

# **PSE Alumni Magazine**

## **Fall 2005**

2005 has been an excellent year in PSE, with a host of notable activities and achievements among faculty and students that continue PSE's long-standing tradition of leadership in polymer research and education in the United States. A particularly notable change in PSE is the hiring of two new faculty. Ryan Hayward will arrive in January 2006 as an Assistant Professor, having finished his Ph.D. in Ed Kramer's group at the University of California Santa Barbara, and a postdoc in David Weitz's group at Harvard. Ryan has kindly contributed an article describing his research and other interests, and we are all looking forward to his arrival in PSE in January. In addition, in September 2005, Professor Jim Watkins moved to PSE all the way from the Chemical Engineering Department at UMass! Jim is a PSE alumnus (1997) from Tom McCarthy's group, and started his academic career in Chemical Engineering at UMass. His state-of-the-art research and campus leadership in nanoscience and nanotechnology helped earn an IGERT (Integrative Graduate Education Research and Training) award from the National Science Foundation (\$3.1 million) that will connect nanoscience research across different disciplines within PSE and campus-wide. This impressive award represents a very exciting beginning to Jim's tenure in PSE!

The Fall Semester is always energizing for welcoming new graduate students, and in September the PSE Department received eighteen new first year students to start their Ph.D. training in polymers. In addition, we continue the tradition of visitors from the University of Mainz in Germany, with five master's level students from Mainz joining our first year class. These students are fully engaged in the Fall Semester PSE courses, then join research laboratories in the Spring before returning to Mainz to complete their pre-Ph.D. requirements. While many new students arrive, many others have successfully defended their theses, and congratulations are due to the latest round of Ph.D. Alums!

There is also sad news to report. Dr. David Lipp, a former Otto Vogl student, passed away in May. David was very proud of his Ph.D. from PSE, and enjoyed a rewarding industrial career for many years. In the last year of his life, many of us in PSE became well-acquainted with David, as he made arrangements for a financial gift to the Department. David's gift will impact PSE for many years to come as it supports efforts of selected first year students prior to their joining research groups. David was a firm believer in the value of the first year experience in PSE, and expressed on many occasions his appreciation for his PSE education, both in the research lab as a student with Otto, and in the coursework and cumulative exam period where students are

able to concentrate on the fundamentals of polymer science before becoming fully engaged in research.

As a final introductory note, the PSE Alumni mailing list is ever in need of expansion and updating, and we welcome your input with address updates, job changes, promotions, or any career or personal note you would like to share in the Alumni Magazine ([www.pse.umass.edu/alum](http://www.pse.umass.edu/alum)). This issue includes a very nice article from Dr. Eric Welsh (thank you Eric!) and we look forward to future articles from Alumni. Finally, there is a very exciting "job-opening" with regards to PSE Alumni, and I would ask that anyone with an interest in working to coordinate alumni efforts to please contact me by email at [tsemrick@mail.pse.umass.edu](mailto:tsemrick@mail.pse.umass.edu), or by phone at 413-577-1613. With a little effort I am certain much could be done to connect PSE graduates in both professional and social settings, and I welcome your participation.



Ryan Hayward



Jim Watkins

### **Upcoming Event**

#### **MackKnight Symposium**

A symposium honoring William J. MacKnight, on the occasion of the 70th birthday, will be held at the University of Massachusetts on June 5-6, 2006. As many of you know, Bill has been a pioneer in many areas of polymer physics and chemistry, primarily in the study of property-structure relationships in polymer phase separation, ionomers, and polyurethanes. He is recognized for his contributions to the thermodynamics and statistical mechanics of polymer blend miscibility. This latter work was done in collaboration with his long time colleague Frank Karasz. Bill has received many honors and awards for his work, and is a member of the National Academy of Engineering. The symposium will consist of invited speakers selected from leading scientists in the major areas to which Bill has contributed, as well as a number of talks from former students. There will also be a poster session to which all participants are invited to contribute. There is more information available at: <http://www.pse.umass.edu/macknight/>



## PSE & Alumni Awards & Recognition

PSE students, faculty and alumni have received a number of well-deserved awards in the past year, some of which are listed below. Alums, please keep us informed so we may showcase your accomplishments!

