

News



The Society of Plastics Engineers

ENGINEERING PROPERTIES & STRUCTURE DIVISION

April 2013

Chairperson's Report



Welcome New & Returning Board Members

sponsorship regarding our ANTEC EPSDIV sessions.

We look forward to a great turn out and people who are willing to spearhead our sponsorship efforts in the future. Our Chair-Elect, John Trent, reported that we have six board members elected or re-elected. They include Brian Grady, Kaan Gunes, Mridula (Babli) Kapur, Daniel Liu, Daniel Schmidt and Luyi Sun. Their willingness to serve our plastics engineering community is greatly appreciated. Very soon we will meet at ANTEC 2013, to catch up on our Society's advancements, and make decisions for our upcoming year. I look forward to seeing you all in Cincinnati and wish you a great Spring!

Shing-Chung "Josh" Wong



Dear EPSDIV Members,

This report is going to be a short one, because I have to write it while out of town. EPSDIV has gone through a fantastic year. We have once again won the Pinnacle Award (Silver) and our councilor, Brian Landes, has been elected as a Fellow of SPE. Many Thanks goes out to our two great co-TPCs, Milan Ivošević & Theresa Hermel-Davidock, who have worked arduously to prepare a great upcoming ANTEC-2013 technical meeting in Cincinnati, OH. EPSDIV will sponsor papers for 7 keynote presentations, a new technology forum, a symposium in honor of Prof. Avraam Isayev, and an international award symposium in honor of Prof. Benny Freeman. Thanks goes to Frank Cangelosi, Dick Bopp, Jason Lyons and Shriram Bagrodia, who assisted us with sending letters out for corporate

Important Meeting Times & Locations

EPSDIV Board Meeting

Sun. 4-7 PM – Hyatt Regency, 3rd Floor in Room Blue Grass AB

EPSDIV TPC Meeting

Tue. Noon – 1:30 PM – Convention Center, Room #204

EPSDIV Reception

Tue. 5 PM – Convention Center, Room #204

New Technology Forum-Polymer Applications in Health Reception

Wed. 4:30 PM – Convention Center, Green House Pre-Function Lobby



INSIDE THIS ISSUE

Chairperson's Report	1
Meeting Times & Locations	1
TPC Report	2
Treasurer's Report	3
Councilor's Report	4
Board of Directors	5

ANTEC 2013 TPC Report



Milan Ivošević and Theresa Hermel-Davidock

ANTEC 2013 will feature a total of 55 presentations under EPSDIV including 7 keynote and 12 invited speakers. EPSDIV will also host the 2013 SPE Education Award. The recipient is Prof. Robert Lochhead, from the University of Southern Mississippi. **The following invited keynote speakers will present at ANTEC 2013** ensuring that some of the EPSDIV core focus areas are covered by the keynote talks.

- **Melissa Grunlan**, Texas A&M University, "Nanocomplex Anti-Fouling Coatings"
- **Jaime Grunlan**, Texas A&M University, "Influence of processing parameters on the gas barrier and anti-flammable behavior of polymer-clay nanobrick walls"
- **Luyi Sun**, Texas State University – San Marcos, "Nanocoatings from Assembled Nanosheets"
- **Kim Walton**, The Dow Chemical Company, "Unusual Crystal Structure and Properties in Olefin Block Copolymers"
- **Cris Schwartz**, Iowa State University, "Quantifying the Haptic Characteristics of Polymer-based Textiles: Using Human Sensation as a Measuring Tool"

- **Jorgen Bergstrom**, Veryst Engineering, "Advanced Modeling of Bioresorbable PLLA Medical Devices"
- **Robert Loehhead**, University of Southern Mississippi, "Robert Y. Lochhead: A lifetime in Polymers"

New Technology Forum "Polymer Applications in Health"

New technology forum "Polymer Applications in Health" is jointly hosted by EPSDIV and Medical Plastics Division.

Younan Xia, Georgia Institute of Technology, "Putting Electrospun Nanofibers to Work for Biomedical Research"

Larry Thatcher, TESco Associates, Inc "Resorbable Polymers: Melt Processing"

Barbara Huibregtse, Boston Scientific Co. "Differentiating Biological Response to DES polymers"

James Oberhauser, Abbott Vascular, "The Application of Bioresorbable Polymers to Vascular Medical Devices"

- **Frank Douglas**, Austen BioInnovation Institute, "Value-driven Engineering and U.S. Global Competitiveness"
- **Scott Sardeson**, 3M Health Care, "Global Regulatory Guidelines for the Design and Development of Medical Devices"

Symposium in Honor of Prof. Avraam Isayev

The symposium has been organized by Prof. Sadhan C. Jana including the following invited speakers:

