Michigan Tech
Create the Future

DEPARTMENT OF CHEMISTRY

2012 Newsletter

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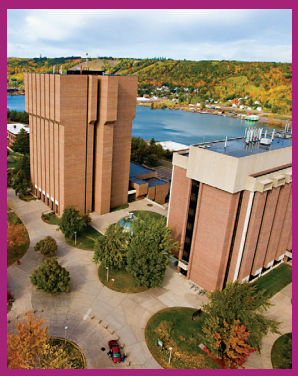

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For the love of the lab: *Robbie Brown '11 and Molly Wiltzius found their niche (p. 5).*

Letter from Sarah

The campus always seems suddenly empty when the students disperse after graduation. Even when summer classes and research projects begin, we feel a change of focus with our more flexible summer schedules and the long UP days.

We sent another great group of graduates into the world this year, with one PhD, three MS, and 22 BS graduates. At the precollege level, we hosted three high school classes: 33 students from Baraga, with Noyce Scholar and former CLC coach Jeremy Brown; 5 students in advanced chemistry from Dollar Bay, with their teacher Kim Rogan '94; and the Calumet AP Chemistry class, with their teacher Corey Soumis. Each group had a chance to interact with staff, students, and faculty, especially Paul Charlesworth and CLC director Lois Blau.

Our faculty continue to expand their research efforts. Shiyue Fang received the first NSF-EAGER award in the department; his wife, plant genomics expert Yinan Yuan, is a co-PI. These awards are intended to support high-risk, exploratory, and potentially transformative research; we are truly excited to catalyze that type of project at Tech. Lynn Mazzoleni is leading a major multi-investigator project to study atmospheric aerosols transiting the Atlantic Ocean. As I write from my comfy office, she is out in the weather, setting up field equipment on top of Pico Mountain in the Azores. The site was originally established by the late Tech Professor Richard Honrath. A number of faculty members are actively pursuing patents. Especially notable is a new fluorescent probe developed by Lanrong Bi and her student Nazmiye Yapici, for which they received the Bhakta Rath award (p. 3).

As usual, we finished the year with a fun awards event at which we honored our most accomplished students. Matt Reuter '06 gave an inspiring talk about his path from a curious kid to a Tech undergraduate to a career in computation nanoscience. He was able to spend several days on campus to share his enthusiasm with many Tech students and faculty. We had a great turnout to hear Matt. Our department awardees are listed on page 3, and many additional door prizes were enthusiastically claimed.

Several other alumni dropped by. Most recently, Larry Mailloux '09 stopped on his way to Isle Royale and reported on his teaching experiences at Miami Dade College; if the students catch any of his energy I'm sure they'll do well. Peikang Song '95 showed up with his family; he is now global project manager at Sherwin-Williams. He recounted how he snooped around outside the facility the night before his interview to find clues about the business. Bruce Sicklesteel '72 recently retired from Valspar in Chicago and decided to see if the department had changed since he graduated 40 years ago (the people have, the building hasn't). Sarah Weinreis '08 used her newly gained teaching expertise as a replacement instructor for Studio Lab (first-year chemistry for majors).

I also had a chance to visit with several alumni during my other travels. In San Antonio, I had lunch with Alan Crowther '77 and his wife Deb; they run a medical clinic focused on healing veins. I had very nice visits with Robert Lane '72 at Shepherd Chemical in Cincinnati, Richard Wilde '82 at PTC in New Jersey, and Yu Tang '06 who develops and tests analytical procedures at USP in Maryland. Wilde reciprocated here in April with an excellent seminar on drug development, which was of great interest to our students. I really enjoy these visits, especially seeing the remarkably diverse directions in which people go with their chemistry degrees.

We were delighted to honor two distinguished alumni as inductees to the College of Sciences and Arts Academy, which now boasts 17 chemists. Our 2011 inductees, David Pruett '74 and John Christianson '75, were contemporaries in the department, then followed dramatically different career paths. Pruett became a senior vice president at CF Industries (now semi-retired as an independent consultant), and Christianson became an outstanding chemistry teacher at Houghton High School. It was fun to see them meet again at our department reception. They both became magnets for our students within a few minutes of their inspiring remarks.

