

DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

DEPARTMENT NEWSLETTER FALL 2011



Departmental Advisory Board Members

Mr. Larry Allen
Retired, Air Products and
Chemicals, Inc.

Mr. Chris Arrick
Caterpillar, Inc.

Mr. Charles A. Clerecuzio
Bard Holding, Inc.

Mr. Roger Cox
The Goodyear Tire &
Rubber Company

Mr. Tom Flynn
The Babcock & Wilcox
Company

Mr. Robert Handelman
Chemstress Consultant
Company

Mr. Karl Jacob (Chair)
The Dow Chemical
Company

Dr. Jeffrey S. Kanel
Renewable Algae Energy, LLC

Dr. Brian Kocher
Promerus LLC

Dr. Jackie Laurich
OMNOVA

Dr. Tim Mallow
Merck & Company, Inc.

Mr. Robert M. Shemenski
RMS Consulting Inc.

Dr. W. Leigh Short
Alternative Environment
Strategies, LLC

Mr. Dan Spak
Firestone High School

Mr. John Zuppo
Emerald Performance
Materials

Welcome to the Fall 2011 issue of the Department of Chemical and Biomolecular Engineering Newsletter. It is with great pleasure to introduce in this issue the new faculty who recently joined our department as well as some of the recent activities, accomplishments, and news. Join us in learning more about our alumni and the events of our student organizations, and enjoy the latest publications, patents, and grants as part of the continued excellence in research and teaching of the Department.

UA Regional Chem-E-Car Competitions



Last Spring's issue was published too early for the results of the UA Chem-E-Car Design Team. On April 9, 2011 **the team won the North Central Regional Chem-E-Car Championship** at Michigan Technological University where UA's "Monty" Carlo stopped 10.5 inches away from the 67-foot finish line. It edged out second and third place Michigan Tech and University of Minnesota, respectively. This was UA's third regional championship. Teams from UA also won the regional championship in 2000 and



2005. UA also placed first in the poster competition for the seventh consecutive time at the regional level.

More good news, on October 14, 2011 **the team won most consistent and best poster** at the Central Regional Chem-E-Car Championship at the University of Minnesota in Minneapolis.

(This information was taken from The University of Akron News Release dated 4/12/2011.)

Department Seminars held during Fall Semester 2011

- On Thursday, August 25, 2011 Dr. Xue-Long Sue, Associate Professor at the Department of Chemistry at Cleveland State University, presented "Biomimetic Flyco-Macroligand for Bioanalytical and Biomedical Applications."
- On Thursday, September 22, 2011 Dr. Yadong Yin, Associate Professor of the Department of Chemistry at University of California, presented "Magnetically Responsive Photonic Nanostructures: From Ordinary to Extraordinary."
- On Thursday, October 27, 2011 Dr. Chang Lu, Associate Professor of Chemical Engineering at Virginia Tech, presented "Microfluidic Tools for Cellular Engineering and Analysis."
- On Thursday, November 3, 2011 Dr. Nehal I. Abu-Lail, Associate Professor at the Gene and Linda Voiland School of Chemical Engineering and Bioengineering at Washington State University, presented "Nanoscale Investigations of Bacterial Physiochemical Properties and Interactions."





Marcus Grimm, Senior
AiChE Award Winner



Dr. Scott Lillard



Student Awards



Marcus Grimm was accepted as a recipient of one of the AiChE Donald F. and Mildred Topp Othmer National Scholarship Awards for the 2011-2012 academic year.



Advisory Board Poster Competition

End of Spring 2011 Semester

1st Place Winners—Awarded \$400

Qiuming Wang
Li Chen
Amir Vahid

2nd Place Winners—Awarded \$300

Majid Hosseini
Ashley Wilkinson
Ehsan Moharreri

One of the PMT teams who presented their Reactor to Dr. Evans, Dr. Elliott, and Dr. Leipzig.

