

Greetings From The Chair



Dear Friends,

As the cold settles in and the lakes freeze over, research and teaching in the Department of Chemistry remains as hot as ever. Evidence for the health and vitality of the department is plentiful in this issue of *ChemNews*, which features items on recent student and faculty awards, research, education innovation, and alumni achievements. I am proud of the people who make the department such an engaging, collegial, and productive place. As newly appointed Chair, I am also humbled to step into the shoes of Jeff Roberts, who left to become Dean of Science at Purdue University last spring. Jeff and I joined the U of M as faculty members ~20 years ago, but it seems like just yesterday! Other significant personnel losses and the “new financial reality” at the U of M resulting from decreasing state support (for the first time, below tuition revenues) make this a particularly challenging time for us. Yet recent hires, a vibrant and increasingly large student body, and a continued focus by all on excellence in research, teaching, service, and outreach put us in an excellent position to move forward.

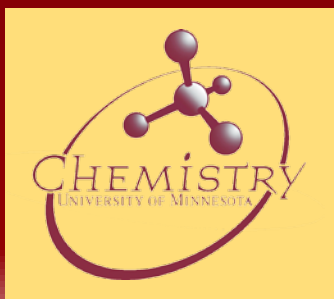
An important priority is to reinforce our already strong relationships with alumni. With our new presence on **Facebook** (click the link on the department web page, or search on Facebook for “University of Minnesota Department of Chemistry”), it’s easier than ever to keep up with developments in the department, interact with other alumni, and guess where Chuck Tomlinson is taking photos in Smith or Kolthoff Halls (try it, it’s fun).

Thanks for reading! And thank you for your support of our continued efforts to push the boundaries of chemistry research and educate the scientific leaders of tomorrow.

Best regards,

Bill Tolman

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Tolman Named Chair



University of Minnesota chemistry professor William Tolman has been named chair of the University of Minnesota Institute of Technology's Department of Chemistry effective August 5, 2009. Tolman succeeds professor Jeffrey Roberts who stepped down as chair to accept an appointment as dean of the College of Science at Purdue University.

A faculty member at the University since 1990, Tolman is a renowned synthetic chemist whose work straddles the traditional boundaries separating chemistry's inorganic, biological, and organic specialty areas. Tolman's current research, funded primarily by the National Institute of Health and the National Science Foundation, focuses on using synthetic chemistry to understand copper sites in enzymes and new ways to develop biorenewable sources to replace petroleum-based plastics.

Tolman is a researcher in Department of Chemistry's Center for Metals in Biocatalysis and the new **Center for Sustainable Polymers** (see page 25).

Tolman has received numerous honors and awards including a University of Minnesota Distinguished McKnight University Professorship, an Alfred P. Sloan Foundation Research Fellowship, and a Humboldt Foundation Research Award. In 2006, he was named a fellow of the American Association for the Advancement of Science. Tolman has given nearly 200 lectures on his research at various universities and research labs around the world. He has published more than 150 journal articles or book chapters and also holds a patent related to polymer synthesis from macrocycles.

Tolman is an active member of several professional organizations including the American Chemical Society, the Society for Biological Inorganic Chemistry and the American Association for the Advancement of Sciences. He is the chair-elect for the Gordon Research Conference "Metals in Biology" in 2011. Tolman also serves as associate editor of *Inorganic Chemistry* and is on the Board of Directors of the Minnesota Academy of Science, a statewide organization committed to promoting interest in and appreciation of science.

Tolman received his bachelor's degree in chemistry from Wesleyan University in 1983 and a Ph.D. in chemistry from the University of California, Berkeley in 1987. Tolman also served as a postdoctoral fellow at MIT from 1987 to 1990.

Bowser Named Director of Graduate Studies

On August 24, 2009 **Michael Bowser** became the **Director of Graduate Studies** for Chemistry, succeeding Ilja Siepmann in this important position.



Que Named Regents Professor

Larry Que, Jr. is a 3M/Alumni Distinguished Professor of Chemistry in the Institute of Technology. He is an internationally acclaimed scholar who has made a tremendous impact in the field of bioinorganic chemistry. Que has played a pioneering role in understanding the function that nonheme iron centers play in dioxygen activation in biology. Under his guidance, 33 students received their doctoral degrees and 10 students received their master's degrees. In addition, he has served as a research advisor to 66 post-doctoral students. Twenty-two former members of this group hold positions at industrial institutions as research scientists and 50 have tenure-track or tenured positions in colleges or universities. He is credited with establishing the University of Minnesota as a world-renowned center of excellence in bioinorganic chemistry and also led the effort to establish the U's Center for Metals in Biocatalysis, which comprises faculty and students from multiple departments who share interests in exploring the roles of metals in biology. He is the author of over 400 publications, and he has presented 290 invited lectures, including 22 plenary, keynotes or endowed lectureships.

The Regents Professor position was established in 1965 by the Board of Regents to recognize the national and international prominence of faculty members. It serves as the highest recognition for faculty who have made unique contributions to the quality of the University of Minnesota through exceptional accomplishments in teaching, research and scholarship or creative work, and contributions to the public good.



Photos from
Larry's party!

Massari Recipient Of NSF Career Award

The Faculty Early Career Development (CAREER) Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization. In this project supported by the Experimental Physical Chemistry Program of the NSF, Professor Aaron Massari will employ two-dimensional infrared spectroscopy (2D-IR) to understand how the molecular motions within conducting polymers influence the mobilities of charges. This work will also explore polymer samples incorporated into interdigitated electrode arrays, which will allow for the exploration of molecular motion – charge mobility relationships in polymer structures in the presence of an external electric field. These studies will provide spectroscopic and structural information that will be more immediately relevant to future photovoltaic or molecular electronic technologies that are based on organic molecules.

In Brief

Christy Haynes has been named a **2009 Camille and Henry Dreyfus Teacher-Scholar**. This award recognizes Christy's considerable body of scientific accomplishments and her dedication to education in the chemical sciences.

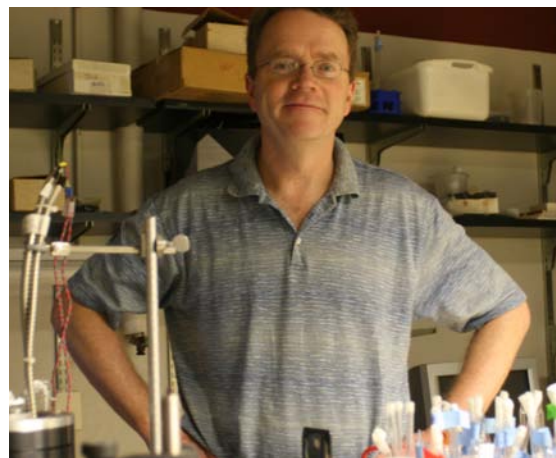


Regents Professor **Don Truhlar** has been elected to the **National Academy of Sciences**. He is one of 72 new members and 18 foreign associates to be recognized this year for their distinguished and continuing achievements in original research. Truhlar was also chosen as a **Fellow of the American Chemical Society**. This is the first class of Fellows of the ACS.

On Sept. 18, **Don Truhlar** gave the **Milton Kahn Lecture** at the **University of New Mexico**. This Lectureship is named in honor of Professor Milton Kahn, who served on the faculty at the University of New Mexico from 1948 to 1980. The recipients of the lectureship have generally been prominent radiochemists and physical chemists. He lectured on new developments in density functional theory.

