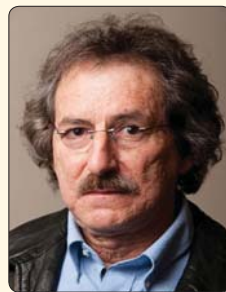


# CHEMICAL ENGINEERING NEWS

THE UNIVERSITY OF ROCHESTER'S EDMUND A. HAJIM SCHOOL OF ENGINEERING AND APPLIED SCIENCES

## A MESSAGE FROM THE CHAIR: FALL 2012



Dear Alumni and Friends of ChE,

I hope this ChE e-newsletter finds you well, enjoying the fall and receptive to this inaugural ChE e-newsletter which we hope to put out twice a year to better keep in touch with all of our alumni and friends. The

newsletter is divided into various sections (see bottom of page) with articles on our students, academic program, alumni achievements, as well as a freewheeling 'out of the box' segment in which we want to periodically showcase avocations of our faculty, staff, students and alumni.

I'd like to provide a couple of items of news to update you about the department's affairs. The undergraduate ChE student population reached a recent high this fall with 165 students having declared an interest in the major. In the difficult current job market students now perceive a degree in engineering as one that will provide the basis for a promising professional career. We also have 60 graduate students in the program and to meet these challenges are in the process of trying to recruit an additional faculty member to augment our two most recent faculty hires, Professors Hitomi Mukaibo and Alex Shestopalov.

Of particular note to the undergraduate program has been the almost-completed renovation of the undergraduate lab space in Gavett Hall. Over the years many of you have stated (often forcefully) that the undergraduate laboratory space in Gavett Hall needed to be significantly upgraded. This was undertaken this past year and recently a new state-of-the-art space debuted to replace

the old lab. Many people were involved in this effort but special kudos go to Professor Doug Kelley and members of our staff, Larry Kuntz and Rachel Monfredo, who assist Doug in teaching the lab courses.

Also, in the recent once-a-decade National Research Council (NRC) rankings of academic programs in the US, which were released on September 28, 2010, the department achieved its best ever results. Instead of an exact rank for any university or program the NRC provided a statistical range, which considered factors like an assessment of the number of publications per faculty member, citations per publication, diversity of the faculty and students, GRE scores, and student work space and health insurance availability. Notwithstanding criticism from some quarters about such rankings the NRC review has historically been seen as the "gold standard" for academic departments in the US and our performance in the recent survey is something to be proud of.

In closing let me say how delighted we'd be to hear from you via phone or email at the address given in this newsletter. I encourage you to join our University of Rochester Chemical Engineering Alumni Group Linked In page if you have not done so already. Our vision for the department is to continue to be a place that provides our students with a well-rounded, outstanding education at the University of Rochester. To do this we need and ask for your help and involvement.

Best wishes,  
Professor Eldred H. Chimowitz

*Please join the University  
of Rochester's Chemical  
Engineering Alumni Group  
on LinkedIn*



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NRC Ranks UR Chemical Engineering Program Among the Best

The National Research Council conducts a survey and compiles a report on United States Research-Doctorate Programs approximately every 10 years. The University of Rochester's Chemical Engineering Doctoral program was recognized as among the best in the nation in the comparative analysis published in September 2010. The study ranked doctoral programs in Chemical Engineering using data that reflect overall quality of research and education. Chemical Engineering at the University of Rochester was ranked between 8th to 28th out of 106 doctoral programs. Rankings are presented in ranges rather than a numerical list because several programs can be statistically similar with overlapping ranges in rank.

NRC Rankings of Chemical Engineering Graduate Programs\*

| Institution              | High ranking | Low Ranking |
|--------------------------|--------------|-------------|
| Caltech                  | 1            | 2           |
| California-Santa Barbara | 1            | 4           |
| California-Berkeley      | 2            | 5           |
| MIT                      | 3            | 8           |
| Texas-Austin             | 3            | 9           |
| Princeton                | 3            | 10          |
| Minnesota                | 4            | 15          |
| Stanford                 | 5            | 19          |
| Illinois                 | 6            | 25          |
| Michigan                 | 7            | 26          |
| Northwestern             | 7            | 27          |
| Carnegie Mellon          | 7            | 28          |
| Wisconsin                | 7            | 29          |
| Rochester                | 8            | 28          |
| Colorado                 | 8            | 29          |
| Delaware                 | 8            | 31          |
| Houston                  | 8            | 35          |
| Pennsylvania             | 9            | 29          |
| Georgia Tech             | 10           | 37          |
| Cornell                  | 11           | 40          |