### Faculty Awards

**Al Crosby**

Army Research Office Young Investigator Award for the project "Responsive Polymer Interfaces"

**Greg Tew**

National Science Foundation CAREER Award

**William MacKnight**

Flory Award from the POLY Division of the ACS

**Richard Farris**

ACS Rubber Division's George Stafford Whitby Award  
Society of Plastic Engineers Polymer Analysis  
Divisions "Founder's Award".

**Thomas Russell**

UMass Distinguished Faculty Lecture Series speaker  
UMass Award for Outstanding Accomplishments in  
Research and Creative Activity  
American Physical Society Polymer Prize

### Student Awards

**Edwin Chan (Crosby group)**

Best Poster: Gordon Research Conference on Coatings &  
Films

### Alumni Awards

**Eric R. Welsh (US Navy)**

William P. Clements Award of Excellence  
Military Faculty Teaching Excellence Award

**Ananda Chatterjee (Kaneka Texas Corporation)**

Honored Service Award of the Society of Plastics  
Engineers

### NEW PSE ALUMS!!

**Lachelle Arnt** Cationic Facially Amphiphilic Phenylene  
Ethylenes as Host Defense Peptides Mimics.

Advisor: Gregory Tew

**Kristopher Lavery** The Closed-Loop Phase Behavior of  
Polystyrene/Poly(n-pentyl methacrylate) Block Copolymers.

Advisor: Thomas Russell

**K. Amanda Leach** Kinetics and Morphology of Electric  
Field-Induced Patterning in Thin Polymer Films.

Advisor: Thomas Russell

**Yao Lin** Directed Self-assembly of Nanoparticles at  
Interfaces. Advisor: Thomas Russell

**Joseph McNamara** Monte Carlo, Small Angle Light  
Scattering, and Dynamic Light Scattering Studies of Dilute  
Polymer Solutions. Advisor: Muthu

**Dmytro Nykypanchuk** A Single Molecule Study of DNA  
Dynamics & Partitioning in Model Porous Materials.

Advisors: David Hoagland and Helmut Strey

**Waiken Wong** Towards Functional Materials from  
Polyelectrolyte-Surfactant Complexes.

Advisor: Helmut Strey

**Pushkala Krishnamorthy** Nickel Salicylaldiminato  
Catalysts for Olefin Polymerization in Organic and Aqueous  
Media. Advisor: Bryan Coughlin

**Engin Burgaz** Morphological Studies of Graft Copolymers  
with Different Molecular Architectures.

Advisor: Samuel Gido

**Xiaochuan Hu** Grain Growth Kinetics in Microphase  
Separated  $A_n B_n$  Star Blocks Advisor: Samuel Gido

**Kishore Indurkuri** Deformation Characteristics of  
Thermoplastic Elastomers and Thermosets.

Advisor: Alan Lesser





## **Thanks to PSE Alumni Contributors!!!**

**We are extremely grateful for the financial gifts of our Alumni, as well as their committment to arranging for employer matching gifts! The most recent contributors are listed below, and we encourage you to join your fellow Alums in the support of PSE.**

**>\$5,000**

David Lipp ('77)

**\$500-\$999**

Lothar W Kleiner ('78)

**\$100-\$499**

Walter W. Adams ('84)

Eric W. Kendall

Douglas Cywar ('83)

John Reynolds ('80)

## **Alumni notes**

*Dr. Eric Welsh, U.S. Navy*

### *Exo-entropic:*

#### *becoming more uniform after graduate school*

One year after graduating from PSE, Dr. Eric Welsh was commissioned as a lieutenant in the United States Navy, where he serves as one of 36 biochemists in the Medical Service Corps. His interest in the Navy started at the Naval Research Laboratory (NRL) in Washington, D.C., where he was a National Research Council Post-Doctoral Fellow, prior to putting on the uniform. After minimal military indoctrination, Eric returned to NRL for his first tour of duty and initiated a research program focused on exploiting biological systems and materials for naval applications, such as the immobilization of enzymes to remediate nerve agents, the use of enzymes to produce sugar-based monomers for hydrogels, and the study of polysaccharide films for metal detection. These initial collaborations resulted in Eric becoming co-principle investigator of a research program to develop anti-fouling coatings for naval vessels. This research resulted in one patent application and five publications, including a collaborative effort with another PSE graduate, Dr. Scott Kennedy, who was at National Institute of Standards and Technology at the time.