New Faculty

Scott Lillard

He received his Ph.D. in Materials Science and Engineering from the Johns Hopkins University in 1992. Before joining UA he was a Technical Staff Member at Los Alamos National Laboratory for over 16 years. He is the author of over 70 technical publications in the field of corrosion, a Fellow of NACE International and the US Editor for Corrosion Engineering Science & Technology. Areas of research include atmospheric corrosion, localized corrosion, oxide films, SCC and hydrogen interactions with metals. He and his wife Jennifer have two sons Jimmy (11) and Tommy (9), two dogs and a cat.



Mariano Iannuzzi

He received his B.Sc at Instituto de Tecnología Profesor Jorge Sabato and his Ph.D. at The Ohio State University in Materials Science and Engineering. His research areas include environmentally assisted cracking, corrosion and corrosion inhibition of aluminum alloys, corrosion of biomedical implants, and modeling of localized corrosion phenomena. Mariano's wife Carla Gai also received her Ph.D. at The Ohio State University in Evolution Ecology and Organismal Biology. They have an 8 year old son, Lorenzo. In his spare time, Mariano enjoys photography.



Dr. Mariano Iannuzzi

Alumni News



Rick Bruno, 1986
Alumnus from the
Chemical Engineering
Department.

Rick Bruno, B.S., '86, stopped by the office to say hello to the folks in the Department and the Co-op office during a recent trip to Akron.

Rick has spent the last 25 years working for the Lubrizol Corporation at both the Wickliffe and Painesville facilities. Over his career, Rick has had the opportunity to perform many different roles ranging from Process Development Engineer, Manufacturing Engineer, Production Superintendent, Corporate Sourcing and Planning, and currently as Operations Support Manager at the Painesville facility. In this role, Rick is responsible for the Processing Engineers, Analytical Support Laboratory, Utilities Department, and the Training Department.

He states that the educational and personal experiences at the University were many and have prepared him for life in the real world. He continues to follow the Zips football and basketball programs and is proud to be an alumnus of the University of Akron.



Faculty News



-Dr. Judit E. Puskas, seen here with a breast prosthetic made from silicone, is exploring how nanotechnology may be used to develop a safer alternative.

Judit Puskas

A new review published in WIREs Nanomedicine and Nanobiotechnology by Judit Puskas, Austin Chemical Chair and professor of Chemical and Biomolecular Engineering at UA, and Matthew T. Luebbers, UA postdoctoral research scholar, explores how nanotechnology may be used to develop safer breast implants as an alternative to silicone rubber, minimizing health complications.

In addition Dr. Judit E. Puskas was recognized by The Woman's Network of Northeast Ohio and given The Woman of Achievement Award. These awards are given to women who have gone beyond personal or career accomplishments to give back to their community. (This was taken from The University of Akron Homepage on Oct. 2011.)



George G. Chase received an award from The Separations Division of AIChE for outstanding contributions to Advanced Filter Media.



Students Organizations

ISPE (Update from Nick Callow)

New officers for the 2011/2012 Academic Year: Nicholas Callow (President), Nathaniel Blasdel (Vice President), Susan Thompson (Treasurer), Majid Hosseini (Secretary), and Ashley Wilkinson (Publicity Chair). The ISPE Student Group has hosted two guest speakers this semester. Nuclear Pharmacist, Laura Bauman from Triad Isotopes Inc. gave a presentation on radio labeling white blood cells. Sarah E. Langan from Eli Lilly and Company presented a discussion on the roles of chemical engineers at Eli Lilly and the benefits of participating in the ISPE community. A bowling night will be held on December 5 at Stonehedge Bowling Alley. This will be our final event to celebrate finals week and another great semester.