\*Data presented are the ranges of "S-Rankings" of doctoral programs published Sept. 28, 2010 by the National Research Council. Only the top 20 ranges of rankings are shown. The complete rankings of all 106 Chemical Engineering Programs may be downloaded from <http://www.nap.edu/rdp/>

Gavett Hall Undergraduate Lab Undergoes Major Renovations



In November 2012, we commissioned a renovated new space in a celebration recognizing the strength and growth of the Chemical Engineering program. Increasingly, students desire a more hands-on laboratory experience, and for anyone who saw the state of the lab infrastructure and experienced the curriculum it was obvious there was a need for change.

In the summer of 2011, an operation was started to clean out the "old" equipment and underutilized materials that had accumulated over the years. Starting in May of 2012, a significant project was undertaken to renovate the building space in Gavett Hall. The main undergraduate lab (Gavett 119) is now a modern facility that will be fully utilized. The room has been designed to be open and much brighter. The old drain pits have been filled, and a tile floor has been installed. All the obsolete equipment has been removed, and wherever possible the old "dead" utility services have been removed. New utility services (compressed air, electric power, hot and cold water) have been strategically located to allow equipment to be easily connected, operated, and disconnected as needed.

The lab curriculum has been modified such that the junior lab (CHE246) focuses on student's doing experiments on work stations that reinforce their understanding of unit operations. There is on-going work in designing and building new mobile CHE246 experiments. The senior lab (CHE255) focuses on student teams defining/proposing an engineering project, and then designing and assembling the equipment needed to accomplish the goals of their proposal. In addition, mobile workbenches will be available for CHE255 students to use. This flexibility will allow both CHE246 and CHE255 student activities to be conducted using the same space.

The laboratory facilities also support independent study projects and some of the activities (i.e. quality control) for the U of R Biodiesel lab. The demands on the lab facilities are continually increasing, since the student class sizes are growing as the Hajim School of Engineering grows.

We commissioned this new space with a ribbon-cutting ceremony that included several of our Seniors playing in a Mariachi band, followed with remarks by Eldred Chimowitz, the Department Chair and Rob Clark, Dean of the Hajim School, who enthusiastically supported the renovation work. Thanks to the many people who were involved in this effort, including students, members of the university's facilities department, and university staff and administrators. Special kudos go to Professor Doug Kelley and members of our staff, Larry Kuntz and Rachel Monfredo, who assist Doug in teaching the lab courses. Pictures of the facility before and after are shown on the next page and the extent of the space makeover is striking. We hope you agree!





**BEFORE**



**AFTER**





## Chemical Engineering Faculty News

**Hitomi Mukaibo** joined the Department of Chemical Engineering at the University of Rochester in July of 2011. She earned her degrees in Engineering from Waseda University, Japan. As a graduate student, her research focus was in the development of novel electrode materials to make Lithium-ion batteries smaller and lighter. After obtaining her Ph.D, she decided to step outside the fields of energy, and explore her interest in biology-related topics. She moved to Florida and worked as a postdoctoral researcher at the University of Florida. Amid swamps and alligators, she studied porous membranes to detect proteins. She also used these porous membranes to develop a thin film supporting an array of tiny needles that stands about one third of the diameter of human hair. These needles were used to deliver genetic materials into living cells. Based on these trainings, her current research interests are in developing methods that use these small needle arrays for energy and/or biology applications.

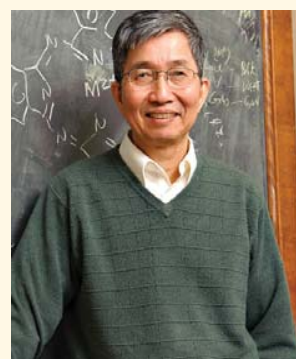
Last February, **Ching Tang**, the Doris Johns Cherry Professor of Chemical Engineering, was awarded the 2011 Wolf Prize in Chemistry for "deep creative contributions to the chemical sciences in the field of synthesis, properties and an understanding of organic materials." Prof. Tang shared the \$100,000 award with two eminent scientists, Prof. Stuart A. Rice, University of Chicago, and Prof. Krzysztof Matyjaszewski, Carnegie Mellon University. The award was presented at a ceremony at the Israeli Knesset in Jerusalem on May 29, 2011 by the President of the State of Israel, and by the Minister of Education, who both chair the Wolf Foundation Council.

