological engineering topics. Check the IBE website ([www.ibe.org](http://www.ibe.org)) for information on the Bioethics Competition for students.

*Session organizer: Jerry Gilbert, [jgilbert@provost.msstate.edu](mailto:jgilbert@provost.msstate.edu) Miss. State Univ.*

**Biological Engineering (Poster)** Poster presentations covering any topic within biological engineering are invited. A special poster session for student research projects or engineering design projects will be included within the poster session. The top three Undergraduate Student Posters and top three Graduate Student Posters will receive cash awards and certificates of merit. Additional information about the Student Poster Competition can be found at [www.ibe.org](http://www.ibe.org).

*Session organizer: Sabrina Jedlicka, [sjedlick@purdue.edu](mailto:sjedlick@purdue.edu), Lehigh Univ.*