On July 9, at the **Conference on the Dynamics of Molecular Collisions** in Snowbird, Utah, **Don Truhlar** was presented with the **2009 Herschbach Medal for Excellence in Research in the Field of Collision Dynamics**. Truhlar received the medal for "for bold and architectural work, inspiring and empowering". The presentation cited his research in theoretical molecular collision dynamics, including the quantum dynamics of molecular collisions, the role of quantized transition states in chemical reactions, the treatment of conical intersections in internuclear dynamics, the importance of quantum effects on enzymatic reactions, interaction potentials underlying molecular dynamics, variational transition state theory including quantum effects, and solvation effects.

Distinguished McKnight University and Lloyd H. Reyerson Professor **Timothy P. Lodge** will receive the **ACS Award in Polymer Chemistry** at the 239th ACS National Meeting in San Francisco, CA in March 2010. Sponsored by ExxonMobil Chemical Co., this national award acknowledges the impact in basic science of a researcher's body of work in the broad field of polymer chemistry on our global needs for advanced polymeric systems and materials.



Alumni Spotlight

Alan R. Hargens, PhD (BA 1966) specializes in orthopaedic and clinical physiology with recent research concerning gravity effects on the cardiovascular and musculoskeletal systems of humans and animals at UCSD. Dr. Hargens also uses lower body negative pressure (LBNP) to challenge the cardiovascular and musculoskeletal systems and to provide artificial gravity for space flight and Moon/mars habitation. He investigates the use of LBNP exercise and other exercise devices to maintain astronaut health and performance in space. This research also is translated to aid post-surgical treatment and rehabilitation of orthopaedic patients and to improve performance of athletes. In addition to his research on gravitational stress, Dr. Hargens measures tissue fluid and osmotic pressures, including those in giraffes to understand how they prevent dependent edema, those in skeletal muscle to diagnose compartment syndromes, and those in intervertebral discs to help understand low back pain.



Alumni Briefs

- * **Jeffrey S. Bankers** (PhD 2004) Principal Scientist for Home Care The Dial Corporation in Scottsdale, AZ, says of himself, “I now have 4 patents, a dozen more in application and am collaborating with NJ Tau, a professor at ASU, on quartz crystal tuning fork sensors.”
- * **Bob Buntrock** (BA 1962) is enjoying the milder climes of Orono, ME (milder than Princeton, MN, at least) where he and his wife run Buntrock Associates, a chemical information services consultancy. He also keeps busy giving presentations on careers in chemistry to both high school and college students, administering Chemistry Olympiad exams for the Maine Section ACS, and reviewing books for several organizations including CHOICE, JCIM, and PIUG.
- * **Brant Kedrowski** (PhD 2000), an associate professor in chemistry at University of Wisconsin Oshkosh, has earned an Edward M. Penson Distinguished Teaching award Sept. 8, 2009. The distinction recognizes exemplary educators who demonstrate scholarly growth, public service and professional commitment. Kedrowski formerly, of St. Cloud, MN, earned his bachelor’s and doctoral degrees from the University of Minnesota Twin Cities.
- * **Phil Price** (PhD 1976) reports, “I’m still hanging in here at Dow Chemical, doing mostly synthetic polymer MS with MALDI.”
- * **Tom Reddy** tells us that **Laurence A. Knecht** (PhD 1959), a fellow student of IM Kolthoff, passed away on May 23, 2009 at his home in Chapel Hill, NC.

Have any news about yourself or other alumni you would like to share? Please contact Marc Hillmyer (hillmyer@umn.edu).

Thank You!

Thanks to the many alumni and friends listed here who gave so generously to the Department of Chemistry in fiscal year 2008-09. These annual gifts are instrumental in supporting our students, faculty and the academic program and allowed us to attract and admit the largest and most talented freshman class to-date in the Institute of Technology.

With state support of the University decreasing rapidly, tuition rising significantly, and a challenging economy, the need for private support for the college and the department has never been greater. All gifts, of whatever amount, are making a difference in the lives of our students. The continued support of our alumni, faculty, staff and friends will ensure that our students will have the chance to shape the future of our world thanks to the education they receive in the department of chemistry and the Institute of Technology.

Join us in training the next generation of scientists and engineers by supporting the department and the college. You can make gift online through this link <http://it.umn.edu/alumni/giving/> or contact Kathy Peters-Martell, External Relations Officer for the Department of Chemistry at 612-626-8282 or kpeters@umn.edu if you need assistance in making your gift.

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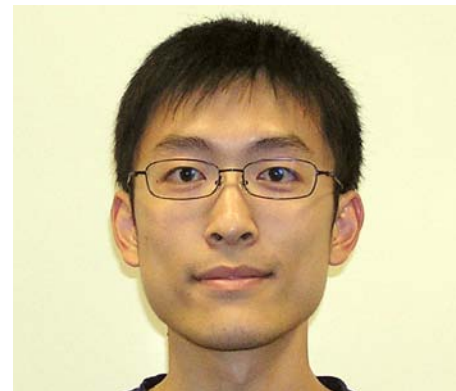
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Outstanding Teaching Assistants

It is with pleasure that we present the winners of the **Wayland E. Noland** and **Robert L. Ferm Outstanding Graduate Teaching Assistant** awards and the **Robert C. Brasted Outstanding Undergraduate Teaching Assistant** award for the 2008-2009 Academic Year. Thanks to **Professor Noland** for making funds available for the Outstanding Organic TA Award, which is being given for the second time. We were fortunate that many excellent nominations were received but, unfortunately, funding only permitted one of each award to be given. Therefore, three Honorable Mentions were given in addition to the three teaching assistants named as recipients of the awards.

The Wayland E. Noland Outstanding Graduate Organic TA Award:

Yiyun Yu: Yiyun's Chemistry 2311 students praised him with comments such as "Yiyun comes to lab with an optimistic attitude, patience and passion," "he is always prepared and challenges each student to his/her full potential," "he makes lab fun," "he explains things clearly," "he is available through e-mail and outside of class" and "he is an excellent TA."



The Robert L. Ferm Outstanding Graduate TA Award:

Erich R. Kuechler: Erich's Chemistry 1022 students described him as "very patient, very understanding and an incredibly helpful TA," "enthusiastic about teaching and about chemistry," "very safety conscious," and "the best TA I've ever had." His students went on to say that he "provided a very enjoyable lab from which I learned an immense amount" and that he "was always available to help students in and out of lab and was a great tutor."

The Robert C. Brasted Outstanding Undergraduate TA Award:

Alla S. Sutin: One of Alla's Chemistry 1022 students described her as "very knowledgeable, approachable, organized and patient." Other students commented that she "was very safety conscious," "made lab fun and comfortable," "encouraged us to think about the material," and "gave real life examples to tie to the information we studied."

Students receiving an **Honorable Mention** for the **Wayland E. Noland** award are:

Heidi Dahlmann (for Chem 4311)

Mohammad Rashidian (for Chem 2311)

The student receiving an **Honorable Mention** for the **Robert L. Ferm Award** is:

Eric Olson (for Chemistry Outreach)



Doctoral Dissertation and IT Fellowships

Congratulations to **Shencheng Ge**, **Chun Liu**, **Katie Maerzke**, **Anusree Mukherjee**, and **Lei Shi** for winning **Doctoral Dissertation Fellowships** and to **Sungjun Hong** and **Ryan Turgeon** for winning **Institute of Technology Fellowships** for academic year 2009-10. This is a tribute to their excellent academic records, hard work, and research successes (and the excellent research environment in our department!).