In December 2002, Eric was transferred a short distance to Annapolis, Maryland to join the Chemistry Department at the United States Naval Academy. While at the academy, he has taught courses in

freshman (plebe) chemistry, nuclear power, and materials science and engineering. After his first year, the department assigned him to be one of the course coordinators for the freshman course comprising 1200 students and 31 instructors. In addition, he has served as a tutor to the football team, officer representative to the men's cross-country team, and in various command and training roles in the sailing program – a training opportunity for the midshipmen to hone skills in navigation and seamanship. He was recently honored as the top of 300 military instructors with the Class of 1951 Military Faculty Teaching Excellence Award and William P. Clements Award for Excellence in Education for the 2005 academic year. The Clements Award is bestowed annually upon a military faculty member at the Naval Academy whose contributions to the academic, professional, and moral development of midshipmen reflect the highest principles of excellence in education. Each year, the winner of this award demonstrated the ability to inspire midshipmen to high levels of academic accomplishment, evidence of improvement of teaching materials and methods (such as development of new texts, courses, exercises, techniques of instruction or other classroom innovations, etc.), and involvement in the academic counseling of midshipmen.

Eric currently lives in Annapolis with his wife, Jessica (UMass, BFA, '99), and 3 year-old daughter, Sophia. The Navy plans to transfer them to Chicago, IL next spring, where Eric will be the second in command of the Great Lakes Navy Drug Screening Laboratory.

## **More Upcoming Events**

### **PSE Alumni Reception**

There will be a PSE Alumni Reception at the Fall 2006 San Francisco ACS Meeting in September. Check the PSE website in the summer for details on this event. These receptions have been a great success, and many alumni have commented on how much they enjoy connecting with PSE friends at ACS meetings.

### **CUMIRP**

The CUMIRP - MRSEC - PSE Spring Meeting will be held from May 9-11, 2006. Details will be available online in April.

### **PSE Seminar Schedule**

We owe a great deal of thanks to Professor Al Crosby for assuming duties as our PSE Seminar Series coordinator. The Fall 2005 and Spring 2006 schedules are printed to illustrate the continuing outstanding quality of the PSE seminar series, and also for alumni to consider giving a lecture in the Department, either as a speaker in our regular Friday afternoon seminar, or at another time. Contact Al Crosby, Jim Capistran, your former advisor, or other faculty in the Department to discuss visiting PSE for a seminar associated with your research/business since graduating from PSE.

**Many thanks to Nik Ivanov, Eugene Kolnick, and Caitlin Capistran for their help with this Magazine, and with the Alumni mailing list!**



## ***New Faculty in PSE***

### ***Professor Ryan Hayward***



**Ryan Hayward** will become the newest faculty member in PSE when he joins the department in January 2006. Ryan received his Ph.D. in Chemical Engineering from the University of California, Santa Barbara in 2004, and is currently a post-doctoral fellow at Harvard University. Ryan is looking forward to getting his research program started and becoming involved in the highly collaborative and interdisciplinary polymer research community in PSE, and across the UMass campus.

Ryan's research is concerned with directed assembly and morphological evolution of polymeric materials under both equilibrium and non-equilibrium conditions. In addition to understanding the underlying physical principles, he seeks to use the resulting polymeric structures in technologically interesting applications. For example, the fabrication of nanostructured inorganic materials, encapsulation and delivery of drugs, surface patterning, and sensing are application areas that are particularly interesting and relevant today.

Once starting in PSE in January, Ryan plans to begin his research in several areas, including the study of mechanical instabilities in confined hydrogel films, and the synthesis and assembly of novel polymeric colloids. During his dissertation research, Ryan became interested in the mechanical surface wrinkling instability that can occur upon swelling of confined hydrogels. This phenomenon was first understood nearly twenty years ago for bulk systems, but the extension to thin films has not been carefully studied nor well-appreciated. Though usually considered a nuisance, this instability provides new opportunities to control topography and chemical patterning of thin film surfaces. More importantly, the patterns are dynamic and reconfigurable, and can potentially be made to respond to a variety of external cues. Ryan will also study the synthesis of new polymeric colloids with aspherical morphologies by emulsion- and photo-processing. He is interested in the assembly of such particles in bulk, on surfaces, and in the presence of external fields, as well as their application to areas such as drug delivery.

