

Department of Academic Year 2010-2011 Chemical Engineering Newsletter

New Faculty Spotlight: Dr. Anand Asthagiri

The Chemical Engineering Department welcomed Dr. Anand Asthagiri in January 2011 as an associate professor. Dr. Asthagiri was attracted to Northeastern's plans for dynamic growth, the collegiality of the faculty and students and faculty scientific interaction. He believes that the work being done at Northeastern, from the students up to the administration, has the potential for great impact on the world.

Dr. Asthagiri grew up in the town of Kent, Ohio. He received his B.S. in chemical engineering from Cornell University and earned his Ph.D. in chemical engineering with a minor in molecular cell biology from MIT. Dr. Asthagiri's Ph.D. work explored the dynamics of adhesion and growth factor-mediated signaling and their co-regulation of DNA synthesis. He conducted his postdoctoral research at the Harvard Medical School, in the lab of Dr. Joan S. Brugge before becoming an assistant professor of chemical engineering at the California Institute of Technology.

The opportunities at Northeastern University and the chance to reconnect with the remarkable biomedical "playground" in New England drew Dr. Asthagiri back to Boston. He looks forward to collaborating with Northeastern faculty and the many universities, pharmaceutical companies, and small start-ups in the Boston area. Dr. Asthagiri is particularly interested in how cells function

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and how chemical engineers can influence those that function through analysis of interactions between cells and materials.

To bring his

research expertise into the classroom, he looks forward to developing a cellular engineering class for graduate and senior undergraduate students. During the Spring 2011 semester at Northeastern, he taught the graduate level course CHME 7350, Transport Phenomena. The small class size allowed him to get to know the students and advise them on their assigned projects. Dr. Asthagiri enjoys mentoring students and has eagerly volunteered to be faculty advisor for the Graduate Student Council (GSC) to help facilitate greater communication between the students and faculty.

When Dr. Asthagiri is not teaching, he devotes his time to his family. He loves playing soccer and baseball with his daughter and talking about questions of the universe with his son. Dr. Asthagiri's favorite food is tiramisu; he plays tennis and enjoys Jack Nicholson movies.

With his experience and enthusiasm, Dr. Anand Asthagiri makes a great addition to the Northeastern Chemical Engineering Department.

- International Exchange Program
- Department News and Awards



Northeastern

Letter from the Chair

Greetings to Northeastern ChE friends and alumns!

The Northeastern University Chemical Engineering Department continues on an upward trajectory, with new hires, new transitions and new accomplishments. I invite you to read about our accomplishments in the department this year.

During the 2010/2011 academic year, the Department was home to 334 chemical engineering majors, 31 Ph.D. students and 18 M.S. students. Unique experiences such as co-op participation, student research, Chem-E Car teamwork and handson Unit Operations Lab experiments shape the Northeastern chemical engineer -- engaged, driven, socially conscious, innovative and entrepreneurial. Congratulations to the Class of 2011!

In Fall 2010, President Joseph E. Aoun announced continued faculty hiring at the University, and the ChE Department is actively participating in this process. In 2011, we welcomed Associate Professor Anand Asthagiri whose profile is featured in this newsletter; we celebrated the tenure and promotion of Rebecca L. Carrier and Shashi K. Murthy to the rank of Associate Professor of Chemical Engineering, and the promotion of Elizabeth Podlaha- Murphy to the rank of Professor of Chemical Engineering. These talented and dedicated individuals have made it possible for the department to award a record seven Ph.D. degrees this academic year.

A special congratulation goes to Associate Professor Katherine S. Ziemer for her election to the 2011 AIChE Board of Directors. This honor brings the accomplishments of the Northeastern ChE Department into national focus.

The NU ChE Cooperative Education program continues as the cornerstone of experiential learning. In spring 2011 the department placed 93 students, with an average grade point average of 3.36 out of 4.0, in 56 companies and research laboratories.

We hope to stay connected with the alumni and friends who have helped support

and shape our department. I always enjoy meeting NU ChE alumni and look forward to hearing how their NU experience shaped their lives. Please do stay in touch. Enjoy our newsletter.