- * **Shencheng's** research is in bioanalytical chemistry: he has developed a novel carbon-fiber microelectrode and has successfully applied it to measure the secretion of chemical messengers from individual blood platelets.
- * **Chun's** research is focused on designing novel block copolymers that can be used for the manufacture of multicompartment micelles for targeted, sequential drug delivery.
- * **Katie's** research is focused on computational approaches for exploring the molecular-level structure and phase behavior of complex mixtures consisting of solvents, monomers, polymers, and additives.
- * **Anusree's** research is focused on bio-mimetic inorganic approaches to develop selective oxidation catalysts which are not only of important for the chemical industry but also offer fundamental insights into enzyme function.
- * **Lei's** research is focused on computational approaches for exploring the function of membrane-bound proteins which are exceedingly important for biological function and represent the majority of drug targets.
- * **Sungjun's** research is focused on bio-mimetic inorganic approaches to elucidate the mechanisms of metalloenzymes; this understanding will provide a route for the systematic development new inexpensive and green oxidation catalysts.
- * **Ryan's** research is focused on analytical approaches for exploring biological function; his novel, high-sensitivity techniques are particularly applicable to neuron communication, i.e., monitoring brain function.

Cheers, Cheers, Cheers!

Graduation 2009



New Noland Award

We are pleased to announce the “Wayland E. Noland Award for Academic Excellence in Chemistry”, which was established through the generosity of Prof. Noland with a departmental match. This fund will provide an annual prize to a rising senior in the Department of Chemistry undergraduate class with the highest GPA and most advanced chemistry courses completed at the U of M. The recipient will be selected from among those students majoring in Chemistry (either through IT or CLA) with the highest overall cumulative GPA and most advanced chemistry courses completed at the U of M. Preference will be given to students intending to pursue a career in chemistry, with or without a graduate degree.



Awards and Fellowships

2009 3rd Year Symposium Winners sponsored by Dow

Melissa Fierke (Stein)
Aalo Gupta (Tolman)
Kyle Schwartz (Mann)

Class of Fall 2008 with a 4.0 GPA

Envgeny Beleskiy (Douglas)
Wei Li (Georg)
Nicholas Petkovich (Stein)
Yen-Chih Wang (Distefano)
Ke Yang (Truhlar)
Can Zhou (Lodge/Hillmyer)
Thomas Pundsack (Blank)

2009-2010 Department Lump Sum Fellowship

Jon Athmann (1st year)
Jennifer Bigelow (1st year)
Angel Cortes-Morales (1st year)
Veronica Diaz Rodriguez (1st year)
Stephanie Harstad (1st year)
Michelle Henderson (Arriaga)
Stuart Kohl (1st year)
Daniel Josh Marell (Hoye)
Maria Miranda (Tolman/Hillmyer)
Makenzie Provorse (1st year)
Stephen Rudisill (1st year)
Patrick Willoughby (Hoye)

2009-2010 3M Fellowship

Stephen Tereniak (Lu)

Pothapragada Fellowship

Charuta Palsuledesai (Distefano)
Chandrasekhar Ramasubramanian (Taton)

ICBG Fellowship

Katie Klotz (1st year)

Krell Institute/DOE Computational Science Graduate Fellowship

Kathleen Beutel (Siepmann)

Dept. of Defense/American Society for Engineering Education SMART Scholarship

Kelly Kyro (Distefano)

Graduate School Fellowship

Emily Pelton (McNeill)
Nicholas Petkovich (Stein)

2009-2010 Conoco Phillips Graduate Fellowship

Adam Huss (Blank)

Biotechnology Training Grant

Joshua Ochocki (Distefano)
Chad Satori (Arriaga)

Chemical Biology Training Grant

Jonathan Dozier (Distefano)
Thane Taylor (Arriaga)

Kunze Fellowship

Zhifeng Bai (Lodge)

NSF Graduate Fellowship

Melissa Ann Maurer-Jones (Haynes)

2009-2010 Interdisciplinary Doctoral Fellowship

Susanna Emond (Hoye)

2009-2010 Doctoral Dissertation Fellowship

Shengcheng Ge (Haynes)
Ansuree Mukerjee (Que)
Katie Maerzke (Siepmann)
Chun Liu (Lodge/Hillmyer)
Lei Shi (Veglia)

2009-2010 Institute of Technology Fellowship

Sungjun Hong (Tolman)
Ryan Turgeon (Bowser)

Oops!

We forgot to mention in the 2008 edition of *ChemNews* that Chunze Lai (Buhlmann) was awarded the **Louise T. Dodsall Fellowship for 2008 -2009.**

CHEMISTRY DEGREES GRANTED

Ph.D. Degrees	Advisor	Thesis Title
Leila Nikkhoy Albers	Gleason	Synthesis and Application of Specifically Sulfated Carbohydrates Containing Methacrylate Functionality.
William W. Brennessel	Ellis	Low Valent Iron and Cobalt Chemistry: Naphthalene and Anthracene as Radical Anion Reducing Agents and Labile Ligands.
Liang Chen	Hillmyer	Fabricating Robust Nanoporous Materials and Polymer Electrolyte Membranes from Reactive Block Copolymers by Metathesis Reactions.
Yang Deng	Zhu	Designing Surfaces for Protein Microarrays.
Jasmine Jade Erbs	Penn and Banerjee	Insights on the Reactivity of Environmental Iron-containing Nanoparticles.
Matthew Paul Goertz	Zhu	Mechanical Properties of Soft Interfaces.
Christopher Scott Jeffrey	Hoye	Studies of the Synthesis and Biology of Petromyzonamine Disulfate and the Synthesis of (+)-Scyphostatin.
Junha Jeon	Hoye	New Applications and Strategies in Olefin Metathesis: Total Synthesis of (+)- Gigantecin and Total Synthesis of (+)-Peloruside A.
Robert Elliot Jilek	Ellis	Organometallic Complexes Containing Titanium, Zirconium, and Hafnium.
Bong Soo Kim	Frisbie	Charge Transport and Contact Effects in Nanoscopic Conjugated Molecular Junctions Characterized by Conducting Probe Atomic Force Microscopy.
Lucas C Kopel	Hoye	Synthetic Efforts Toward a Total Synthesis of (+)-Pelorusdie A.
Nicholas Peter Lanzatella	Noland	Access to Indoles via Diels-Alder Reactions of Vinypyrroles.
Larry R. Masterson	Veglia	Towards the Full Molecular Investigation of Protein Kinase A Mediated Catalysis by NMR Spectroscopy.
Kari Ann McGee	Mann	Synthetic, Structural, and Spectroscopic Study of Luminescent Transition Metal Complexes for use in Electronic Devices and Environmental Sensors.
Tyler Leighton Moersch	Gladfelter	Understanding Cominatorial Atomic Layer Deposition and Chemical Vapor Deposition.
Renee Karen Mosing	Bowser	Aptamer Selection Using Capillary Electrophoresis Selex.

CHEMISTRY DEGREES GRANTED

Ph.D. Degrees	Advisor	Thesis Title
Joseph David Scanlon	Cramer	Computational Studies of Inorganic Compounds and Reactions.
Galen James Sedo	Leopold	Fourier Transform Microwave Spectroscopy of Gas Phase Acids and Acid-Base Complexes.
Elena Pavlovna Sizova	Hoye	Second Generation Synthesis of UCS1025A. Synthetic Efforts Toward Total Syntheses of CJ-16,264 and Phomopsichalasin.
Carolyn Leigh Wanamaker	Hillmyer and Tolman	Fully-Renewable and Degradable Thermoplastic Elastomers.
Zhiyong Wang	Stein	Design, Fabrication, and Testing of Nanostructured Carbons and Composites.
Christofer Eryn Whiting	Arriaga	Statistical Analysis of Electrophoretic Mobility Distributions of Individual Mitochondria.
James Wyman Hubert Wollack	Distefano	Exploitation of Prenylation in Biomolecules: Cell-penetrating Prenylated Peptides and Prenylated Proteins.
Kin-Yiu Wong	Gao	Simulating Biochemical Physics with Computers: 1. Enzyme Catalysis by Phosphotriesterase and Phosphodiesterase; 2. Integration-Free Path-Integral Method for Quantum-Statistical Calculations.
Wangshen Xie	Gao and Truhlar	Development of Polarizable Force Fields for Proteins.
Yonggang G. Yu	Wentzcovitch	Structural Properties and Phase Transitions in Earth Minerals: A First Principles Study.
Xin Zhao	Siepmann	Monte Carlo Calculations for Organic Solids.