Ryan was born in Ridgefield, CT, and grew up in the Virginia suburbs of Washington, DC. He graduated from

Thomas Jefferson High School in Alexandria, VA in 1995. He then attended Princeton University, graduating in 1999 with a B.S.E degree in Chemical Engineering with a concentration in Materials Science. While at Princeton, Ryan first became interested in polymer science while taking a class taught by Professor William Graessley. His interactions with Professor Graessley eventually led to a research project on dilute solution properties of polymers. For his undergraduate thesis, Ryan worked with Professors Ilhan Aksay and Dudley Saville on the combined use of electrohydrodynamic flows and optical patterns to selectively assemble colloidal polymer particles on surfaces.

In 1999, Ryan began his graduate studies at the University of California, Santa Barbara. He worked primarily with Professors Ed Kramer and Brad Chmelka, but also found fruitful collaborations with the groups of Professors Galen Stucky and Glenn Fredrickson. His work was concerned with the use of self-assembled block copolymer thin films as templates for the formation of mesostructured and mesoporous inorganic structures. He received his Ph.D. in Chemical Engineering in 2004. Together, Ryan's undergraduate and graduate research have resulted in the publication of 12 papers and one patent.

Currently, Ryan is working as a post-doctoral fellow at Harvard University with Professor David Weitz. He is focusing on the use of microfluidic devices to form water-in-oil-in-water emulsion droplets of controlled size and structure. These emulsion droplets can then be used to prepare water-filled capsules made of block copolymers ("polymerosomes") or colloids ("colloidosomes"), that are promising for the encapsulation and delivery of therapeutic agents and other active ingredients. The microfluidic fabrication technique shows promise for achieving unparalleled control over the structure and release properties of such capsules, as well as providing a model system for studying morphological evolution during the assembly of polymers and colloids at oil-water interfaces.

Ryan is a member of the American Physical Society, the Materials Research Society, and the American Institute of Chemical Engineers. He is looking forward to the opportunity to become more involved in these organizations at the faculty level, and also to continue to take an active role in the polymer physics community.

On the personal side, Ryan is happy to return to his New England roots, and after a year in Boston has almost gotten used to the idea of having weather again (the scarcity of good Mexican food is still a sore point, however.) After arriving in Boston last October ('04) just in time for the Red Sox to come back against the Yankees, it was hard not to become a Sox fan, and he has managed to catch a few games at Fenway this year. He loves to ski, hike, and snowshoe, and is looking forward to exploring all that the Amherst area has to offer.