- **Eric Baer**, Case Western Reserve University, "Layered Polymeric Systems by Forces Assembly"
- **Petr Saha**, Tomas Bata University, "Highly-deformable Composite Based on Carbon-nanotubes Network Embedded in Polyurethane"
- **Miko Cakmak**, University of Akron, "Structural Gradient Development in Injection Molding of Crystallizable Polymers"
- **David Kazmer**, University of Massachusetts Lowell, "System Identification and Modeling of Capillary Melt Rheological Data"
- **Mahesh Gupta**, Michigan Technological University, "Viscoelastic Simulation of Bi-Layer Coextrusion in a Square Die"
- **Musa Kamal**, McGill University, "Morphology of Micro Injection Moldings in Expanding and Contracting Stepped Cavities"

Financial Report

from July 1, 2012 to March 27, 2013



**ANTEC 2013
TPC Report
Cont. from page 2**

BALANCE as of July 1, 2012 (cash, checking, savings, investments)	\$ 33964.35
INCOME	ACTUAL
Award Sponsorships	\$ 1000.00
SPE Rebate	1478.81
ANTEC Sponsorships	2488.70
TOTAL INCOME	\$ 4967.51
EXPENSES	
Newsletter Production	1056.00
Awards	334.00
Councilor Travel	455.32
Misc (Bank Fees)	9.00
TOTAL EXPENSES	\$ 1854.32
CASH FLOW	\$ 3113.19
ENDING BALANCE as of March 27, 2013	\$ 37077.54

Submitted by Emmett Crawford, EPSDIV Treasurer 2012-2013

International Award Symposium in Honor of Professor Benny Freeman

Lloyd Robeson, Lehigh University, "The Effect of Solubility Selectivity on the Permselectivity of Polymer Membranes"

Douglass Kalika, University of Kentucky, "Fundamental Studies of Relaxation Dynamics in Gas Separation Membrane Polymers"

Donald Baird, Virginia Tech, "Kinetics of Phase Separation in Block Copolymers during Solvent Removal in Film Casting"

Eric Baer and Joel Carr, Case Western Reserve University, "Dielectric Properties of Micro and Nanolayered Films for Capacitor Applications"

James McGrath, Virginia Tech, "Synthesis and Characterization of Multiblock Hydrophilic-Hydrophobic Block Copolymers for Water Purification Membranes"

Benny Freeman, University of Texas at Austin, "Polymer and Polymer-based Materials to Control Small Molecule Transport in Water and Gas Separation Membranes"

CONGRATULATIONS!

to Brian Landes, for his
election as Fellow of SPE

Welcome to EPSDIV New & Returning Board Members

Brian Grady,
Kaan Gunes,
Mridula (Babli) Kapur,
Daniel Liu,
Daniel Schmidt and
Luyi Sun.



I've worn glasses for nearly my entire life. After a spate of eye surgeries (detached retinas and cataracts) I can now see better than ever – and without glasses. That is why I have not been the least bit interested in 3D motion picture and television technologies which require me to wear a special pair of glasses. I'll hop on to that technology wave when I can do so without a pair of specs. However, I feel very differently about 3D printing technologies. Almost every day I read about a new object or manufacturing process that is being impacted by the wave of capabilities in 3D printing. Let's take a look (no special glasses needed) at some of the headlines from the past few months (Search "2013 in Science" on Wikipedia):

January 2013 – Architects begin preparations for constructing the world's first 3D-printed building. The building will be constructed of a high-strength artificial marble laid down by an industrial-scale 3D-printer, and is planned for completion in 2014.

February 2013 – A company constructs a lightweight, high-efficiency urban car with an entirely 3D-printed plastic body that is as damage-resistant as steel. The vehicle's construction is entirely automated, requiring no human input beyond the uploading of the car's

3D – Without the Glasses: A New Wave of Polymer Processing Innovation

design.

March 2013 – In a world first, researchers replace 75 percent of an injured patient's skull with a precision 3D-printed polymer replacement implant. In the future, damaged bones may routinely be replaced with custom-manufactured implants.

Amazing! After reading just these three headlines is there a limit to what you can imagine 3D-printing could do? It may only be limited by the computer in the design process or the mathematical algorithms used to define how and where to place material during "printing". The technology has already produced articles with significant improvements in properties (minimizing fabrication stresses), uniformity (dispersing minor phase structures), and fit (achieving complex geometric requirements). For these reasons the printed designs may look very different than what you would normally see produced from more conventional processes. In fields such as medicine as well as furniture and clothing design, the technology has already had a huge impact. Already, well over 90 percent of in-the-ear hearing aids are made using 3D printing. The process can precisely optimize the acoustic properties and fit for each individual hearing aid device. On the other end of the size scale, the largest 3D printers have a printing area over two meters long and can take up to a week to complete the biggest print jobs. Inside these devices, an array of laser scans over the surface of liquid polymer resin. Layer by layer, they solidify the resin to form the 3D-printed object under the liquid. At the end of the print, the object rises out of the liquid when it is pushed up and out of the reservoir.