CHEMISTRY DEGREES GRANTED

Masters Degrees	Advisor	Thesis Title
Adam Richard Wohl	Hoye	Plan B
Amy E.M. Iblings	Gladfelter	Plan B
Andrew Jay Fielding	Que	Plan B
Anh Dinh Vu	Stein	Plan B
Anne Elizabeth Brownson	Blank	Plan B
Bo Wang	Truhlar	Plan B
Chad Patrick Satori	Arriaga	Plan B
Danhui Ye	Stein	Plan B
Daniel Bruce O'Brien	Massari	Plan B
David P Josephson	Stein	Plan B
Ece Cazibe Gaffarogullari	Veglia	Plan B
Eric Dominick Smolensky	Pierre	Plan B
Eric Olson	Buhlmann	Plan B
Erich Riley Kuechler	York	Plan B
Gregory G Wolken	Arriaga	Plan B
Hannah Ruth Leverentz	Truhlar	Plan B
Heidi Ann Dahlmann	Douglas and Sturla	Plan B
Hugh Heldenbrand	York	Plan B
Jacob Conrad Schmidt	Kass	Plan B
Jamie Lynn Doran	Leopold	Plan B
Jun Sung Kang	Taton	Plan B
Ke Huang	Carr and Simcik	Plan B
Kenrick John Williams	Zhu	Plan B
Leah Leone Groess	Noland	Plan B
Li Chen	Buhlmann	Plan B
Ligeng Yin	Hillmyer	Plan B
Lindsay Marie Hinkle	Mann	Plan B
Lisa I Koenig	Mann	Plan B
Lucas John Fiedler	Truhlar	Plan B
Mary Elizabeth Messner	Buhlmann	Solid-Phase Synthesis of a Tris(thiourea) Ionophore.
Melissa Ann Maurer-Jones	Haynes	Plan B
Meng Jing	Bowser	Plan B
Nathan Dennis Burrows	Penn	Plan B
Nicholas William Frost	Bowser	Plan B
Nina Jill Barnett	York	Plan B
Qiang Gao	Gao	Mechanism of Subtilisin Carlsberg-Catalyzed Sulfonamide Hydrolysis and Ras-Catalyzed GTP Hydrolysis by QM/MM MD Simulations.
Ryan Joseph Hue	Gladfelter	Plan B

CHEMISTRY DEGREES GRANTED

Masters Degrees	Advisor	Thesis Title
Sarah Elizabeth Page	Pierre and McNeil	Plan B
Tao Yu	Veglia	Plan B
Troung Giang Hoang	Douglas	Plan B
Xiaoying Lu	York	Plan B
Yiyun Yu	Georg	Plan B
Yong Wook Kim	Georg	Plan B
Yu Lei	Lodge	Plan B
Yu-Shen Lin	Haynes	Plan B



CHEMISTRY DEGREES GRANTED

Bachelors Degrees	Home Town
Nathan James Alpert	Inver Grove Heights, MN
Robert John Berscheid	Grey Eagle, MN
Derek Colwill	North Chicago, IL
Martin Daniel Donakowski	Saint Paul, MN
Christopher Randolph Hanson Hale	Arden Hills, MN
Patrick Kevin Hoard	Elk River , MN
Samantha Danielle Hudrlik	Blaine, MN
Nathan James Huelskamp	Inver Grove Heights, MN
Alex Mitchell Jensen	Richfield, MN
Mikhail Nikolayevich Karpich	Shakopee, MN
Jennifer Lynn Kostroski	Minneapolis, MN
Nishant Chanan Kumar	Maplewood, MN
Chad Evans Larson	Roseville, MN
Joshua Mitchell Lee	Santa Clarita, CA
Derek Michael Maanum	Minneapolis, MN
David Steven Nedrelow	St. Paul, MN
Chan Woong Park	Rochester, MN
Tariq Rashid	Minneapolis, MN
Alex Michael Siems	Plymouth, MN
Hussein Ebro Waliye	Blaine, MN
Kyle T Wilke	Wauwatosa, WI
Stephen P Anderson	Burnsville, MN
Grant C Armstrong	Minneapolis, MN
Laura Dale Asmuth	Metuchen, NJ
Megan Fay Babcock	Faribault, MN
Linzey Ann Bachmeier	Minneapolis, MN
Marcus Calvin Becker	Juda, WI
Miseung Borgers	Spring Lake Park, MN
Wei-Han Chen	Winthrop, MA
Dennis E Cherkasov	Maple Grove, MN
Christina Danielle Cowman	Woodbury, MN
Brandon J Dvorak	Concordia, KS
Allison Lee Dzubak	Johnston, IA
Ryan Maxwell Friedrich	Woodbury, MN
Matthew J Giles	Maple Grove, MN
Christine F Grewe	Minneapolis, MN
Johnathan Michael Grivna	Coon Rapids, MN
Joseph Curtis Gunnerson	South Haven , MN
Christopher J Hall	Racine, WI

CHEMISTRY DEGREES GRANTED

Bachelors Degrees	Home Town
Adam W Hauser	Maple Grove, MN
Erica A Jennings	New Hope, MN
Alexander Jesus Johansson	Robbinsdale, MN
Amber Marie Johnson	Iron River, WI
Courtney L Jones	North Mankato, MN
Nicholas T Kirby	Stillwater, MN
Abigail Elizabeth Kopan	Middleton, WI
Michelle C Kuhnly	Excelsior, MN
Aimee Kwong	Brooklyn Park, MN
Michelle K Larson	Eagan , MN
Xiong Lor	Saint Paul, MN
Andrew David MacRostie	Saint Paul, MN
Michelle Ann Malaska	Oklahoma City, OK
Joseph Tor-Bjorn Masrud	Saint Paul, MN
Sharon Vanessa Matamoros	Saint Paul , MN
Isaac David Mitchell	Mounds View, MN
Jonathon Jerald Montag	Albert Lea, MN
Timothy Jason Normandt	West Salem, WI
Katie Lynn Oldeen	Maple Grove, MN
Joseph H Ostrowski	Hutchinson, MN
Rita M Otto	Lisle, IL
Manar Fouad Said Reda	Brooklyn Center, MN
Jeanette Nicole Rice	Mequon, WI
Michael Joseph Ruether	Eagan, MN
Jeffrey Lee Schunk	Brooklyn Park , MN
Arick McCue Severson	Minneapolis, MN
Phillip Wayne Seymour	Sandstone, MN
Patrick Ryan Simpson	Minneapolis, MN
Nathan John Sokolowski	Eau Claire, WI
Carolynn Kay Stephani	Eagan, MN
Matthew Txam Vang	Columbus Twnship, MN
Alexander John Wagner	Apple Valley, MN
Erin Elizabeth Weiland	Evanston, IL
Evan August Weitz	Minneapolis, MN
Renee Kaye Welch	Eagan, MN
Kia Xiong	Minneapolis, MN
Katie Ann Zalesky	Blaine , MN
Xi Zhang	Green Bay, WI

Welcome, Mary!