We truly appreciate the generosity of our alumni to the department. Donations have allowed us to support summer research opportunities for students, travel to ACS meetings for graduate and undergraduate students, improvements in the CLC and postdoctoral fellowships to help faculty launch new research projects. In the past four years, seven students have been able to pursue summer research with department faculty using earmarked fellowships from the Rebecca Sandretto Trust and the David and Valeria Pruett Fund.

The giving page on our newly updated website is designed to make sure your gift goes to support the programs you choose. Please take a few minutes to read about our "Elements of Success" Periodic Table. We are working toward the goal of having every element sponsored. Numbers 114 (flerovium) and 116 (livermorium) have just received official approval of their names, and they are both still looking for sponsors!

Pushpa Murthy: Looking Back, Looking Ahead

On a winter weather advisory day, Professor Pushpa Murthy (honored with the 2011 Distinguished Service Award) was in her office awaiting the latest storm and talking about her twenty-five years at Michigan Tech.

The Distinguished Service Award reflects one important change she's seen since 1986 when she and her husband, Madhukar Vable, associate professor in ME-EM, came to Michigan Tech: paid maternity leave for faculty and staff.

"It was very satisfying because it will benefit junior faculty and staff. It doesn't impact me!" she laughs.

She continues to get thank-you emails from women using the benefit, she says.

"Women have said to me, 'This wasn't here the last time I had a baby.'"

It was a team effort, Murthy says, with Faith Morrison, associate professor of chemical engineering; Tammy Haut Donohue, associate professor of biomedical engineering; and Renee Hiller, Michigan Tech Benefits Office.

Support from Provost Max Seel and President Glenn Mroz sealed the deal, she says.

She discussed another major change, this one regarding the University's focus.

"It's much more research intensive now," she says. "Tech put into effect an early retirement plan, and many professors had retired when we came. Tech wanted to change the research posture of the University. It has grown significantly, and it continues to grow. Now we juggle research and teaching, and graduate and undergraduate education."

She cited the more modern equipment and instruments in chemistry and across the campus, too.

"There's also been a huge turnover of faculty," Murthy says. "Sixty to seventy percent of the faculty who were here when I started have retired. The department is younger, and [the new faculty] have brought many different experiences with them. There's been a lot of change."

One change isn't occurring fast enough, in her opinion.

"The percentage of women students [University-wide] hasn't changed," she says. "We want the numbers to increase, but they haven't. It is very dissatisfying, but it's not from a lack of trying."

She's in no hurry to retire, either. She'll remain "as long as I'm still enthusiastic and enjoying my work," and that includes mentoring graduate students.

Mimi Yang, a PhD candidate in chemistry, appreciates working with Murthy.

"Her office door is always open, and she is always smiling whenever you have any questions for her," Yang says. "She always gives me timely guidance on my research and talks with me patiently to resolve all the problems I encounter in my research."

Yang says that Murthy also constantly keeps up to date in grad students' research areas and communicates the new ideas with the students.

"As an international student, I got a lot of help from her," Yang adds. "She spent a lot of time talking with me about living here, and she treats me as her family member. She always tries to comfort her students when they go through some issues. All in all, she is a really wonderful advisor."

Renovated CLC and Learning Opportunities Help Students Succeed

A renovated Chemistry Learning Center means a brighter environment for studying. And a familiar face makes the area even more welcoming.

Lois Blau, director of the CLC, is showing off the remodeled facility, which is busy as usual on a winter day.

"The students love it," says the twenty-plus-year employee. "And we get a real mixture of students: the premeds, the A/Bs, and all the others know they can come here and ask questions to get help. They can study in here, too."

They get regulars, she says, coming weekly for one-on-one help or working in study groups.

The improved space was possible thanks to a generous gift from Amway, coordinated by alumna Wendie Preiss, who saw it as giving back to a place that meant a lot to her.

"My coaching and self-awareness journeys began at the CLC," Preiss says. "It was where I learned many key things that I still use fifteen years later."

That spirit of learning and growing has expanded both within and without the walls of CLC, according to Blau.

"There are also supplemental instruction (SI) sessions here and in Dow, Fisher, and Wads," she says. "Current students lead review sessions for those

(continued on page 3)

(from page 2)

struggling, and it works. We reduce our numbers of Ds, Fs, and withdrawals."