**David Foster**, adjunct professor of Chemical Engineering, was named a University Professor of the Year in 2011. This Students' Association honor was created in 1981 to underscore the importance of undergraduate instruction. The program celebrates a faculty member for his or her achievement purely as an undergraduate professor; recipients are decided in a student vote. The award annually recognizes a professor in each academic division of the College – Engineering, Humanities, Natural Sciences, and Social Sciences – who "makes a positive and lasting impact on undergraduate student life at the University by developing relationships with students, creating an engaging and challenging classroom atmosphere, and inspiring the further pursuit of knowledge."

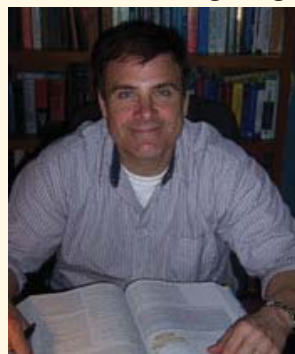
**Alexander Shestopalov** recently received an NSF award of \$799,980 to purchase a major piece of research equipment. A high resolution imaging X-ray photoelectron spectrometer (XPS) will provide researchers from the University of Rochester and surrounding institutions and industry with (1) a highly sensitive quantitative tool to measure elemental composition and chemical and electronic states of diverse inorganic and organic thin films and solids and (2) a parallel imaging capability of chemical patterns and structured films with sub 3  $\mu\text{m}$  lateral resolution. It will offer highly accurate and non-destructive characterization of inorganic semiconductors and insulators, organic and polymeric thin films, bio-inorganic interfaces, organic self-assembled monolayers, multilayered thin film devices and air/moisture sensitivesamples. The shared access to the instrument will be based on the successful model currently employed by UR's Nano facility. One of the critical parameters of the proposed instrument is a fully automatic operation and the ability to analyze multiple samples in a continuous automatic mode. This will not only permit the 24/7 use of the instrument, but will also allow the analysis of samples from research institutions outside of the greater Rochester area.



Professor Hitomi Mukaibo



Professor Ching Tang



Professor David Foster



Professor Alex Shestopalov

## Chemical Engineering Staff News

Many of you will fondly remember **Thor Olsen**, who announced his retirement from the department in 2010 after more than 40 years of service. His knowledge, technical skills and dedication have been valuable to generations of students. Thor was one of the early pioneers of introducing the computer into the chemical engineering laboratory. He continues to occasionally drop by the lab and is very excited about the recent renovation. We all wish Thor a long and happy retirement.

**Rachel Monfredo**, Senior Technical Associate, comes to the Chemical Engineering department with a diverse background. After graduating from Yale University with a Bachelors in Psychology, Rachel received a McNeil fellowship to pursue studies in the connoisseurship of American decorative arts, receiving an M.A. in the Winterthur Program of Early American Culture at the University of Delaware. She then moved to Massachusetts to work in the American Decorative Arts and Sculpture department at the Boston Museum of Fine Arts.

Despite the beautiful setting in which she worked, Rachel missed the rigors of math and science. She began taking Calculus courses at night school. A scholarship in the accelerated "LEAP" Engineering program at Boston University enabled Rachel to begin her career in engineering. She subsequently received a Patricia Roberts Harris fellowship to study Material Science (a seemingly natural transition from decorative "material" arts) in BU's Manufacturing Engineering department, where she received her Master of Science. Rachel moved from Boston to Austin, to work as a Research Engineer in the Institute for Advanced Technology at the University of Texas, Austin. Rachel designed and conducted experiments for the Electro-Magnetic Railgun program, investigating materials for conducting rails, insulators, and kinetic energy penetrators. Her research has been published in journals such as the IEEE Transactions on Magnetics, Materials Characterization and International Journal of Impact Engineering.

In 2005, Rachel returned to her hometown of Rochester, and started her own business. Working with palm wax in batch processes, Rachel creates unusually-shaped molded candles which she has sold at local galleries (including the Memorial Art Gallery) and area craft shows. Rachel went back to school again to become certified to teach high school mathematics and chemistry. The tight economic climate has been difficult for public education teachers, and Rachel was thrilled to find this position at the University of Rochester. She started in August 2011.

**Sandra Willison**, Administrator, celebrated her 10th year with the department in June of 2012. Sandra wears many hats -she is responsible for the daily operation of the department and providing support to the Chairman. Sandra oversees the department's finances including yearly budget submissions, payroll, renovation, new faculty, visiting students, purchasing for the research labs, and post grant administration. Thank you for all you do, Sandra!