A warm welcome to **Mary White** who began employment as an Executive Accounts Specialist in our Accounting Office on Monday, November 3, 2008. Mary was born and raised in Shakopee, MN and graduated from the Shakopee High School. Mary started taking courses at Normandale Community College in Bloomington, MN but interrupted her formal education to enlist in the United States Coast Guard where she served as a Chief Petty Officer for the next twenty years in places as varied as Puerto Rico, New York City, Savannah, and Chicago (yes, Chicago - ask Mary sometime what the Coast Guard does in Chicago). After retiring from the Coast Guard, Mary returned to Normandale to continue her education, receiving an AA degree in General Education and an Associate of Applied Science degree with a medical secretary major. Mary worked as a medical secretary for Park-Nicollet for a time before beginning her employment with the University of Minnesota. Prior to joining our department, Mary held positions in Central Payroll and in the Department of Medicine. Mary lives in Shakopee and has one daughter, Carrie, who is employed in the accounting office of Mechanical Engineering (must run in the family), and two grandsons, Linus (4) and Landon (1.5) who love hockey. In addition to doting on her two grandsons, Mary also enjoys scrapbooking when she gets the time.

Answers to Just For Fun:
 KOELSCH'S LAW
 OVEREND OUT
 LIND O LAKES
 THE GOLDEN MEEHAN
 HUNG OUT TO DRY
 OBSERVATION CARR
 FILL-IN-THE-BLANK
 FISHER PROJECTIONS
 HAYNES BRIEFS
 A TURN FOR THE WERTZ
 LIPSCOMB SERVICE
 LECLAIRE-DOW DE LUNE
 The renovation of Kolthoff Hall
 was completed in May 2009.

Vic Munsch Supplies All

Vic Munsch began working for the Department of Chemistry, as our receiver, in 1979. Through the many years Vic's knowledge of the department and his multitude of capabilities have been appreciated by many fellow staff, students, and faculty. As of March 2008 Vic was promoted to the retiring Dale Randall's position, managing our Department Stockroom.



Chuck Tomlinson To The Rescue!



As I write this, it's been approximately six months on the job as the new department administrator following the retirement of **Stan Bonnema** back in June. It's an obvious understatement to everyone who has worked with Stan that his are big shoes to fill. And the learning curve has been steep.

I am grateful to my many colleagues who have shared their wisdom, experience and advice during a year with so many changes, arrivals and departures. I simply could not have managed it without everyone's help.

I have worked on campus for 18 years, 16 of them in Chemistry. I started on the secretarial staff working for Prof. **Paul Barbara** and Prof. **Lou Pignolet**, and managed our graduate and undergraduate student services office for the last 7 years. In that time I've worked with students, staff and faculty across the entire department. In my new role, I look forward to meeting more new people as they join our department, and I'll certainly be learning something new literally every day.

Dylan Huss Joins Student Services

Dylan Huss joined **Nancy Thao** in student services this summer. He says of himself, "I was born and raised in Staples, Minnesota. I attended UMD and graduated this last May. I now live in South Minneapolis. This is my first time in the big city and I'm enjoying it so far."



Joe Dalluge Takes Control of the Mass Spectrometer

Joe Dalluge joined us November 2 as the new head of of the Mass Spec facility in Kolthoff Hall. It's not his first time in our department; he spent the summer of 1990 as a Lando student in Prof. Noland's lab. He joins us now after working at Cargill for the past eight years.

Joe has two children, 11 and 9, and currently resides in Waverly, MN where he dabbles in orchids, Belgian beer, poetry and wiggery.

Please Welcome Karen Swyter to Accounting

My name is **Karen Swyter**. We moved to Minnesota from Washington state about 10 years ago. We are still die-hard Seahawk and Mariners fans, but will occasionally root for the Twins and Vikings. I've been with the University for almost 2 years. Before coming to Chemistry I was the Executive Accounts Specialist with the Department of Computer Science and Engineering. What that really means is, I did all the purchasing, receiving and non-travel reimbursements for the department, while backing up payroll timesheet entry. I will be doing the same things in Chemistry. Before the coming to the U, I was in the Banking Industry for 11 years. I've been married for 32 years, with two married children and two wonderful and brilliant grandsons and two granddogs.



A Fond Farewell



This spring we said a fond farewell to several familiar faces:

- Stan Bonnema**
- Kathy Ross**
- Michael Kurth**
- Carol Makkyla**
- Flurina Hadley-Davis**

We wish them all a wonderful retirement!

Crystal Structure of Octabromoditechneate(III) and a Multi-Configurational Quantum Chemical Study of the Quadruply Bonded $[M_2X_8]_2^-$ dimers ($M = Tc, Re; X = Cl, Br$)

Recent research from the research group of **Laura Gagliardi**.

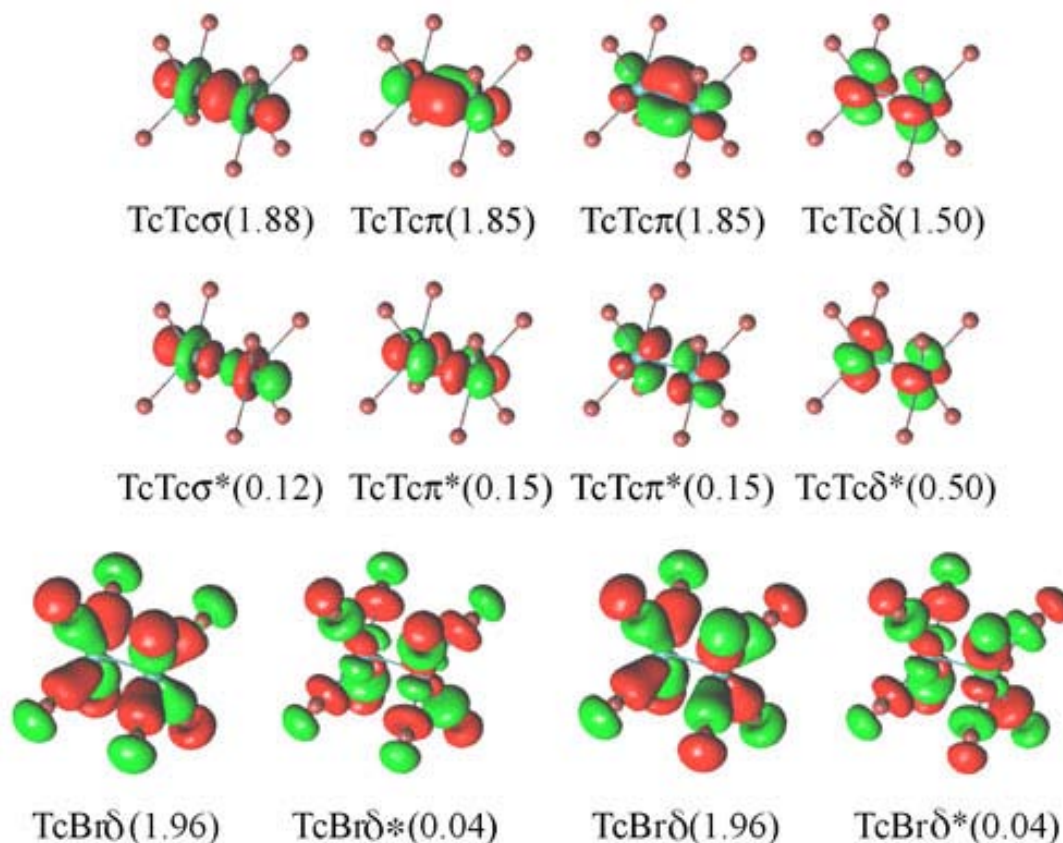
Understanding the properties of compounds that contain metal-metal bonds is fundamental to interpreting structural and bonding properties, catalysis, metal surface chemistry, and magnetism. The discovery of dirhenium(III) complexes with metal-metal quadruple bonds foreshadowed a revolution in the study of metal-metal bonds and the identification of novel types of bonding. The importance of quantum chemistry to this area of science is not only based on its ability to solve the quantum-mechanical equations to a good degree of approximation for complex molecules, but also on the fact that the field can now perform theoretical simulations of real benefit to the experimental community. Technetium chemistry represents a challenge for experimentalists and the interplay between theory and experiment is of extreme importance in such a case.

