Michigan Tech
Create the Future

DEPARTMENT OF CHEMISTRY

2013 Newsletter

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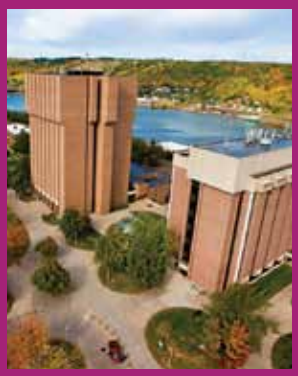

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"Happy to be here!" New chair Cary Chabalowski is looking forward to leading the department into the future.

Letter from Sarah

June 30th marked a transition for the chemistry department, as I stepped down after nine years as department chair. Our new chair, Cary Chabalowski, comes to Tech after a distinguished career at the Army Research Laboratory in Washington. I will be going to Washington next year for a one-year position as a Jefferson Science Fellow and will return to my faculty position in fall 2014.

As the class of 2013 packed its bags and sailed off to the four winds in May, we were still wearing our snow boots and brandishing snow brushes. I fully expected students to arrive at commencement on skis. For the first time this year, thanks to the generosity of Paul and Deb Charlesworth, the department reserved a skybox for parents, faculty, and friends to watch the festivities together. At the end of June, our beautiful Keweenaw summer finally arrived and our quieter summer session was in full swing. This is the season when research students, graduate and undergraduate alike, can concentrate on their new discoveries in the lab, while still finding daylight left at the end of our long days to enjoy the outdoors. Others have dispersed to research and career experiences around the country.

Our annual Spring Awards event featured Eric Schelter '99, an assistant professor of inorganic chemistry at Penn State. He spent many hours chatting with students about his career path. (And he stayed a bit longer in Houghton,when his travel was delayed by an April storm.) We recently learned that Eric has been named a Cottrell Scholar, a prestigious award for early career faculty. At the awards ceremony, we feted our 2012–13 graduates: 18 BS, 4 MS, and 5 PhDs, (p. 4). Nathanael Green was named the department scholar; Nate contributed to Shiyue Fang's research group this summer. We continue to be grateful for summer research fellowships: Ray E. and Eleanor K. Cross Endowed Graduate Fellowship to Jingtuo Zhang; Robert Nelson for our Outstanding Graduate Student Award to Nazmiye Yapici; David J. and Valeria L. Pruett Summer Undergraduate Research Fellowship to Trevor Curtis; and the Rebecca Sandretto–Susan Stackhouse Summer Fellowship to Daniel Beegle. Students gain tremendously from these opportunities.

In addition to student support, alumni donations have made possible the purchase of a new state-of-the-art Olympus confocal microscope. This instrument is rapidly becoming an indispensable resource; training sessions offered by Lanrong Bi have been oversubscribed.

Our students continue to excel in University activities. Notably, Eponine Zenker is a member of the Pep Band and also had a role in Tech's production of *Fiddler on the Roof*. A number of students work as coaches in the Chemistry Learning Center and other learning centers. Chemistry had a big turnout at the annual Graduate Research Symposium, with well-attended oral and poster sessions, and at the Undergraduate Research Expo (p. 5).

A record seven postdocs have advanced research in the department this past year: Katja Dzepina with Lynn Mazzoleni, Jagadeesh Janjanam with Ashutosh Tiwari, Mingcui Zhang and Bin Cao with Shiyue Fang, Xin Chen with Lanrong Bi, Shilei Zhu with Haiying Liu and Ashutosh Tiwari, and Mimi Yang with Pushpa Murthy. Thanks again to David J. and Valeria L. Pruett for postdoc support. Our newest Pruett postdoc, Kapil Adhikari, began work with Loredana Valenzano this summer. Although sometimes invisible because they are so busy in their labs, these professional scientists provide invaluable assistance to students and faculty as they gain experience to launch their careers.

Our staff also frequently do their important work in the background. This year, storeroom manager Don Wareham, was recognized by the University for thirty-five years of service and was honored by his professional organization, NAOSMM, as Manager of the Year (p. 3).