## Fall 2005 Seminar Series

<i>Date</i>	<i>Guest</i>	<i>Title</i>	<i>Faculty Host</i>
<i>September 9</i>	<b>Prof. David Neivandt</b> <i>Department of Chemical and Biological Engineering University of Maine</i>	<i>“Spectroscopic Characterization of the Interfacial Conformation of Polymers and Surfactants”</i>	<i>Shaw Ling Hsu</i>
<i>September 16</i>	<b>Prof. Kirk Schanze</b> <i>Department of Chemistry University Of Florida</i>	<i>Conjugated Polyelectrolytes: Self Assembly, Amplified Quenching and Application to Biosensors</i>	<i>Greg Tew</i>
<i>September 23</i>	<b>Prof. Heather Maynard</b> <i>Department of Chemistry &amp; Biochemistry University of California, Los Angeles</i>	<i>“Proteins and Polymers in Solution and on Surfaces”</i>	<i>Tom McCarthy</i>
<i>September 30</i>	<b>Prof. Herald Stover</b> <i>Department of Electrical &amp; Computer Engineering McMaster University</i>	<i>“Structured Polymer Microspheres and Capsules”</i>	<i>Todd Emrick</i>
<i>October 7</i>	<b>Prof. Seshu Desu</b> <i>Department of Chemical Engineering University of Massachusetts</i>	<i>“Organic Ferroelectric Random Access Memories”</i>	<i>Frank Karasz</i>
<i>October 14</i>	<i>PSE/MRSEC/CUMIRP Week</i>		
<i>October 21</i>	<b>Prof. Thomas A. Zawodzinski</b> <i>Department of Chemistry Case Western Reserve University</i>	<i>“Proton Conducting Polymers for Fuel Cells: A Critical Overview”</i>	<i>Bryan Coughlin</i>
<i>October 28</i>	<b>Prof. Gerard Wong</b> <i>Department of Materials Science &amp; Engineering University of Illinois at Urbana-Champaign</i>	<i>“Counterion Liquids on Polyelectrolytes”</i>	<i>Greg Tew</i>
<i>November 4</i>	<b>Prof. Herbert Hui</b> <i>Department of Theoretical and Applied Mechanics Cornell University</i>	<i>“Biomimetic Design of Fibrillar Interfaces for Contact and Adhesion”</i>	<i>Al Crosby</i>
<i>November 11</i>	<i>Veteran's Day - No Seminar</i>		
<i>November 18</i>	<b>Prof. Eric Kaler</b> <i>Department of Chemical Engineering University of Delaware</i>	<i>“Polymerization Reactions in Complex Fluids”</i>	<i>Maria Santore</i>
<i>November 25</i>	<i>Thanksgiving - No Seminar</i>		
<i>December 2</i>	<b>Prof. Benny Freeman</b> <i>Department of Chemical Engineering University of Texas at Austin</i>	<i>“New Approaches to Designing Polymer-based Materials for Membrane Applications”</i>	<i>Todd Emrick</i>
<i>December 9</i>	<b>Prof. Dan Luo</b> <i>Department of Biological &amp; Environmental Engineering Cornell University</i>	<i>“Nucleic Acid Engineering: Using DNA as a Generic instead of a Genetic Material”</i>	<i>Shaw Ling Hsu</i>

## Spring 2006 Seminar Series

<i>Date</i>	<i>Guest</i>	<i>Title</i>	<i>Faculty Host</i>
<i>February 3</i>	<i>Prof. Chris Ober</i> <i>Cornell University</i>	<i>TBA</i>	<i>J. Watkins</i>
<i>February 10</i>	<i>Prof. Stephen McCarthy</i> <i>University of Massachusetts Lowell</i>	<i>TBA</i>	<i>S. Hsu</i>
<i>February 17</i>	<i>Prof. Nily Dan</i> <i>Drexel University</i>	<i>TBA</i>	<i>R. Hayward</i>
<i>February 24</i>	<i>Prof. Kristi Küick</i> <i>University of Delaware</i>	<i>TBA</i>	<i>G. Tew</i>
<i>March 3</i>	<i>Prof. Justin Hanes</i> <i>John Hopkins University</i>	<i>“Polymer Systems for Targeted Drug and Gene Delivery“</i>	<i>M. Santore</i>
<i>March 10</i>	<i>Prof. Phil DeLuc</i> <i>Carnegie Mellon University</i>	<i>TBA</i>	<i>A. Crosby</i>
<i>March 17</i>	<i>APS Meeting</i>		
<i>March 24</i>	<i>Prof. Matthias Ballauff</i> <i>Universitat Bayreuth, Germany</i>	<i>TBA</i>	<i>M. Muthukumar</i>
<i>March 31</i>	<i>ACS Meeting</i>		
<i>April 7</i>	<i>Prof. John Torkelson</i> <i>Northwestern University</i>	<i>TBA</i>	<i>S. Hsu</i>
<i>April 14</i>	<i>Prof. Alex Fadeev</i> <i>Seton Hall University</i>	<i>“Hydrophobicity at the Nanoscale”</i>	<i>T. McCarthy</i>
<i>April 21</i>	<i>Prof. Timothy Deming</i> <i>UCLA</i>	<i>“Synthesis and Properties of Polypeptide Materials”</i>	<i>T. McCarthy</i>
<i>April 28</i>	<i>Prof. Lynn Loo</i> <i>University of Texas at Austin</i>	<i>TBA</i>	<i>A. Crosby</i>
<i>May 5</i>	<i>Prof. Mike King</i> <i>University of Rochester</i>	<i>TBA</i>	<i>M. Santore</i>
<i>May 12</i>	<i>PSE/MRSEC/CUMIRP</i>		
<i>May 19</i>	<i>TBA</i>	<i>TBA</i>	<i>TBA</i>