The single-crystal X-ray structure of carmine-red $[Tc_2Br_8]_2^-$ has been determined almost three decades after the original report of its synthesis. Frederic Poineau, Paul M. Forster, Alfred P. Sattelberger and Kenneth R. Czerwinski at the Department of Chemistry, University of Nevada Las Vegas, have prepared the technetium(III) compound $(n-Bu_4N)_2[Tc_2Br_8]$ by metathesis of $(n-Bu_4N)_2[Tc_2Cl_8]$ with concentrated aqueous HBr in acetone and recrystallized from acetone-diethyl ether solution. The structure of $[Tc_2Br_8]_2^-$ was previously determined via EXAFS methods

on an acetone free sample of $(n-Bu_4N)_2[Tc_2Br_8]$ and the two methods give essentially identical results for the quadruply bonded anion.

Laura Gagliardi at the Department of Chemistry, University of Minnesota, has performed multi-configurational quantum chemical calculations of the molecular structure and electronic spectra of the $[Tc_2Br_8]_2^-$ compound and comparative calculations on the $[Re_2Cl_8]_2^-$ – $[Tc_2Cl_8]_2^-$ – $[Re_2Br_8]_2^-$ compounds.

Novel Tc-Tc compounds are now under investigation.



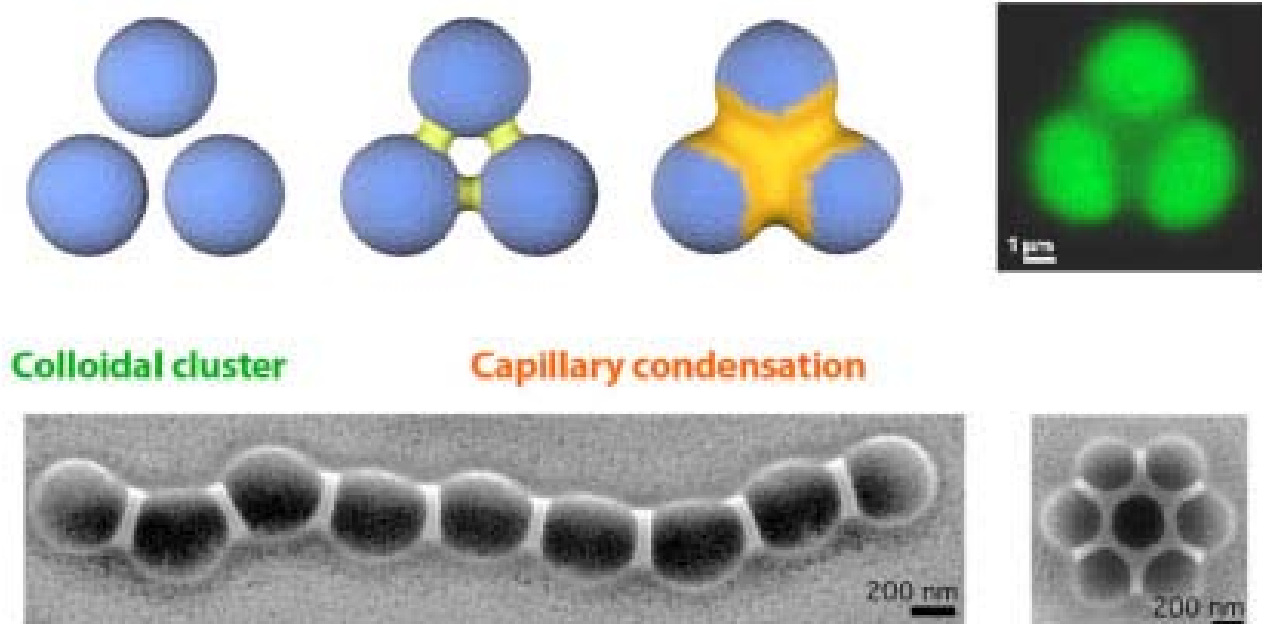
Stringing Up Nanobeads

Recent research from the research group of Professor **Andreas Stein**.

Spherical colloids with diameters of a few hundred nanometers (several hundred times smaller than the thickness of a human hair) are useful building blocks for self-assembly into functional structures. They can be likened to atoms but on a larger scale. Just like metal atoms that assemble into close-packed structures, they can also pack into regular patterns. Opals are natural examples of close packed colloidal spheres, and their brilliant colors (“opal-science”) arise from the interaction of light with the periodic sphere structures. Many examples of close-packed colloids can be found in the literature, but more open structures or analogs of molecules, in which “colloidal atoms” are connected with specific directionality are more difficult to obtain.

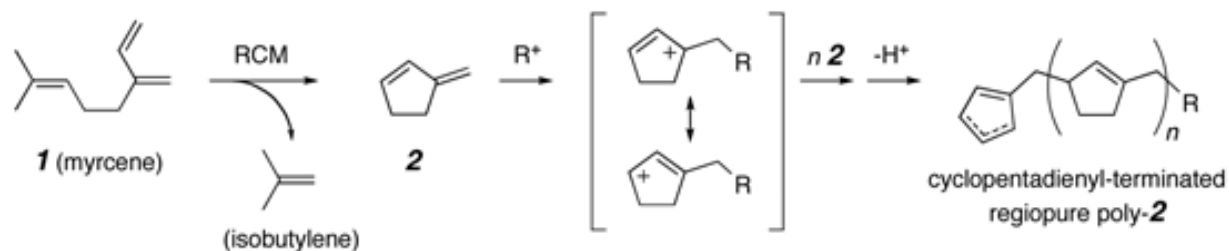
In a recent paper published in the **Journal of the American Chemical Society 2009, 131: 9920**, graduate student Fan Li and Professor Andreas Stein describe a novel approach to connect colloids into conjugated clusters and chains of various geometries, using a process called “capillary condensation” to provide the glue and to impart clusters with specific directional interactions. Capillary condensation involves selective condensation of a vapor below its saturation vapor pressure in cavities or between surfaces. Dichloromethylvinylsilane vapor was deposited between spin-coated aggregates of polymer spheres. The vapor condensed primarily between sphere contacts and reacted to form a thin coating in these regions that linked the spheres together and stabilized the clusters. This process occurred even if spheres were slightly separated from each other.

The figure above shows a schematic drawing of a colloidal cluster with three spheres that are linked by the capillary condensation process. When fluorescent polymer spheres are connected, the “nanoglu” shows up as dark regions in the fluorescence image. In the scanning electron images of a linked chain and a seven-particle cluster, the glue appears as lighter regions. Either the coated or the non-coated regions can then be selectively functionalized to provide contact points for further reactions, for example, if clusters are intended to be linked up into more extended structures via directional interactions. This method provides a new tool toward mimicking molecular assembly at the colloidal scale and toward the realization of rational colloid assembly processes by true designer pathways.



Making Modern Materials by the Metathesis Manipulation of a Monoterpene

Recent research from the research groups of Professors **Marc Hillmyer** and **Thomas Hoye**.



Shingo Kobayashi and Cheng Lu working in the labs of Professors Marc Hillmyer and Tom Hoye recently demonstrated the controlled polymerization of a cyclic diene prepared from the ring-closing metathesis (RCM) reaction of myrcene, a naturally occurring hydrocarbon produced by a variety of plants or by the rearrangement of pinene, the principal component of turpentine. The cyclic diene 3-methylenecyclopentene (**2**) was synthesized from myrcene (**1**) by means of RCM chemistry. The monomer **2** could be polymerized by chain polymerization techniques using radical, anionic, and cationic initiators. The polymerization of **2** proceeded in “living” fashion in both anionic and cationic polymerization systems and afforded polymers in quantitative yield with narrow molecular weight distributions and predictable molecular weights. Furthermore, the living cationic polymerization of **2** proceeded smoothly to afford regioregular polymers having thermal properties consistent with a stereoregular structure. The second product in this RCM reaction is isobutylene, a monomer that can be converted into butyl rubber. In principle, this chemistry will allow us the overall transformation of the starting material **1** into polymeric materials with perfect atom economy.