I commend Lanrong Bi, promoted to associate professor with tenure, and Haiying Liu, promoted to full professor. Both are highly talented, creative, and energetic researchers who inspire their students.

Organic chemist Marina Tanasova joins the faculty this fall. Her interests in pharmaceutical chemistry will complement current research activities, as will her additional expertise in toxicology.

Faculty continue to travel for meetings and conferences, research projects and collaborations, and visits to Washington to meet with funding program officers or participate on review panels. This summer Lanrong Bi worked with collaborators in China, along with her student Doug Smith who received an NSF fellowship for his travel. Patricia Heiden also visited China earlier this year. Pushpa Murthy will be spending a second year at the National Science Foundation, working in the Division of Graduate Research. Lynn Mazzoleni continues her fieldwork on Pico Island (Azores) this summer bringing a high school teacher, Lorentyna Harkness, to learn about the research.

Alumnus John Frost '07, now with Thermo Fisher in Colorado, was featured as an ACS Science Coach for his outreach work with Overland High School in Aurora. Steve Johnson '10 is joining the faculty at Lake Superior State University. Tsitsi Hungwe is enjoying her first year at the University of Louisville Dental School. Please send us your news, too! We want to know how you are using your Michigan Tech degree.

It's hard to imagine it's been nine years since Pushpa Murthy handed me the key to the chair's office. Many students have come and gone (and some returned). Faculty turnover is slower but steady; we have seen some leave for new endeavors and/or retirement and mourn those who left their indelible stamp on the department. Chemistry, like all of campus, has a large proportion of new faculty. We have added new expertise, equipment, ideas, and discoveries. I'm excited to see what evolves as their collective enthusiasm reacts with the strong foundations of teaching and scholarship that have always been mainstays of the department.

Promising New Tests of Mitochondria Could Provide Health Care Answers

by Frank Stephenson

Assistant Professor Lanrong Bi

If modern medicine had a safe, fast, and efficient way to check the health of a patient's mitochondria, physicians would have a powerful new tool for catching some of the worst diseases in their earliest stages. New developments coming from the lab of two Michigan Tech chemists suddenly make the prospects of putting such power in the hands of healthcare providers an exciting possibility.

The work of Lanrong Bi, an assistant professor of chemistry, and doctoral student Nazmiye Yapici details their breakthrough development of two fluorescent dyes that show remarkable promise for detecting sick mitochondria in live mammalian cells. In repeated tests, mainly in rats and mice, these new compounds outperformed the best dye-based mitochondrial probes now on the market. The University's Office of Innovation and Industry Engagement has filed for a patent on the compounds.

"Our new compounds enable us to quickly analyze the oxidative stress in mitochondria," said Bi (pronounced "bee"). "These new dyes can easily differentiate between sick and healthy mitochondria and give us more information, and faster, than anything out there."

For many years, biochemists have relied heavily on a special class of dyes for studying the inner workings of live cells. The best of these are based on rhodamine, a compound that readily combines with intracellular organs, or organelles, and has the added benefit of fluorescing under scrutiny by light microscopes. Such dyes can be engineered to literally light up almost anything inside a living cell, thereby pinpointing in vivid colors a select target for study.

Bi's new compounds also are rhodamine-based, but are otherwise vastly improved probes, she said.

"The secret (to our dyes) is in their molecular configuration. Their chemical structures are built to bind only with the molecules that make up mitochondria."

The new compounds are so specifically drawn to mitochondria that they easily reveal the damage done by oxidative stress. To help mitigate such damage, mitochondria will resort to dramatically altering their shapes to stay alive. This microscopic life-and-death drama can now be seen and studied in stunning detail with the improved dyes, Bi said.

Another promising dye Bi's team has produced targets yet another essential cell organ, the lysosome. Commonly thought of as being a cell's "stomach," these organelles are responsible for digesting and getting rid of waste material. These vital units are subject to health problems as well. The new probe the Michigan Tech group has developed is capable of identifying sick lysosomes more efficiently than any commercial dye now available, Bi said.