Blau says SI actually began thirty years ago and is a national and international program certified by the US Department of Education.

The Tech SI sessions include organic chemistry as well as the first-year courses, and Blau says they focus on the courses, not the students, "so they are more likely to drop by and learn from students who have just taken the classes."

The SIs also benefit the student teachers, she says, who must do weekly planning sessions and learn about various capacities for instruction.

"It increases their leadership abilities," she says. "They become role models."

Those lessons can help outside the classroom. Preiss agrees that teaching experiences in the CLC and beyond taught her even more important lessons.

"Be adaptable because different people require different coaching and communication styles." she says. "Stretch people with high expectations and watch them surprise themselves."

She also stresses gratitude.

"I will always be grateful for the CLC and Lois Blau."

Student Awards

The department held its annual spring awards banquet in April. Students were recognized for their academic achievements and service to the department.

CRC Press Freshman Chemistry Achievement Award: Victor Claremboux

Doc Berry Award: Nicholle Stark

Undergraduate Award in Analytical Chemistry: Christopher Thomas

Studio Lab Endurance Awards: Luke Doskey, Rachel Fouts, Tyler Haggenmiller, Rachel Wiltenburg, Audra Winter

ACS-UPLS Award for All-Around Best Chemist: Travis Olds

Leslie Leifer Award in Physical Chemistry: Christopher Thomas

Outstanding Senior Award: Chelsea Uganski

Outstanding Senior Research Award: Travis Olds

Undergraduate Award in Inorganic Chemistry: Travis Olds

Outstanding Lower-Division Chemistry Teaching Assistant: Sissi (Xi) Lin

Outstanding Upper-Division Chemistry Teaching Assistant: Mimi Yang

Outstanding Graduate Student: Mimi Yang

Ray '25 E. and Eleanor K. Cross Endowed Graduate Fellowship in Chemistry: Sissi (Xi) Lin

David J. and Valeria L. Pruett Summer Undergraduate Research Fellowship: Nathanael Green

Rebecca Sandretto-Susan Stackhouse Fellowship: Sarah Riutta

Departmental Scholar: Chelsea Uganski

Student Employee Recognition: John Neuman, Jacob Kurka

Department of Chemistry Ambassador Awards: Claire Allison, Luke Doskey, Rachel Fouts, Tyler Haggenmiller, Gregg Hasman, Andrew Kennedy, Shari Konst, Stephen Krieger, Karen McKelvie, Erik Meinke, Austin O'Dea, Philip Olivares, Morgan Owen-Cruise, Cassandra Radka, Thomas Schneider, Rachel Wiltenburg, Audra Winter, Eponine Zenker, Allison Fallon, Kelly Grady, Adam Pap, Nicholle Stark, Molly Wiltzius, John Hausman, Tsitsi Hungwe, Rachel Rees, Chris Thomas, Connor Olds, Jamie Saiberlich, D. M. Ashraf Habib, Parichehr Saranjampour, Melanie Talaga, Sasha Teymorian, Mimi Yang, Molly Yang, Yunzhu Zhao, Kahlie Langley

Michigan Tech Graduate School Outstanding Graduate Student Teaching Award: Katrina Bugielski

The Bhakta Rath Research Award: Nazmiye Yacipi with faculty member Lanrong Bi. The Bhakta Rath Research Award, endowed by Bhakta Rath and his wife, Sushama, is awarded to a PhD student and faculty mentor. The award "recognizes those who conduct exceptional scientific and technological research of particular value and in anticipation of the future needs of the nation while supporting potential advances in emerging technology."

ACS Student Affiliate Officers: We would like to thank the 2011-12 officers—President Gregg Hasman, Vice President Stephen Krieger, Treasurer Andrew Kennedy, and Secretary Cassandra Radka

Tsitsi Hungwe, 2011 Woman of Promise Award from the Presidential Council of Alumnae (PCA).

American Chemical Society Student Chapter Continues Successful Strategies

Gregg Hasman and Karen McKelvie have tag-teamed the American Chemical Society student chapter toward a great-looking future.

Sitting in a lab in Chem Sci 708 recently, the two reminisced on past successes and future possibilities.