ChemESO

The newly organized group provided a potluck in September to welcome new graduate students. Five members went to the National Conference in Minneapolis, MN in October 2011 and presented their research. Advisers Dr. Monty and Dr. Elliott accompanied the students. There was a pumpkin carving activity on Halloween that produced some very interesting jack-o-lanterns. (update from Alvaro Rodriguez)

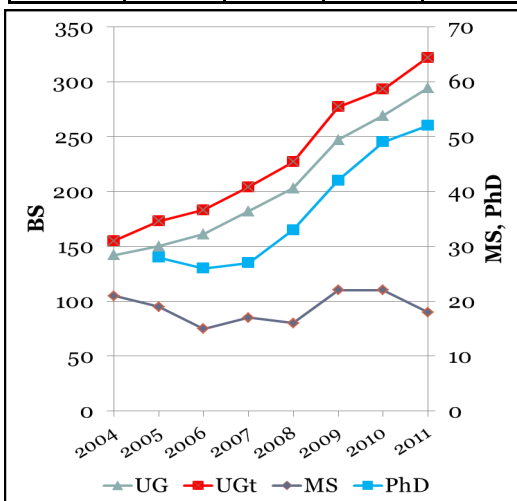
2011 Professor Bake-Off

AICHE invited faculty and staff members from the department to compete against each other to see who could bake the best brownies. They also welcomed cookie and pastry donations from students, faculty, and staff. The organization was able to raise over \$300, which will help cover the costs of AICHE activities throughout the current school year. After the votes were tallied, **the department's best brownies were baked by Mr. Frank Pelc.** Dr. Bi-min Newby was a close runner-up, followed by Dr. George Chase in third. (submitted by Jacob Kohl)



Left: **Brittany Naymik**, #1 Student Assistant who has done an amazing job the past two years. Middle: **Judy Wilke**, our new Administrative Secretary who lives in Cuyahoga Falls with Ollie (English Bulldog) and Rosie (Pug). Right: **Frank Pelc** with his winning Brownies. *Is that a Little Debbie wrapper on those brownies? Hmm...*

Year (Fall)	UG	UGt	MS	PhD
2011	294	322	18	52
2010	269	293	22	49



Departmental Statistics

The Department Continues to grow as seen with these figures.



Student enrollment figures are shown in the chart and graph to the left. Faculty and staff have been added to accommodate the increased enrollment of the department.



Faculty and Staff:

- 17 tenured/tenure-track Faculty members
(This includes 7 Professors, 3 Associate Professors, and 7 Assistant Professors.)
- 2 Research Faculty
- 2 Research Post-docs/associates
- 2.5 Secretaries
- 1 Technician
- Searching for one Assistant Professor to join Fall 2012



Grants Awarded

- Dr. Judit E. Puskas awarded \$7500 and \$157,500 from the National Science Foundation and \$5,000 from the Army Research Office/ARL.
- Dr. Donald P. Visco awarded \$99,088 from the National Science Foundation through Tennessee Technological University.
- Dr. Jie Zheng awarded \$74,977 from the National Science Foundation.
- Dr. Chelsea Monty awarded 33% of \$83,257 from the Ohio Department of Development through Austen BioInnovation Institute in Akron.
- Dr. Gang Cheng awarded 40% of \$561,448 from the National Science Foundation.
- Dr. Richard J. Elliott awarded \$37,572 from PolyOne.

Faculty Publications

S Swaminathan, **GG Chase**, Electrospinning of Metal Doped Alumina Nanofibers for Catalyst Applications, Chapter 3, in Nanofibers, Intech Open Access Publisher, ISBN 978-953-307-420-7, 2011. <http://www.intechopen.com/articles/show/title/electrospinning-of-metal-doped-alumina-nanofibers-for-catalyst-applications>

JS Varabhas, **GG Chase**, DH Reneker, New methods to electrospin fibers, JEFF, (2011), 6(3), 32-38.

SU Patel, PS Kulkarni, SU Patel, **GG Chase**, The effect of surface energy of woven drainage channels in coalescing filters, Sep Pur Tech, (in press).

G Viswanadam, **GG Chase**, Contact angles of drops on curved superhydrophobic surfaces, J. Colloid Interface Sci, (in press). <http://dx.doi.org/10.1016/j.jcis.2011.11.004>.

PS Kulkarni, SU Patel, **GG Chase**, Layered hydrophilic/hydrophobic fiber media for water-in-oil coalescence, Sep Pur Tech, (in press).