Yapici also discussed her travel support, an important part of her research. "I would not be able to afford the conferences without support. It was highly important to improve my presentation skills, to see where I am compared to other researchers at the same level, and to network with other researchers. It was also important to improve my research, since I had a chance to get other researchers' ideas and opinions." (See other students' thoughts on presenting on page 7.)

> *"[Presenting at conferences] was also important to improve my research, since I had a chance to get other researchers' ideas and opinions."*
>
> — Nazmiye Yapici

Bi and Yapici Win Rath Award

Last summer, Michigan Tech honored Lanrong Bi and Nazmiye Yapici's work with the University's Bhakta Rath Research Award. Endowed in 2010 by alumnus Bhakta Rath and his wife, Sushama, the award recognizes campus research that shows promise for meeting national needs in engineering and the life sciences.

In supporting their nomination for the award, James J. Russo, research scientist with Columbia University's Genome Center, said that the novel fluorescent dyes to detect sick mitochondria (see story, page 2) "will have great potential for biomedical applications."

"This project is especially exciting because the new compounds already show a dramatic improvement over (probes) currently on the market," he said.

Yapici has been key to this research. "She is an absolutely outstanding student," Bi said. "She works very hard; to demonstrate one fluorescent dye, she will test it under two thousand experimental conditions. And we will meet at two or three o'clock in the morning to do our work, because not many people are working on the fluorescent microscope at that time."

Yapici was also among only fifteen students from graduate schools throughout the nation selected to present her work at the May 2012 American Chemical Society Graduate Research Symposium. In addition, her presentation on detecting free radicals in living cells, given at the 2012 ACS National Meeting, was one of a select few posted online at ACS Presentations on Demand, available here: http://tinyurl.com/Yapici.

Nazmiye Yapici and Lanrong Bi

Wareham Named Manager of the Year by NAOSMM

Don Wareham and his awards from NAOSMM.

Donald Wareham, manager of Chem Stores, a unit of the Department of Chemistry, has received the "manager of the year" award from the National Association of Scientific Materials Managers (NAOSMM).

At its conference in Albuquerque, NAOSMM singled out Wareham for his contributions to the profession and the association, as well as his distinguished activities involving education and administration.

Wareham has worked at Tech thirty-six years and has managed Chem Stores for thirty-two years. He calls the service a "chemical bookstore" that supplies chemicals and glassware campus-wide.

NAOSMM has about 500 members from academia, industry, government agencies and research institutions who oversee operations involving chemicals, supplies and instrumentation.
Don joined NAOSMM in 1982 and served on the Executive Board for NAOSMM, the Survey Committee, and conference co-host for the Grand Rapids conference in 2001.

"Don has always been extremely dependable," said Chair Sarah Green. "Chem Stores just keeps functioning smoothly along; it's one of those things that people don't notice much unless it's broken, and ours never is. Don has gracefully managed Chem Stores through the various budget challenges in the last few years (and decades). He trains and retains a cadre of dedicated undergraduate assistants; I know they enjoy working there because many continue to work for Don throughout their time at Tech."

In addition to a plaque from NAOSMM, Don was also awarded a beautiful glass anchor, sculptured of Frabel Glass, presented by Kimble-Chase. Outside of work, Don is a member of his local volunteer fire department and organized a grass roots effort to develop a new park in his community.

Spring Awards Program 2013

The department held its annual spring awards banquet, and students were recognized for their academic achievements and service to the department.

Spring 2013 awardees included—

CRC Press Freshman Chemistry Achievement Award: Paul Langford

Doc Berry Award: Jacqueline Walitalo

Studio Lab Endurance Awards: Wade Korf, Jacquelyn Hood, Spencer Snider

Leslie Leifer Award in Physical Chemistry: Aaron Chartier

Outstanding Senior Award: Nathanael Green

Outstanding Senior Research Award: Christopher Thomas

Biochemistry Research Award: Chelsea Uganski

Undergraduate Award in Inorganic Chemistry: Christopher Thomas

Outstanding Lower-Division Chemistry Teaching Assistants: Melanie Talaga and Suntara Fueangfung