Lama J. H. Lewis

Dr. Laura H. Lewis Cabot Professor and Chair



Emma Chory (Class of 2012) **Awarded Prestigious Steamboat Scholarship**

"I've been on the job for two days and I have already learned so much!" Emma Chorv exclaimed when asked about her internship experience at the Dana-Farber Cancer Institute (DFCI) in Boston, Massachusetts. This internship is the culminating co-op experience for Emma as she pursues a B.S. in Chemical Engineering at Northeastern University.

While working with Chemical Engineering Associate Professor Shashi Murthy in his laboratory researching cell-adhesion phenomena, Emma was attracted to therapeutics and the biological applications of chemical engineering. As a result, Emma pursued a co-op experience at Firefly Bioworks, a small five-person startup company located in Cambridge. This experience cemented her interest in biochemical engineering. She contributed to the developing of a novel assay for the detection of non-coding RNA biomarkers associated with many cancers. Emma loves her research and strives to enable early detection and diagnosis of diseases.

Recently, Emma won a prestigious scholarship from the Steamboat Foundation, an organization that selects scholars from different universities and majors every year to polish leadership skills, receive mentorship from top industry have. Over 80,000 variations of that leaders, and intern with their grant partners. The Steamboat Scholarship provides Emma with a unique opportunity to work at the Dana-Farber Cancer Institute (DFCI) under the guidance of Dr. James Bradner, the attending physician in bone-marrow transplant and stem cell transplant.



Emma loves seeing the engineering world from a medical standpoint at the hospital. including going on rounds. As an engineer, she had sometimes felt removed from the real-world applications. Now she gets to see firsthand how devices developed by engineers are actually contributing to and making a difference in peoples' lives.

At DFCI, Emma is working to combat midline carcinoma, a rare but deadly cancer that affects young people. Patients with midline carcinoma disease do not respond to chemotherapy or radiation, which makes them good candidates for targeted therapies. This treatment option employs small molecules to target specific cells. It is important to identify and block enzymes that play key roles in cancer growth. Complex models are used to determine what kinds of structures these small molecules should structure are then made and have to be tested. Emma's contribution to this area is to design a high-throughput assay to test these molecules and determine which ones will be most effective at targeting the designated cells. Once identified, these molecules will be tested on cell lines and mice then finally used to treat cancer in humans.

Grad Spotlight: Jimmy Green

Dr. James V. "Jimmy" Green earned his Ph.D. this year and is off to an exciting career in biologic purification.



After receiving his B.S. degree in chemical engineering from the University of Connecticut in 2007, Jimmy interned at Biogen Idec and Genzyme. These experiences steered him towards graduate school in chemical engineering at Northeastern for biological research, which he found to be very rewarding.

Under the guidance of Dr. Shashi Murthy, Jimmy pursued Ph.D. graduate research to investigate the application of microfluidic techniques to healthcare. The first aspect of his research examined cardiac cell separation for tissue engineering. In this work, microfluidic techniques were employed to obtain cardiac stem cells and create grafts to replace damaged tissue. The second aspect of his work investigated ocular disease diagnostics. Currently several ocular diseases, including ocular cancer, are difficult to diagnose. Microfluidic devices can process small samples in minutes to produce a clear diagnosis at the point-of-care location.

During Jimmy's time at Northeastern, he published four papers and presented at several conferences around the world, including conferences in the Netherlands, San Francisco, Fort Lauderdale, and Boston, On April 8, 2011. Jimmy defended his Ph.D. thesis and has started his new position at Bayer Business and Technology Services (BBTS) in Berkeley, CA. He is a project manager developing a closed concept downstream purification system to produce Bayer's next generation drug to treat hemophilia A.

Jimmy enjoys golfing and skiing in his free time. He says that his favorite part of grad school was hanging out with his lab mates.

NU AIChE

The group has been up to it's old tricks again this year with Lobsterfest, ChemE Car, the AIChE conference, and more!

Check out their website for more information. http://www.coe.neu.edu/Groups/aiche/



The Chemical Engineering Graduate Student Council (ChemE GSC), a group of graduate students selected by their peers, experience at Northeastern University by promoting both on- and off-campus student activities and communication throughout the entire department.