**Victoria "Vicki" Heberling** joined the department in July 2012. Vicki is the Program Coordinator for the NSF IGERT "Distributed Renewable Energy: From Science & Technology to Entrepreneurship & Policy". Vicki has been with the University since 1993, working on an international women's health research project before coming to the River Campus in 2005.



Thor Olsen



Rachel Monfredo



Sandra Willison



Vicki Heberling



## Alumni Profile - Maruti Bhandarkar

Maruti Bhandarkar (MS ChE 1985, PhD 1988) has over 20 years of experience in pilot plant scale process research and commercial scale process engineering.

After graduating in 1988 with a PhD in Chemical Engineering from U of R, he worked as a Research Associate in the Inorganic Membrane Research Center at WPI (Worcester, MA) where he investigated the use of hollow glass fiber membranes for gas separation at high temperatures.

Subsequently Dr. Bhandarkar joined Badger Licensing, a subsidiary of Raytheon Company at the time. During his nearly 16 years of employment at Badger, he mostly worked in the company's Weymouth (MA) R&D facility. He started off as a Research Engineer and later became a Research Program Manager.

At Badger Dr. Bhandarkar primarily worked on developing the processes for the manufacture of cumene and ethylbenzene by the liquid-phase benzene alkylation using Exxon Mobil's proprietary, zeolite catalysts. He also worked on improving Badger's highly successful process for the manufacture of styrene by dehydrogenating ethylbenzene. A significant fraction of the world's production of cumene, ethylbenzene and styrene is being carried out using Badger's technologies.



Dr. Bhandarkar is presently working in the Houston (TX) area as a Team Leader in the Global Process Engineering department of Chevron Phillips Chemical Company (CPChem). In this position he oversees a team of chemical engineers responsible for providing support to CPChem's plants manufacturing polystyrene and a variety of specialty chemicals. His team also focuses on maintaining CPChem's position in several proprietary technologies for specialty chemicals, as well as bringing in innovations to improve profitability.

Dr. Bhandarkar has also had a stint in academia. During 2001-2004, he took a break from the US chemical industry and returned to his native country, India. There he worked as Professor and Head of the Department of Chemical Engineering at BMS College of Engineering, in Bangalore (India).

Dr. Bhandarkar and his wife, Mamata, are settled in Houston (TX). They have one daughter, Manasa, who is studying medicine in Boston (MA).

**Are you interested in becoming the featured alumni?**

**Contact Jennifer Condit at [jennifer.conda@rochester.edu](mailto:jennifer.conda@rochester.edu)**

**We want to hear from you! Please email Jennifer Condit your latest and greatest achievements to: [jennifer.conda@rochester.edu](mailto:jennifer.conda@rochester.edu)**

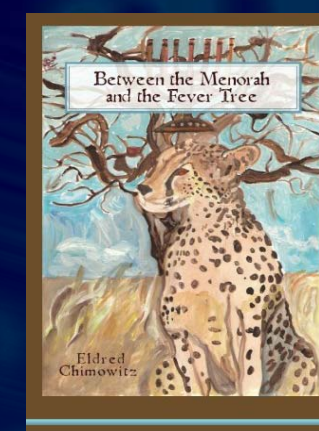
## Outside the Box

The CHE Department Welcomes It's Latest Family Member!

Welcome to baby boy Teos Klee Anthamatten, son of Professor Mitch Anthamatten, a healthy  $7.63 \pm 0.05$  lb born on October 1st, 2012 at ~ 2:40 pm. Mitch said "The little one is accumulating mass at an astonishing rate" and he experienced nostalgia and fond memories of his seven years teaching Heat and Mass Transfer.



Teos Klee Anthamatten



**"Between the Menorah and the Fever Tree"**

Professor Eldred Chimowitz published his first novel in July of 2010. A bildungsroman set in Southern Africa, 'Between the Menorah and the Fever Tree' depicts the Jewish-African experience tracing the story of its protagonist 'Chungle' from boyhood in 1950s Rhodesia to youth in 1960s South Africa during the Apartheid era, and finally to America. Eldred is currently working on his second novel.

**Did you know?**

Larry Kuntz, Laboratory Engineer, mixes sound for a 6 piece rock & roll band. Nightowl started out in high school and four of the original members are still in the band. Larry's band plays music from the 50's through the present.



Larry Kuntz