Outstanding Upper-Division Chemistry Teaching Assistant: Jingtuo Zhang

Outstanding Graduate Student: Nazmiye Yapici

Ray E. Cross and Eleanor K. Cross Endowed Graduate Fellowship in Chemistry: Jingtuo Zhang

David J. and Valeria L. Pruett Summer Undergraduate Research Fellowship: Trevor Curtis

Rebecca Sandretto-Susan Stackhouse Fellowship: Daniel Beegle

Departmental Scholar: Nathanael Green

Woman of Promise: Helen Halt 2012–2013, Sasha Teymorian 2013–2014

Department of Chemistry Ambassador Awards: Alexandra Maday, Rachel Fouts, Eponine Zenker, Trevor Curtis, Jacquelyn Hood, Timothy Butler

Assistant Professor Loredana Valenzano presents the Rebecca Sandretto-Susan Stackhouse Fellowship to Daniel Beegle.

ACS Student Affiliate Officers

We would like to thank the 2012–13 officers—President Eponine Zenker; Vice President Stephen Krieger; Treasurer Austin O'Dea; Secretary Rachel Fouts; Public Relations/Webmaster Audra Winter.

Research Funding

2012–2013 Support for Research

Michigan Space Grants

Assistant Professor **Loredana Valenzano** has received $5,000 for a Research Seed Proposal entitled, "Revealing the Performance Barrier: First Principles Prediction of the Physical-Chemical Properties of New Co-Crystals for Rocket Propulsion."

Associate Professor **Shiyue Fang**, Co-Pi **Yinan Yuan** (Forestry), and Co-Pi **Nathanael Green** (chemistry undergraduate student) received $2,500 for their project, "A Sequencing Technology Capable of Monitoring Variations of DNA Methylation Induced by Travel in Space."

Michigan Tech Research Excellence Fund Award Technology Commercialization Grant

Assistant Professor **Lanrong Bi**, $10,000 for "Mitochondria-Targeting Fluorescent Probes (Superior-MitoProbes) for Detection of Mitochondrial Oxidative Stress."

Century II Campaign Endowed Equipment Fund

Associate Professor **Shiyue Fang**, $2,250 for "Acquisition of a Fluid Cell to Enable Interdisciplinary Research . . . Atomic Force Microscopy."

Instructor **Andrew Galerneau**, $4,000 for "Gas Chromatograph with Autosampler."

Other Awards

Chair **Sarah Green**, has received $4,999 from the University of Michigan for "Implementation of 2012 GLOS Nearshore Observing Network."

Assistant Professor **Lanrong Bi**, $30,000 from University of Michigan—Michigan Initiative for Innovation and Entrepreneurship for "Cancer Cells and Tumor Tissues."

Assistant Professor **Loredana Valenzano** and Co-PI Chair **Ravindra Pandey** (Physics) have received $4,481 from the University of California-Los Angeles for "First Principles Study of Primary Components of Portland Cement."

Professor **Pushpalatha Murthy** has received $179,653 from the National Science Foundation for, "Introgovernmental Personnel Act (IPA) Assignment."

From Detroit to Michigan Tech to Washington, DC, to ?

Ashli Fueri, MS student.

Ashli Fueri, a master's student in chemistry from Detroit, has done some fascinating research lately, and she was able to go on the road to present it.

Last September, Fueri attended the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) conference in Washington, DC.

"I'm focusing on glycan-binding proteins or lectins, with a goal to find a lectin that can potentially detect cancer cells," she says.

With advisor Tarun Dam, assistant professor of chemistry, she said they've characterized a lectin, from a plant native to Brazil, that binds to a cancer antigen, over-expressed by cancer cells. The next step is to get an actual cancer cell line and do more in vitro studies.

"Ashli is very passionate about her research in glycobiology and is always eager to learn more," Dam said. "She is a motivated budding scientist, and she is already on her second project and making good progress."

About her Washington, DC, trip, she says. "At NOBCChE, I had a chance to visit the University of Maryland and other universities, and I talked with people from NIST (National Institute for Standards and Technology), NIH, NSF, and other companies such as Pfizer and Life Technologies, in addition to presenting my research. I discovered that there are many opportunities for chemists."