They began by discussing their fun at a recent Orientation, where the Big Bang Extravaganza was a big hit.

"It's pyrotechnic chemistry that's not dangerous," Hasman insists.

"We had the students make their own sparklers, too," McKelvie adds. "They loved another demonstration we did with hydrogen balloons that went way up in the sky and then had an exothermic reaction."

The two have been involved in Family Science Nights, focusing on third- to fifth-graders with Silly Putty, Oobleck [a non-Newtonian liquid that you can walk on], a nitrogen cannon, and more. They've done demos for Boy Scouts and slightly older children with shows of flash paper, also known as gun cotton.

"We explained how a slime was a polymer, and, of course, we ended up with blue everywhere," Hasman said, adding that he was the one left to clean up the mess.

The enrollment in ACS has grown, too, according to Hasman. It stands routinely at twenty-five to thirty active members, and he credits advisor Paul Charlesworth for keeping them growing.

Future plans include open houses in September and May for twelfth-graders, so that they can see the labs and experience part of a first year at Michigan Tech.

And McKelvie seeks to make ACS more self-sufficient, getting folks involved in various projects like open houses without having to try too hard: even better organized than now.

"We've made it this far, with great help from Dr. Charlesworth," she adds.

And she's convinced that they can do even better.

Gregg Hasman and Karen McKelvie

Research Funding

Vice President for Research Office

Research Excellence Fund (REF) Awards Spring 2011

Research Seed Grant:

Assistant Professor **Tarun Dam** for "Glycan Mediated Survival of Cancer Cells," $20,000.

Infrastructure Enhancement Grant:

Lynn Mazzoleni and others, "Acquisition of a Sunset Laboratory OCEC Instrument," $35,000.

Technology Commercialization Grants:

Professor **Bahne Cornilsen** and others, "Benchmark Performance Testing of Michigan Tech Rechargeable Carbon Foam Supported Nickel Asymmetric Capacitors," $4,500.

Associate Professor **Shiyue Fang,** "Purification of Synthetic Oligonucleotides," $18,500.

Tarun Dam

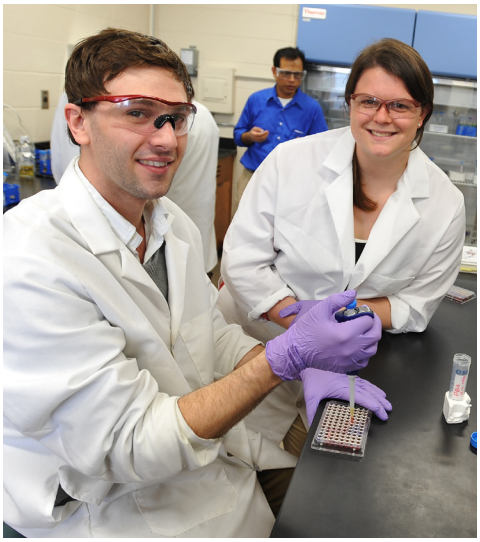
REF Awards Spring 2012

Technology Commercialization Grants:

Lanrong Bi and Co-PI **Mike Morley**, "Developing of New Fluorescent Probes for Trafficking Cancer Cells," $25,000.

Professor **Bahne Cornilsen** and others, "Performance Testing of Michigan Tech Rechargeable Asymmetric Capacitor with a Carbon Foam Supported Nickel Hydroxide Electrode," $5,500.

Associate Professor **Haiying Liu** (PI) and Assistant Professor **Ashutosh Tiwari** (Co-PI) "FRET-based Fluorescent BODIPY Polymeric Dyes for Detection of Bacteria, $7,000.



Robbie Brown '11, left, and Molly Wiltzius '12 in Tarun Dam's lab. Dam is in the background.

Enlightenment in a Lab Coat

By Danny Messinger

Often, students' most valuable learning experiences as chemistry undergrads don't come from lectures or recitations. They come from time spent in labs, working one on one with professors on cutting-edge research projects aimed at solving some of the scientific community's most vexing problems.

But, proof of the success of the undergraduate research program isn't only seen in the outcomes of experiments, numbers of papers published, or stains on lab coats. The research program's success can also be evident when you talk to excited students—who can't stay away from the labs even after graduation—like Robbie Brown '11 and Molly Wiltzius '12.