Basic research that underpins the development of new materials from renewable resources is the focus of the new Center for Sustainable Polymers at the University of Minnesota. This work was recently reported in the **Journal of the American Chemical Society 2009, 131: 7960–7961**.



Hillmyer Research Group

A Structural Resolution Cryo-TEM Study of the Early Stages of MFI Growth

Recent research from the research group of Professor **R Lee Penn**.
Sandeep Kumar, Zhuopeng Wang, R. Lee Penn and Michael Tsapatsis

Journal of American Chemical Society 2008, 130 (51): 17284

Understanding the nucleation and growth phenomena in solution is of fundamental and practical significance for the synthesis of various materials including zeolites. In this context, the synthesis of all-silica zeolite with MFI-type framework (referred to as MFI) has been studied extensively as a model system. Of fundamental importance is the role of nanoparticles (ca. 5 nm) present in the precursor sol in nucleation and crystallization. Recently we proposed a mechanism in which the nanoparticles evolve towards the zeolite crystal structure, which can then contribute to crystal growth by aggregation.^(1,2) However, information regarding the structure of the evolving nanoparticles, nuclei and early aggregates is limited since they are vanishingly small components of the sols at the early stages of growth and due to the challenges of sample preparation and characterization.

In this communication, the authors present a cryogenic transmission electron microscopy (cryo-TEM) study on precursor sols prior to and during the early stages of MFI formation. Cryo-TEM images with structural resolution were obtained and yielded new insights in MFI growth. The importance of this study is two-fold. First, the authors provide evidence supporting the recently proposed mechanism of evolution of nanoparticles followed by aggregative crystal growth while adding a new element. The new element is the formation of predominantly amorphous aggregates before MFI crystallization and points to the importance of intra-aggregate rearrangements in nucleation and growth. Second, the authors demonstrate that electron-beam sensitive materials such as zeolites can be imaged by cryo-TEM with structural resolution in their parent sols. Similar studies for other zeolites under different conditions may reveal useful structural information for the understanding of hydrothermal nucleation and growth.

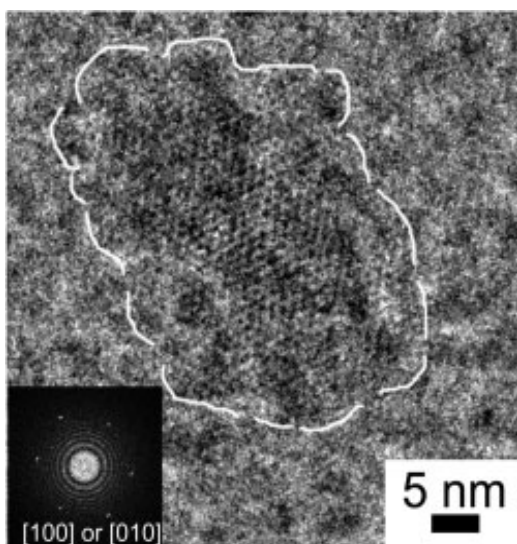


Figure: A high-resolution cryo-TEM image of a representative crystal in synthesis sol aged for 220 days at room-temperature. Fast Fourier transform (FFT), shown in the inset, indicates the crystal to be oriented either along [100]- or [010]-axis. The bright and dark dots within the high-lighted perimeter represent the straight or sinusoidal pores of the MFI framework structure. Image obtained using the FEI Tecnai G2 F30 Cryo-TEM.

References:

1. Davis, T. M.; Drews, T. O.; Ramanan, H.; He, C.; Dong, J.; Schnablegger, H.; Katsoulakis, M. A.; Kokkoli, E.; McCormick, A. V.; Penn, R. L.; Tsapatsis, M., *Nat. Mater.* 2006, 5, 400-408.
2. Kumar, S.; Davis, T. M.; Ramanan, H.; Penn, R. L.; Tsapatsis, M., *J. Phys. Chem. B* 2007, 111, 3398-3403.

Acknowledgements. Financial support was provided by the NSF (NIRT-CMMI-0707610, -CBET-0522518 and the MRSEC Program: DMR-0212302). Characterization was carried out at the Characterization Facility, University of Minnesota, which receives support from NSF through the NNIN. ZW received support from China Scholarship Council (2007) for his stay at the University of Minnesota.

Biobased Plastics Research is Focus of New University of Minnesota Center

The University of Minnesota has launched a new Center for Sustainable Polymers aimed at developing a new generation of environment-friendly products. The team of scientists and engineers will lead cutting-edge basic research aimed at developing commercially feasible products including pressure-sensitive adhesives, toughened plastics and polyurethanes from renewable resources.

Today, nearly all polymers—materials more commonly known as plastics that are found everywhere in our world—originate from petrochemicals. Researchers participating in the Center for Sustainable Polymers will work to develop new polymeric materials that are competitive with petroleum-derived products but are made from renewable resources. They are also targeting materials that can be composted and produced in an energy efficient manner.

Researchers from the Department of Chemistry, Department of Chemical Engineering and Materials Science, and the Department of Bioproducts and Biosystems Engineering are currently involved in the center activities. The center will also integrate science, technology, and public policy initiatives. The researchers will partner with industry, train students in the area of sustainable materials, and engage the public through initiatives led by the Center for Science, Technology, and Public Policy within the University's Humphrey Institute of Public Affairs.

A banner image featuring a field of green grass in the background. Overlaid on the grass is the text "Center for Sustainable Polymers" in a large, bold, orange font with a slight shadow effect.

Center for Sustainable Polymers

“We are building a comprehensive center like no other in the country that is focused on working toward the goal of a sustainable polymer industry,” said **Marc Hillmyer**, a professor of chemistry and the director of the new Center for Sustainable Polymers. “We are excited to build partnerships with companies and universities across the country to achieve this goal.”

Hillmyer says biobased products are permeating the marketplace and the public wants sustainable materials that are more environmentally friendly. Hillmyer and his colleagues envision the center as a focal point for both scientific and public engagement efforts to help position the University of Minnesota as a leader in sustainable polymers.

Start-up funds for the center come from the University of Minnesota Initiative for Renewable Energy and the Environment (IREE) large grant program aimed at helping launch early-stage, high-potential projects in emerging fields of renewable energy and the environment.

“We are grateful for IREE’s commitment to our proposed work in sustainable polymers,” Hillmyer said. “We will use these funds to position the center for future funding opportunities from agencies such as the National Science Foundation or Department of Energy.”

For more information about the center, visit www.chem.umn.edu/csp.

The Virtual Classroom

This fall, the Department of Chemistry began a venture in e-education by moving Introductory Chemistry (CHEM 1015) to an online format. This lecture-only preparatory course, taught by **Michelle Driessen**, is traditionally populated by freshman with an enrollment of around 1200 students each fall. A majority of those who successfully complete this course go on to take general chemistry courses in the department.

The new online course covers the same content as the previous lecture-based course, but the information is provided in prerecorded “mini-lectures” that are topic based. The lectures range in length from 5 minutes to around 35 minutes and are housed in the University’s private iTunes channel. Students in the course download the closed captioned videos onto their personal computer or iPod for viewing at their convenience. To



keep students on track throughout the semester, there are online homework sets due each week. While the entirety of the course content is delivered online, students must attend four midterm exams and a final on campus.