She says she enjoyed talking to others from around the world, too.

"It was great to see what others are interested in," she says. "You forget about them, sometimes, because you are so focused on your own work."

For now, the research bug has bit her, and she would like to continue in a PhD program, although not sure where.

"I'm just looking now, but I'd like to focus on being a protein chemist, and want to apply Glycobiology in cancer research," she says.

"I think her research experience will help her become a competitive scientist," Dam added. "Young investigators like her will make Michigan Tech more visible at the national level."

Undergraduate Research Expo a Success

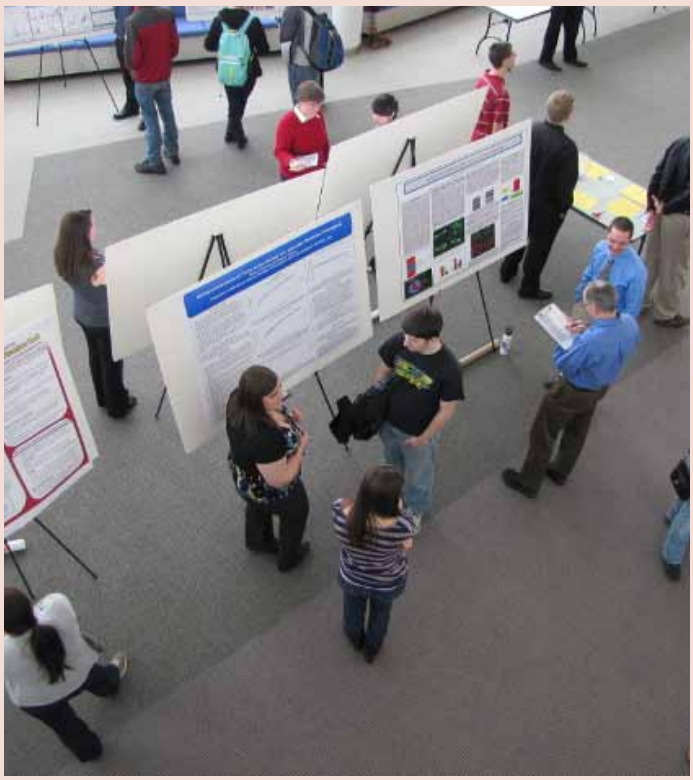
Michigan Tech's Honors Institute held its first Undergraduate Research Expo in March. Twenty students from ten different schools and departments presented their research in the lobby of the Rozsa Center for the Performing Arts.

The Expo took place on Preview Day, when hundreds of potential students, their parents, and teachers come to Tech to see if it is a good fit for them.

Organizing the expo for the Honors Institute this year was chemistry student Caleb Vogt, and there was other representation from the department.

Megan Dalbec, an environmental engineering major, took first place in the judged competition. Her research was entitled "Molecular Characterization of Biogenic Secondary Organic Aerosol," and her advisor was Assistant Professor of Chemistry Lynn Mazzoleni. Dalbec won $200 for her efforts.

Eponine Zenker, a chemistry major, took second place with "Incorporation of Nanoparticle into Dopamine-based Injectable Hydrogel: A Novel Method of Improving Bulk Cohesive and Adhesive Properties" and won $150. Her advisor was Assistant Professor of Chemistry Ashutosh Tiwari. Dalbec and Zenker also won the Audience Choice Award.



An overhead view of the first Undergraduate Research Expo.

Waino Wahtera '42: UP Native Benefitted Lives of Many

Waino Wahtera '42 began his life in Marquette, spent a long career at Eastman Kodak in upstate New York, and his ashes will be returned to his beloved UP woods and streams this summer.

In his 94 years, Wahtera spent a lot of time with his mandolins (including some he made himself), and performed in many bluegrass bands, according to nephew Kim Wahtera.

"He was a member of the New York Bluegrass Association for seventy years," Kim Wahtera said. "His love of music began with his youth in Marquette, in his mother's boarding house."

There, his academics began, too, attending Northern Michigan and getting a general science degree before coming to Michigan Tech for his BS in Chemistry with honors. His love of Tech began, and he has left a legacy.