Brown, a biochemistry major who graduated in December 2011, says he has spent more time at school—on campus—than he did when enrolled in classes. And that's not a problem.

Side by side with Assistant Professor Tarun Dam, Brown has been able to work continuously in the same lab since its opening in May 2011—a pretty unique experience, Brown said.

"I helped Dr. Dam set everything up," Brown says. "The equipment, the projects . . . everything. I started working in the lab for credit toward graduation. But the experience of seeing it all go up is invaluable."

Since building the lab from the floor up, one of the projects yielding the most promising results so far looked at the presence of two proteins in the body, which are known to be markers of an already-developed thyroid cancer presence. Dam's team wanted to know if there was a different way to determine if a patient has thyroid cancer. Brown, along with Wiltzius, a pharmaceutical chemistry graduate, says the project gave them fantastic results.

"I was on Dr. Dam's research team for summer 2011, after receiving a Sandretto-Stackhouse summer research fellowship," Wiltzius says. "I got paid to do lab work, and it also went to pay for things from the lab. I only worked in the lab for three months, but I got two abstracts published."

Brown agrees that seeing his name published in the *Journal of Glycobiology* made his hours of lab work feel very rewarding.

"In class, there are usually twenty-five or thirty other people trying to learn at the same time," Brown says. "In lab, you get one-on-one time with a professor; everything makes so much more sense. You can actually get involved in stuff you're really interested in."

Getting published means national recognition, and "that's going to really help my résumé—give me the extra boost ahead of others when I'm looking for a job," says Wiltzius. And she says her research experience has helped hone her technical skills for an ideal job in glycobiology or pharmaceutical chemistry.

Brown agrees that his undergraduate research experience has helped prep him for his career—even more so, since that's exactly what he wants to do: research and teach at a college level.

"I've had some really 'okay' teachers and some really awesome teachers," he said. "There's actually not a big difference between the two. You just have to be really interested in the subject—both the student and the teacher. That's what's great about undergrad research. Everyone's interested."

Other Awards

Assistant Professor **Ashutosh Tiwari**, "Characterizing the Surface Hydrophobicity of ALS Mutants of SOD1 by Novel Fluorescent Probes," $119,174, ALS Therapy Alliance.

Associate Professor **Haiying Liu**, "A Miniaturized, Point-of-Care Electrochemical Detector for Reagent-free, and In-situ Diagnostics of Pathogens," $42,500, CFD Research Corporation (NASA).

Associate Professor **Haiying Liu**, "Synthesis of Poly(p-phenylene-ethynylene) Bearing Carboxylic Acid Residues," $4,000, NanOasis Technologies Inc.

Assistant Professor **Lynn Mazzoleni** PI and others, "Collaborative Research: Chemical, Physical, and Radiative Properties of North Atlantic Free Tropospheric Aerosol after Long-range Transport," $546,213, National Science Foundation.

Associate Professor **Shiyue Fang**, "Purification of Synthetic Peptides Using a Catching by Polymerization Approach," $260,000, National Science Foundation.

Professor **Pushpa Murthy**, "Collaborative Research: Functional Characterization of Diphospho- and Triphospho-Inositol Phosphates in Plants," $16,705, Virginia Tech.

Associate Professor **Shiyue Fang** and others, "IDBR (EAGER): An AFM-Based Instrument for Monitoring DNA Synthesis in Real-time," $200,000, National Science Foundation.

Burnett (Bertie) Hojnacki in an early school photo (left) and pictured at her fiftieth reunion at Michigan Tech, second row.

Burnett (Bertie) Hojnacki '47: Pioneer Alumna Broke Down Barriers

We are sad to note the passing of Burnett (Bertie) Hojnacki in July 2011.

After graduating as valedictorian from Vulcan High School (near Norway, Michigan), she had to choose between the University of Michigan, Michigan State, Marquette Normal College (NMU), and the Michigan College of Mining and Technology, a "men's school."

She chose MCMT, where older and younger brothers attended. She enrolled in chemistry in 1943 because the registrar said, "that's what women take."