We are happy to have Dr. Anand Asthagiri as our new faculty advisor for this year. He brings fresh ideas which, together with his enthusiasm, are improving the group activities and the department as a whole.

Recent ChemE GSC activities included a department barbecue, a bowling night, a trip to the Harbor Islands (pictured right), and a Red Sox game. These are only a few of the events thus far, with much more to come.

Graduate Student Council

We are currently in the process of creating new avenues for students' feedback to the faculty by conducting surveys designed to identify graduate is designed to enhance the overall graduate students' comments and concerns, and to identify areas for improvement and success.

> We are excited for what will be a very active year! For more information see our website: www.northeastern.edu/cheqsc/

Nina Bordeaux, GSC President '11-'12



Congratulations to our 2010/2011 ChE Degree Recipients

Doctor of Philosophy

Dr. Sheba Goklany

Transcriptional Regulation of Terpenoid Indole Alkaloid Hairy Root Cultures Biosynthesis by Jasmonte in Catharanthus roseus Advisor: Dr. Carolyn Lee-Parsons

Dr. James V. Green

Size- and Adhesion-Based Microfluidic Cell Separation for Tissue Engineering and Clinical Diagnostics Advisor: Dr. Shashi K. Murthy

Dr. Mariam Ismail

Synthesis and Bandgap Engineering of Vanadosilicae AM-6 for Photocatalytic Applications Advisor: Dr. Albert Sacco, Jr.

Dr. Savidra Lucatero

Electrodeposited Au/FeAu Porous Nanowires for Enhanced Catalytic Activity and Stability of Reactions on Titania Advisor: Dr. Elizabeth Podlaha-Murphy

Dr. Courtney Pfluger

Biomimetic Replication of Intestinal Basement Membrane Topography Advisors: Dr. Rebecca Carrier and Dr. Daniel Burkey

Dr. Brian Plouffe

Magnetic Particle Based Microfluidic Separation of Circulating Tumor Cell Populations from Whole Blood for Applications in Diagnostic Medicine Advisors: Dr. Shashi K. Murthy and Dr. Laura H. Lewis

Dr. Lin Wang

Biomimesis of Intestinal Crypt Micro-topography and Extracellular Matrix Chemistry for Intestinal Cell Culture Advisor: Dr. Rebecca Carrier

Bachelor of Science Graduating Summa Jordan McGinty

Cum Laude Adrian Li Emilia Smith

Graduating Magna

Cum Laude Steven Cardoso Pin-I Chen Naftali Fraiman Christopher Harcourt Clinton Holmes Sanjin Hosic Tatiana Kniazeva David Ledoux Nicole Manton

Master of Science

Alex Avekians Tania Bairachna

Paul Madenjian (Class of 2012) Talks Co-op

In 2010 Paul Madenjian recieved a Galante Scholarship! This exciting Northeastern program provides support to students pursuing both a B.S. and an M.B.A. degree. Paul will be able to earn his M.B.A. one year after receiving his B.S. in 2012.

Throughout high school Paul Madenjian enjoyed mathematics and the sciences (particularly chemistry). He decided to be a chemical engineer because he wanted to pursue a challenging, broad course of study that would allow him to be flexible in deciding his future opportunities. He also wanted to test and explore possible future opportunities through the co-op program at Northeastern University.

From June to December of 2009, Paul worked at Merck Research Laboratories as a Pharmaceutical Manufacturing Research Co-op Student. A key lesson he learned from this coop experience is, "one will only use 5 - 10% of what one learns from their academic education in industry." He says, "There is no doubt that the engineering knowledge I learned in the classrooms supported my work at Merck, but what was much more valuable was the analytical thought process that I had learned through my ChemE studies." Paul was able to use that same structured thinking to solve problems that were presented to him during his co-op, the majority of which



he had never been exposed to in the classroom. Paul credits Professors Katherine Ziemer and Al Sacco, Jr. as having made the greatest impressions on his professional development. He says, "Both professors taught and emphasized the value of learning

how to think as a chemical engineer and develop one's analytical thought process."