Lotus, A. F.; Tacastacas, S. N.; Pinti, M. J.; Britton, L. A.; Stojilovic, N.; Ramsier, R. D.; **Chase, G. G.** (2011). Fabrication and Characterization of TiO₂-ZnO Composite Nanofibers. Physical E-Low-Dimensional Systems & Nanostructures, 43(4), 857-861.

Chien, A. C.; **Chuang, S. C.** (2011). Static and Dynamic Hydrogen Adsorption on Pt/AC and MOF-5. International Journal of Hydrogen Energy, 36(10), 6022-6030.

Ghobadi, A. F.; **Elliott, J. R.** (2011). Evaluating Perturbation Contributions in SAFT Models by Comparing to Molecular Simulation of n-Alkanes. Fluid Phase Equilibria, 306(1), 57-66.

Aljarrah, M. T.; Wang, R.; **Evans, E. A.** (2011). Experimental Characterization and Modeling of a Nanofiber-Based Selective Emitter for Thermophotovoltaic Energy Conversion: The Effect of Optical Properties. Journal of Applied Physics, 109(3).

Aljarrah, M. T.; **Evans, E. A.**; Hicks, J.; Clemons, C. B.; Young, G. W. (2011). Modeling of Emission Properties from a Spatially Distributed Selective Emitter. Journal of Applied Physics, 109(3).

Wang, H.; Sodagari, M.; Chen, YJ.; He, X.; **Ju, LK.**; **Newby, BMZ.** (2011). Initial Bacterial Attachment in Slow Flowing Systems: Effects of Cell and Substrate Surfaces Properties. Colloids and Surfaces B-Biointerfaces, 87(2), 415-422.

Koganti, S.; Kuo, TM.; Kurtzman, C. P.; Smith, N.; **Ju, LK.** (2011). Production of Arabitol from Glycerol: Strain Screening and Study of Factors Affecting Production Yield. Applied Microbiology and Biotechnology, 90(1), 257-267.