His gifts to Michigan Tech include the new Wahtera Center for Student Success, which will coordinate initiatives to help students complete their degrees:

- funding learning centers
- supporting peer coaches
- initiating an academic recovery program for suspended students
- increasing cooperation with academic advisors
- remodeling the Dean of Students Office to coordinate Financial Aid, Enrollment Services, Disability Services, and COMPASS.

Renaissance Man

Waino was multi-faceted.

"He was well-read and well-rounded, and he loved to sit and talk about any subject," Kim says.

He also found time to build thirteen mandolins over the years and became proficient on the guitar, banjo, and bass fiddle, performing in several bluegrass groups, including at more than sixty senior citizen and assisted-living facilities in his later years.

Waino Wahtera '42 and one of his handmade mandolins.

"I recall the Park Avenue Playboys and The Bear Waller Gap being the names of two of the groups," Kim recalls.

The family is sure that Waino's tenure at Michigan Tech must have included some jam sessions with other musicians, when he wasn't studying intensely.

Some good but safe pranks were also very likely at Tech, as Waino loved to instigate them.

The avid outdoorsman also made time for camping, fishing, hunting, and skiing, in spite of a prosthetic leg.

"His neighbors of many years were stunned to find out he had an artificial leg. He got around so well, even when it didn't truly fit," Kim said.

His inventive ways helped him create gadgets to better move around in the outdoors, especially in the Adirondack Mountains.

He was also a self-taught painter and he invested wisely. The Wahtera Student Success Center is a result of those investments and a reflection of how he was treated at the University.

"He said he always found open doors at Tech in the chemistry department," Kim said. "The professors welcomed him back and asked him what he had been doing. They wanted to know how Tech had benefitted him and how they could benefit a vocation like his."

That vocation was working as a chemist in the polymer technology and engineering divisions of Eastman Kodak for thirty-three years.

He married Lucile Schweiger in 1951, and she passed away in 1985.

Waino's funeral service was a perfect testament to him: friends and relatives gathered in a circle and reminiscing about a great man.

And when his ashes are spread this summer in the UP woods, this Renaissance man will truly have come full circle, while enriching the lives of so many along the way.

Kim Wahtera with Waino.

1979

Laura Berry says "At MTU I learned to channel creativity and problem solving in ways that have helped me my entire career—as a chemist, engineer, investment manager, and now, shareholder activist. I especially think being among the few women on campus (9 men: each woman) helped me learn to enjoy and thrive in more 'male-centric' environments. There is so much I'm grateful for, and although I've spent most of my life after grad school in and around New York City, I've never forgotten the breathtaking beauty of the Keweenaw Peninsula. Thank you, Tech!"

2009

Lindsey Wells says "I have been employed with Prism Analytical Technologies since June 2011. PATI is the leading consultative air testing laboratory in the United States that is devoted to the chemical identification and analysis of contaminants in the air. My title is chemist, FT-IR applications specialist."

2011

Doug Smith From Sarah Green: "Please help me congratulate Doug Smith (and advisor Lanrong Bi) for his NSF award to participate in the East Asia and Pacific Summer Institutes (EAPSI). He will be traveling across the Pacific Ocean this summer to China."

2012

Ning Chen, PhD says "My second postdoc position started in February 2013 in the Department of Physics (group of Jeff Urbach) at Georgetown University. My current project is super-resolution imaging work of fluorescent carbon nanotube nanocomposites and most of my research is in the group of Dr. Jeff Gilman in the Material Measurement Laboratory at NIST. If you plan to visit DC, please send me a note and we should get together."

Giving

How can my gift be used?

Your gifts are used to build programs that enhance education and research for our students. For example, the Sandretto-Stackhouse and David and Valeria Pruett gifts have been used for several years to provide support for postdocs and for summer undergraduate research.

Each year, the number of students attending national and regional meetings is growing. Students present their research, network with researchers from other universities and industry, and provide exposure of our programs.