Paul's second co-op, which was at the MIT Chemical Engineering Department: Novartis - MIT Center for Continuous Manufacturing, exposed him to academic research that allowed him to compare the academic environment to the industrial environment. He was also exposed to the entire continuous pharmaceutical manufacturing process that the Novartis - MIT Center for Continuous Manufacturing was developing.

His final co-op, which started in July 2011 with the Technical Risk group at General Electric Capital Energy Financial Services, requires him to draw upon the engineering and business knowledge he obtained from NU. It allows him to gain an immense amount of professional knowledge about the financial system supporting today's evolving energy industry. This will be the first co-op placement Paul completes outside of the laboratory environment, and he plans to use the experience to refine his career aspirations. Jordan McGinty Steven Modzelewski Michael Oliver James Peerless Mark Somers Christopher Testa Jared Yanofsky

Graduating Cum Laude

Sean Bartlett Miranda Gray Rachael Hogan Martin Kimani Ashley King Hong Long Graduating Daniel Johnson Anthony Kilroy Brian Mahoney

Devyesh Rana

Alexandra Steele

Daniel Shea

Joan Wozny

Csky Young

Robert McConaghy Edward Proctor Matthew Ryan Anthony Sanfilippo Tyler Scanlon Brendan Toohey

Radhika Barua Lutfiye Kurt Stephanie Fernandez Brian McMahon

International Exchange

In Summer 2011, Dr. Elizabeth Podlaha-Murphy coordinated a new exchange program at Northeastern University with a grant from the European Commission Marie Curie International Research Staff Exchange Scheme (IRSES). She is working with groups at four European universities (VU, Lithuania; KUL, Belgium; ECP, France; and IAP, Moldova).

Tania Maliar is the first European student to visit NU with the program. She comes from Dr. Henrikas Cesiulis's group at Vilnius University, Lithuania. She is working with Dr. Podlaha-Murphy for five months researching template-assisted deposition of functional materials and devices. During her time at NU, Tania is learning how Dr. Podlaha-Murphy's research lab works at the cutting edge of scientific development. She sees this cultural exchange as an opportunity to share experiences and scientific practices between Europe and the US. Tania hopes that this Vilnius-Northeastern exchange will help her to advance her knowledge of electrochemistry, build successful scientific relationships, and learn about the American culture.

As part of the exchange, Dr. Podlaha-Murphy's Ph.D. student Shaopeng Sun worked with Dr. Cesiulis in Lithuania this past July 2011.



Pictured L-R: Tania Maliar (left), Tania Bairachna, Fulbright Fellow (middle), and Dr. Podlaha-Murphy (right)

Department News and Awards

Faculty

Associate Prof. Anand Asthagiri received a National Institutes of Health (NIH) grant in the sum of a \$1.25 M to pursue quantitative analysis of how epithelial cells scatter during cancer development.

Associate Prof. Rebecca Carrier received a \$230 K grant from NIH to develop a natural matrix-based cell delivery vehicle for delivery of RPCs to the subretinal space to promote retinal regeneration. Her grant is collaborative with the Schepens Eye Research Institute, an Affiliate of Harvard Medical School.

Prof. Laura H. Lewis was awarded a grant of \$512 K from the Office of Naval Research for investigations of "Rare-Earth-Free Permanent Magnets for Advanced Applications".

Prof. Elizabeth Podlaha-Murphy received a \$300 K grant from the NSF to study the electrochemical codeposition of molybdenum and tungsten alloys to catalyze electrolytic hydrogen production.

Prof. Ronald Willey received the Professor of the Year award at the 2010 NU ChE Award Ceremony.

Associate Prof. Katherine Ziemer has been invited to speak at the National Academy of Engineering's Frontiers of Engineering Education Symposium.

Graduate

Sheba Goklany won first place in the poster competition for her poster: "Transcriptional Regulation of Terpenoid Indole Alkaloid Biosynthesis in Methyl Jasmonate-Induced Catharanthus Roseus Hairy Root Cultures." Goklany, S., Loring, R.H., Glick, J., Lee-Parsons, C. W.T., (2010) at the Annual International Society of Pharmaceutical Engineers (ISPE) meeting held November 7th-10th, 2010, Orlando, FL. **Pegah Hosseinpour** and **Melissa Loving** attended the highly selective IEEE Magnetics Society Summer School held in New Orleans, Louisiana, in May 2011.