Faculty Publications Continued

- Zhang, Q.; **Ju, LK.** (2011). Rhamnolipids as Affinity Foaming Agent for Selective Collection of Betaglucosidase from Cellulase Enzyme Mixture. *Enzyme and Microbial Technology*, 48(2), 175-180.
- Leipzig, N. D.;** Wylie, R. G.; Kim, H.; Shoichet, M. S. (2011). Differentiation of Neutral Stem Cells in Three-dimensional Growth Factor-Immobilized Chitosan Hydrogel Scaffolds. *Biomaterials*, 32(1), 57-64.
- Lin, SH.; Zhang, B.; Skoumal, M. J.; Ramunno, B.; Li, XP.; Wesdemiotis, C.; **Liu, LY.;** Jia, L. (2011). Antifouling Poly(Beta-Peptoid)s. *Biomacromolecules*, 12(7), 2573-2582.
- Wang, QM.; Shah, N.; Zhao, J.; Wang, CS.; Zhao, C.; **Liu, LY.;** Li, LY.; Zhou, FM.; Zheng, J. (2011). Structural, Morphological, and Kinetic Studies of β -Amyloid Peptide Aggregation on Self-Assembled Monolayers. *Physical Chemistry Chemical Physics*, 13(1), 15200-15210.
- Zhang, B.; Lalani, R.; Cheng, F.; Liu, QS.; **Liu, LY.** (2011). Dual-Functional Electrospun Poly(2-Hydroxyethyl Methacrylate). *Journal of Biomedical Materials Research A*, 99(A), 455-466.
- Lalani, R.; **Liu, LY.** (2011). Synthesis, Characterization, and Electrospinning of Zwitterionic Poly(Sulfobetaine Methacrylate). *Polymer*, 52(23), 5344-5354.
- Monty, C. N.;** Londono, N. J.; Masel, R. I. (2011). Non-Biological Inhibition-Based Sensing (NIBS) Demonstrated for the Detection of Toxic Arsenic Compounds. *Chemosphere*, 82(11), 1644-1648.
- Model, M. A.; Fang, J.; Yuvaraj, P.; Chen, Y.; **Newby, BMZ.** (2011). 3D Deconvolution of Spherically Aberrated Images Using Commercial Software. *Journal of Microscopy*, 241(1), 94-100.
- Shan, X.; **Payer, J. H.;** Wainright, J. S.; Dudik, L. (2011). Demonstration of a Micro-Fabricated Hydrogen Storage Module for Micro-power Systems. *Journal of Power Sources*, 196(2), 820-826.
- Shan, X.; **Payer, J. H.;** Wainright, J. S.; Dudik, L. (2011). A Micro-Fabricated Hydrogen Storage Module With Sub-Atmospheric Activation and Durability in Air Exposure. *Journal of Power Sources*, 196(2), 827-834.
- Xu, YQ.; Malkovskiy, A.; Wang, QM.; Pang, Y. (2011) Molecular Assembly of a Squaraine Dye with Cationic Surfactant and Nucleotides: Its Impact on Aggregation and Fluorescence Response. *Organic & Biomolecular Chemistry*, 9(8), 2878-2884.
- Yu, X.; **Zheng, J.** (2011) Polymorphic Structures of Alzheimer's β -Amyloid Globulomers. *PLoS One*, 6, e20575.
- Yang, Y.; Zhao, C.; Hsieh, I.; Subramanian, S.; **Liu, LY.;** **Cheng, G.;** Li, LY.; Cheng, SZD.; **Zheng, J.** (2011) Strong Resistance of PEG-Based L-Tyrosine Polyurethanes to Protein Adsorption and Cell Adhesion. *Polymer International*.
- Yu, X.; **Zheng, J.** (2011). Cholesterol Promotes the Interaction of Alzheimer β -Amyloid Monomer with Lipid Bilayer. *Molecular Biology; Amyloid Structure, Function, and Molecular Mechanisms*, (in press).
- Zhao, C.; **Zheng, J.** (2011). Synthesis and Characterization of Poly (n-Hydroxyethylacrylamide) for Long-Term Antifouling Ability. *Biomacromolecules*, 12, 4071.
- Zhao, J.; Wang, QM.; Liang, GZ.; **Zheng, J.** (2011) Molecular Dynamics Simulations of Low-Ordered Alzheimer's β -Amyloid Oligomers from Dimer to Hexamer on Self-Assembled Monolayers. *Langmuir*, (in press).
- Zhao, J.; Yu, X.; Liang, GZ.; **Zheng, J.** (2011). Heterogeneous Triangular Structures of Human Islet Amyloid Polypeptide (amylin) With Internal Hydrophobic Cavity and External Wrapping Morphology Reveal The Polymorphic Nature of Amyloid Fibrils. *Biomacromolecules*, 12(5), 1781-1794.
- Zhao, C.; Li, LY.; Wang, QM.; Yu, QM.; **Zheng, J.** (2011) Effect of Film Thickness on the Antifouling Performances of Poly (hydroxyl-functional Methacrylates) Grafted Surfaces. *Langmuir*, 27(8), 4906-4913.
- Wang, QM.; Shah, N.; Zhao, J.; Wang, CS.; Zhao, C.; **Liu, LY.;** Li, LY.; Zhou, FM.; **Zheng, J.** (2011) Structural, Morphological, and Kinetic Studies of Beta-Amyloid Peptide Aggregation on Self-Assembled Monolayers. *Physical Chemistry Chemical Physics*, 13(33), 15200-15210.
- Zhao, J.; Yu, XA.; Liang, GZ.; **Zheng, J.** (2011) Structural Polymorphism of Human Islet Amyloid Polypeptide (hIAPP) Oligomers Highlights the Importance of Interfacial Residue Interactions. *Biomacromolecules*, 12(1), 210-220.



Have a great holiday season!

Send this newsletter to others who would be interested in seeing more about our department.

It is always wonderful to hear from you. Please keep us up to date with news that you may want to share for inclusion in the Spring issue!

Please send your information to Marcia D. Main at main1@uakron.edu