The results to a recent student survey were overwhelmingly positive. The students cited flexibility in scheduling, watching lectures during their commute or in the comfort of their dorm room, and the opportunity to rewind and pause lectures when needed as the most positive aspects of the new format.

New Interactive Periodic Table Installed in Kolthoff Hall



Dr. Larry Que in front of the new periodic table

The display was made possible in part by a generous donation from William Prichard III, who received his B.S. degree from this Department of Chemistry in 1935, and his Ph.D. in organic chemistry under the guidance of Lee Irwin Smith in 1939 (yes, that’s the same person that Smith Hall is named after.) The exhibit, installed at the end of May this year in conjunction with completion of the renovation of Kolthoff Hall, was obtained from RGB Research Ltd in London, England. When you touch an element on the computer screen, a short description of that element appears, along with a relevant video clip about that element.

Next time you’re in Kolthoff, come and have fun!

Dragonfly TV Takes Flight

When DragonFly TV, a nationally syndicated science show targeted at junior high viewers, decided to dedicate an entire season to the topic of nanoscience, they asked Assistant Professor **Christy Haynes** to be featured in one of the episodes. Specifically, the DragonFly TV production team was excited to discuss the safety considerations of using nascent nanoscience and technology, and Christy Haynes' group had just published their first few scientific papers on this topic. Prof. Haynes approached the researchers in her lab working on this "nanoparticle toxicity" project, and they enthusiastically agreed to participate in this unique outreach opportunity. As the day of filming approached, Prof. Haynes, four graduate students (Bryce Marquis, Sara Love, Yu-Shen Lin, and Melissa Maurer-Jones), and one undergraduate student (Katherine Braun) brainstormed ideas for how to best convey their complicated microelectrochemical nanotoxicity assay to twelve year olds. It was Bryce, a fourth year graduate student, who suggested the winning idea of describing the microelectrodes like microphones to "listen in on cellular conversations" before and after nanoparticle exposure. On the day of filming, a production team of five people arrived early in the morning and filmed various segments, showcasing the newly renovated Kolthoff laboratories that the Haynes Lab occupies as well as the University's Characterization Facility, throughout the day. In the segment, the researchers are shown using commercially available products known to contain nanoscale materials (cosmetics, sunscreen, and socks to name a few) and they discuss the process by which they assess whether or not the nanoparticles interfere the critical cell function of chemical messenger delivery. In an interwoven vignette, Prof. Haynes discusses the overall goal of her group's work to formulate design rules to control nanoparticle toxicity and paints scientific research as a collaborative and rewarding endeavor.

To view the featured segment online, please visit <http://pbskids.org/dragonflytv/scientists/scientist65.html>.



Jane Wissinger Talks About Green Chemistry



Dr. Jane Wissinger, the U of M's organic laboratory director, explained to MPR that a few years ago one common experiment was performed using a compound containing an expensive and toxic metal. Today it's done with something much safer and cheaper.

"Now we do the reaction with household bleach," Wissinger said. "Now bleach isn't perfect, we all know it has chlorine, but that's a step in the right direction."

Wissinger said chemists at the U follow other green chemistry guidelines, like working on a smaller scale to use fewer materials. But since the U of M has thousands of students in chemistry programs, that's not always possible. "Sometimes it's not, and you have to do things bigger," she said. "So you try to do things the best way you can with the least amount of harm." Wissinger said the U's goal is to usher in more environmentally-friendly chemistry procedures, but that takes time.

Institute of Technology To Become College of Science and Engineering

The University of Minnesota Board of Regents has approved a name change for the Institute of Technology to the College of Science and Engineering, effective July 1, 2010. The Educational Planning and Policy Committee approved the request and the full Board of Regents have given their approval.

The purpose of the name change to College of Science and Engineering (COSE) is to more clearly describe the unique combination of science and engineering disciplines within the college. This will help raise the national and international profile of the college's science and engineering programs among prospective students and faculty, business partners, and research-granting agencies.

The current college name of the Institute of Technology (with its acronym IT) has become increasingly problematic in terms of securing financial support and recognition for critical academic programs. Today, IT has come to mean Information Technology to virtually everyone. In addition, few people outside the University have an understanding of the difference between the Institute of Technology and various research institutes at the University that do not have academic degree programs. While several highly regarded Institutes of Technology exist in the United States, these names represent entire institutions that also have separate colleges of engineering, sciences, etc.

Changing the name of the college has been thoroughly discussed for more than a year.

- * In fall 2008, the Institute of Technology Dean's Advisory Board recommended that the Dean pursue a possible name change for the college.
- * In January 2009, the college publicly announced the decision to move forward on exploring the change.
- * During spring semester 2009, the college worked with the University's Carlson School of Management's Brand Enterprise program to assist with research that involved a wide variety of stakeholders, including alumni, students, faculty, staff, business leaders, and other groups.
- * This past summer and fall, the Dean consulted with several student and faculty groups, as well as with the deans and department heads in the College of Biological Sciences and the College of Food, Agricultural, and Natural Resource Sciences.
- * In November 2009, the Dean announced his intention to recommend the name change to the provost in his "State of Institute of Technology" address.

Members of the Institute of Technology Dean's Advisory Board have agreed to donate private funds to cover the costs of the name change to ensure that no funds are taken away from any other important financial matters this year due to this change.

Preparations for the name change will begin this month, with full implementation this summer including the launch of a new College of Science and Engineering Web site and revised materials for new student orientation and prospective student events.

Minnesota Chemistry Anagramacrostic

by George Barany, Carol Stoneburner, Deborah Schoenholz, and Michael Shteyman

It is well known (meaning that we haven't bothered to look up the reference) that few things in life keep the mind as sharp as thinking about chemistry ... and solving puzzles. Below is what we believe to be the first-ever exemplar of a new form of brainteasing, combining elements of acrostic puzzles, anagrams, and crosswords (the cryptic cluing, not the crossing).

Instructions: there follow twelve clues for you to decipher. Each clue is in two parts, a capitalized anagram of a short phrase that answers the jokey reference to a former or current Department of Chemistry faculty member (with one obvious exception) that is given immediately below. A listing of faculty hired from 1867-2001 appears at <http://www.chem.umn.edu/alumni/HISTfaculty.html> whereas <http://www.chem.umn.edu> (click on "faculty") provides a current roster. Rearrange the letters of each anagram, and write down your answers in order. The first letters of your answers, read downwards, will spell out the final surprise answer of something that, having been rearranged, is now as good as new. Answers are found on page 18. Enjoy!

- — — — —

A SWELL SHOCK
Organic chemist Fred's great discovery during his salad days?
- — — — —

DO NOT REVUE
Physical chemist John's sign-off to his lectures?
- — — — —

ANODE SKILL
Physical chemist Samuel's means for buttering up students?
- — — — —

OH, METHANE LEGEND!
Analytical chemist Ed's standard for alchemist's target?
- — — — —

DOUGHNUT STORY
What happens to TLC plates in organic chemist Richard's lab?
- — — — —

ARRIVES TO CARBON
Analytical chemist Pete's choice for traveling cross-country to ACS meetings?
- — — — —

THINK FINAL BELL
Exam instruction from physical chemist Dave?
- — — — —

THIN PROFS REJOICE
Chemical biologist Jed's vision for the future of chemistry?
- — — — —

IF SHE'S NEARBY
When to edit analytical chemist Christy's communications?
- — — — —

UTTER FROZEN WRATH
Change in teaching assignment, to physical chemist John?
- — — — —

COSMIC VERB PILES
Genuflection to Nobel laureate Bill?
- — — — —

ENDOWED CELLAR LIEU
Moonlit place (French) for Department of Chemistry Instrumentation Facility?

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This publication/material is available in alternative formats upon request. Direct requests to Marc Hillmyer, Department of Chemistry, hillmyer@umn.edu, 612-625-7834.