Mariam Ismail received the American Institute of Chemists Award for exceptional academic excellence in chemical engineering.

Dr. Brian Plouffe won an "Outstanding Student Research" award for his poster presentation at the NU Research and Scholarship Expo. This is his second time winning this award (the first was awarded 2008).

Noreen Rizvi received an NSF Graduate Fellowship Honorable Mention.

Undergraduate

Anthony Fusco ('12) was awarded a \$1000 Undergraduate Research Grant from the Provost to work in Dr. Edgar Goluch's research group.

Lauren Gianino ('12), the Tau Beta Pi vice-president elect for '11-'12, has won a TBP Scholarship for \$2000 for her senior year. The TBP Scholarship Program was established in 1998 to advance engineering education and the profession.

Daniel Shea ('12) was awarded a \$1000 Undergraduate Research Grant from the Provost to work in Dr. Carolyn Lee-Parson's research group.

ChE Awards were presented on April 20th, 2011. The winners are listed below:

AIChE Outstanding Senior Award (Local Section) Miranda Gray ('11)

American Institute of Chemists Award Emily Smith ('11)

Calvin S. Cronan Award James Peerless ('11) Hong Long ('11)

Supporting the Department

This is an opportunity to make a lasting contribution to the future of the Chemical Engineering Department and Northeastern University.

Your support is essential to furthering our mission to provide our students with education and experiences that will help transform their lives. It will also provide scholarships to students, develop new chemical engineering programs, and contribute to new facilities and equipment.

A planned gift to Northeastern can support the College of Engineering. For more information please visit www.northeastern.edu/giftplanning or email giftplanning@neu.edu.

For more information on ways to give, please contact Mae Lynn Patten, Director of Development and Alumni Affairs, by telephone at (617) 373-4845. *Gifts by Mail: To mail in a gift, please make your check payable to Northeastern University and send it to:

Development and Alumni Affairs College of Engineering Snell Engineering Center, Room 230 Northeastern University 360 Huntington Avenue Boston, MA 02115

Please indicate Department of Chemical Engineering on the memo line to designate your gift.

*Online Gifts: www.neu.edu/giving/ You will have an opportunity to designate your gift to the College of Engineering.

*Gifts By Telephone: To make a gift by telephone, please call (617) 373-5520 during regular University business hours of 8:30 a.m. to 4:30 p.m., Monday through Friday. Be sure to designate your gift in support of the Department of Chemical Engineering. Nabil Morris Outstanding Student Award Anthony Fusco ('12)

National AIChE Outstanding Sophomore Thomas Dusseault ('12)

Omega Chi Epsilon Award for Student of the Year Emily Smith ('11)

President's Award for Outstanding Scholarship Sean Burns ('13) Taylor Dickman ('13) Lauren Gianino ('12) Thomas Dusseault ('12)

Ralph Buonopane Award for Outstanding Hands-on Learning Matthew Van Oudenaren ('12)

ChemE Car Wins!

The Northeastern ChemE Car team won first place in the ChemE Car poster competition, sixth place in the race, and received the Outstanding AIChE Chapter recognition. Their technical and safety analysis was said to "set the standard" of the competition.



Team Members: Emma Chory, Matthew DiNitto, Ross Dworet, Dan Kaplan, Aaron L. Lamoureux, Nate Mahlmeister, Emily Nelson, Sam Wallner, (class of '12); Ben Langhauser, Russell Williamson (class of '14); and Kevin O'Toole (class of '15).

Stay Connected, Stay Informed!

Our goal is to keep you connected and informed.

Tell us about your own professional accomplishments or personal updates. Please send news to us and we will include it in an Alumni Updates column.

Do you have any suggestions for articles for upcoming issues?

Do you know of an alumnus who is not receiving our newsletter but would like to be on our mailing list?

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