Your donations can defray costs of these meetings, which take place across the country and even overseas. Our students describe the importance of departmental contributions to travel expenses:

"It was a great opportunity to learn from other researchers and experience the community of aerosol research. The participation definitely helped me to see the total span of the research and strategic approaches to solve problems. It helped me to communicate with other individuals who are not familiar with the kind of research I do and helped me to learn more. It was a super opportunity." ~ DM A Habib

"I presented at the April 2013 ACS National Meeting, and it was great practice for me to explain my research to others both in my field and in slightly different fields. Seeing the breadth of topics presented at a national meeting also reminds you of all the opportunities and fields that are available for you after graduation. ~Katrina Bugielski

"This funding enabled me to stay longer at the ACS conference and spend more time learning about current research in my field. I also met many professors, and they gave me a lot of advice for my research and career, which is really helpful for establishing a professional network." ~Jingtuo Zhang

Chemistry Learning Center (funding code 3181) The CLC is an important part of our department. Funding helps to provide quality coaching in a comfortable, supportive learning environment. This service continues to have a substantial impact on student success and retention.

Undergraduate research (3093) Supports undergraduate student research and the development of valuable professional skills.

Graduate research (2969) Supports graduate student research, travel, and professional development activities.

Elements of Success (2942) Educational and research activities are supported along with other special needs in the department.

Opportunities for Giving

We have a new web page—www.chemistry.mtu.edu/pages/giving—to make sure your gift goes to the right place. All gifts made to the chemistry department are used to enhance the education of our students. Donations of any amount are welcome, and listed above are a few of the areas to which you can direct a gift (with funding codes in parentheses).

To make a gift to one of the choices above, visit www.chemistry.mtu.edu/pages/giving or use the enclosed envelope.

Michigan Tech

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Les Leifer Passes Away

Les Leifer, professor emeritus of chemistry, passed away in November in Denver at the age of 83.

Leifer came to Michigan Tech in 1966 as a full professor, bringing with him an Atomic Energy Commission research grant. He would receive Michigan Tech's Research Award in 1970.

A longtime member of the University Senate, he was known for his passion to improve retirement benefits.

In 2001, he received the Faculty Distinguished Service Award, in part for efforts that prompted the University to match employee contributions to TIAA-CREF accounts.

Tony Rogers, an associate professor of chemical engineering, said, "He got everybody's attention. And he loved working with students, he loved teaching, and he loved to challenge students. He didn't like to see students just get by. He wanted them to become deep thinkers."

For his efforts, Leifer received the Big Screw Award, given by a student organization to the most deserving faculty member. "He was proud of it," Rogers said.

He also received the 2001 Claire M. Donovan Award. Sponsored by the Blue Key Honor Fraternity, it is awarded to a member of the Tech community for outstanding service.

During his last years at the University, Leifer's vision deteriorated. "He was pretty blind, but it was amazing what he could do in class," Beck said. "And he was always interested in learning things. Someone would take his arm, and he would come to our seminars."

"He probably taught from memory," Rogers said. "When his eyesight failed him, he would go to Fisher, and it would drive me crazy; we thought he would trip over a bench and fall. But he never worried. He never complained about anything, he just did it.

"Once, he bet his class that he could make a hook shot with a piece of chalk, and he made it. He didn't even hit the rim; it went right in the middle of the waste basket," Rogers said.

After retiring in 2002, he moved to Lakewood, Colo., where he could be closer to his children and grandchildren.

Leifer is survived by his wife, Elizabeth Leifer; his son and daughter-in-law, Andrew and Carla Leifer of Evergreen, Colo.; and his two grandchildren.

Private services were held in November. Memorials may be directed to Willa's Wheels at willaswheels.blacktie-athon.com/Carla_Hammer, the T. J. Martell Foundation for Leukemia Cancer and AIDS Research, or the American Cancer Society.

Jack Holland and John Allison also Passed Away this Year

Jack Holland earned his PhD in Chemistry from Michigan Tech. He acted as director of the clinical laboratory science (medical technology) degree program until his retirement as a full professor in 1988.

John Allison, associate professor, taught organic and inorganic chemistry, including polymer and organometallic chemistry, until his retirement in 1983.