The first commercial 3D printer was based on a technique called stereolithography. These printers

position a perforated platform just below the surface of a reservoir of photopolymer. A UV laser beam then traces the first slice of an object on the surface, causing a very thin layer of photopolymer to harden. The perforated platform is then lowered and another slice is traced out and hardened by the laser. Additional slices are created, until a complete object has been printed and can be removed from the vat of photopolymer, drained of excess liquid, and cured. Another 3D-printing technology based on the selective solidification of a tank of liquid or 'vat polymerization,' is DLP projection. This uses a projector to solidify object layers one complete cross-section at a time, rather than using a laser to trace them out. A third category of 3D-printing hardware is based on material extrusion. Here a hot thermoplastic is deposited from a computer-controlled print head. Yet, still another broad category of 3D printer hardware creates objects by selectively sticking together successive layers of a powdered material. A polymer 'binder' is jetted from an inkjet style print head to stick together successive powder layers.

It is clear that in all of these processes, and many of the applications given, polymers are the material of choice because of their broad process compatibility and the wide array of properties that they can produce. I am excited by the opportunities for process development and materials research that this technology will bring. I have compiled a list of interesting articles describing this technology arena. If you would be interested in them send me an email – I would love to hear from you. 3D printing is a new wave of research, development and business opportunities. It's one that you don't need a special pair of glasses to see, but one you will want to keep your eye on!

- Brian Landes
4

EPSDIV Board of Directors 2012-2013

CHAIR

(Josh) Shing-Chung Wong
University of Akron
330-612-1149
swong@uakron.edu

CHAIR ELECT & EDITOR

John Trent
S.C. Johnson & Son, Inc
262-260-4943
jstrent@scj.com

TREASURER

Emmett Crawford
Eastman Chemical Company
423-229-1621
ecrawford@eastman.com

SECRETARY

Stephen Driscoll
U. Massachusetts/Lowell
978-934-3431
Stephen_Driscoll@uml.edu

PAST CHAIR

Frank Cangelosi
Unimin Corporation
203-442-2319
fcangelosi@unimin.com

COUNCILOR

Brian Landes
The Dow Chemical Company
989-638-7059
BGLandes@dow.com

Shriram Bagrodia (Sr. Senate)
Tredegar Film Products
804-503-3984
shriram.bagrodia@tredegar.com

Sadhan C. Jana (Sr. Senate)
University of Akron
330-972-8293
janas@uakron.edu

Paul Rothweiler
Aspen Research Corporation
651-341-5427
paul.rothweiler@aspenresearch.com

Ashish Batra
The Dow Chemical Company
979-238-3495
abatra@dow.com

Kevin Kit
University of Tennessee
865-974-7055
kkit@utk.edu

Murali Rajagopalan
Acushnet
508-979-3405
murali_rajagopalan@acushnetgolf.com

Richard Bopp
NatureWorks, LLC
952-562-3314
Richard_C_Bopp@natureworkslc.com

Daniel Liu
979-739-4624
danieljliu@gmail.com

Daniel Schmidt
University of Massachusetts at Lowell
978-934-3451
Daniel_Schmidt@uml.edu

Jeff Gillmor (Sr. Senate)
Eastman Kodak
585-588-7415
jeffrey.gillmor@kodak.com

Jason Lyons
Arkema Inc.
610-878-6604
jason.lyons@arkema.com

Duane Simonson
US Naval Research Laboratory
202-404-6190
d3poodd@gmail.com

Brian Grady (Sr. Senate)
University of Oklahoma
405-325-4369
bpgrady@ou.edu

Pierre Moulinie
Bayer MaterialScience
412-777-2332
Pierre.moulinie@bayer.com

Ashish Sukhadia
Chevron Phillips Chemical Co.
918-661-7467
sukhaam@cpchem.com

Milan Ivošević
(TPC 2013 Co-Chair)
BD Medical
201-847-4787
milan_ivošević@bd.com

Rajen Patel
The Dow Chemical Company
979-238-2254
rmpatel@dow.com

Luyi Sun
Texas State University-San Marcos
Tel: 512-245-5563
luyi.sun@txstate.edu

Theresa Hermel-Davidock
(TPC 2013 C0-Chair)
BD Medical
201-847-6171
Theresa_Hermel-Davidock@bd.com

Hoang Pham (Sr. Senate)
Avery Dennison
440-534-6386
Hoang.Pham@averydennison.com

David Zumbrennen
Clemson University
864-656-5625
zdavid@ces.clemson.edu

Sreekumar Pisharath
Energetics Research Institute,
Nanyang Technological University
65-65921808
Sreekumar@ntu.edu.sg