She was one of three females of the thirty-two civilians in her freshman class. Military personnel in the Army Specialized Training Program were also enrolled at Tech at the time. (Burnett worked at defense plants in Milwaukee for two summers of her college life.)

After graduating, she worked with Thilmany Pulp and Paper in Kaukauna, Wisconsin, and 3M Company in St. Paul, Minnesota, where she realized she didn't want to spend her life in a lab. So, she was given time off to "practice teaching" in high schools in the mornings and took education classes after work.

Eventually, Burnett chose teaching full time, even though she started at half the pay of her salary at 3M. Everyone thought she was crazy, but her father, Joseph, supported her decision.

After initially teaching algebra and biology, she taught high school chemistry at Patrick Henry High School in Minneapolis, where male teachers were routinely paid much more than women.

"To tell you the truth, I think I went into teaching because I liked the idea of summers off," she once said. "Fortunately, I really enjoyed it. I think you have to. Otherwise, you would need to leave. I really loved teaching. I never worked so hard, but there was so much satisfaction."

She married David Hojnacki in 1967 in Wakefield, Michigan, and they made their home in Duluth for the rest of their lives, with summers in Wisconsin.

She returned to Tech for her fiftieth reunion in 1997 and remarked, "It was just me and a bunch of old guys."

Today's female chemistry students would do well to recall Burnett and her fellow co-eds who broke down barriers and proved that women can succeed at Michigan Tech and far, far beyond.

Burnett (Bertie) Hojnacki '47 at her camp in Wisconsin.

1988

John Saporta is a research scientist at Silgan White Cap. jsaporta@sbcglobal.net

1991

Dan Walker is a senior scientist at Kalexsyn in Kalamazoo. dpwalker@kalexsyn.com; www.kalexsyn.com

2002 and 2005

Markku Savolainen is a PhD student at Dartmouth. He was also a research scientist for DuPont, Adolor (biotech/biopharma company), and did a co-op with GlaxoSmithKline.

2005

Jonathan Kemling is an analytical chemist with 3M. jonathan.kemling@gmail.com

Jonathan received his PhD from the University of Illinois at Urbana-Champaign. He accepted his current position at 3M in August 2011.

2006

Matthew Reuter, BS, Chemistry, Mathematics, and Cheminformatics; PhD, Chemistry, Northwestern University 2011. reutermg@ornl.gov

Matt is a Wigner Fellow in the Computer Science and Mathematics Division for Nanophase Materials Sciences at the Oak Ridge National Laboratory in Oak Ridge, Tennessee.

Matt was also our featured alumni speaker for the Department of Chemistry's Spring 2012 Awards Program. Matt's topic was "Becoming a Ghostbuster" or "How Michigan Tech helped me find my career and prepared me to tackle research in nanoscience."

Giving

Sandretto-Stackhouse Gift

Michigan Tech received a gift of more than $280,000 from the estate of Rebecca M. C. Sandretto that will benefit a wide range of student programs.

"The thoughtful allocation of these gift funds by her daughter and son-in-law, Sue and Steve Stackhouse, will help us deliver a first-rate education to a great number of students," said Eric Halonen, director of major gifts and gift planning at Michigan Tech's Office of Development.

Over the years, Mrs. Sandretto was always interested in and very impressed with the many accomplishments of the unique student projects across the campus. A longtime friend of Michigan Tech who died on December 25, 2007, she had expressed the wish that her gift be used to support these student endeavors. "Her generosity means more opportunity for our students," Halonen said in announcing the gift.

In the Department of Chemistry, the Sandretto-Stackhouse Fellowship will support summer research.

David J. and Valeria L. Pruett Gifts

David J. and Valeria L. Pruett have made a generous donation to the chemistry department that will provide much-needed funding for its postdoctoral fellowship and Summer Undergraduate Research Fellowship (SURF) programs.

The postdoctoral fellowship program attracts experienced scientists who will bring new ideas and techniques to the department. The program will also provide a professional bridge for them, as well as a strong ambassadorship for the department and Michigan Tech when these individuals leave the University.

SURF provides undergraduate students with an employment experience in a research environment. This is excellent preparation for a variety of careers or continuing studies, again providing an ambassadorship for the department and Michigan Tech.

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.

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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.

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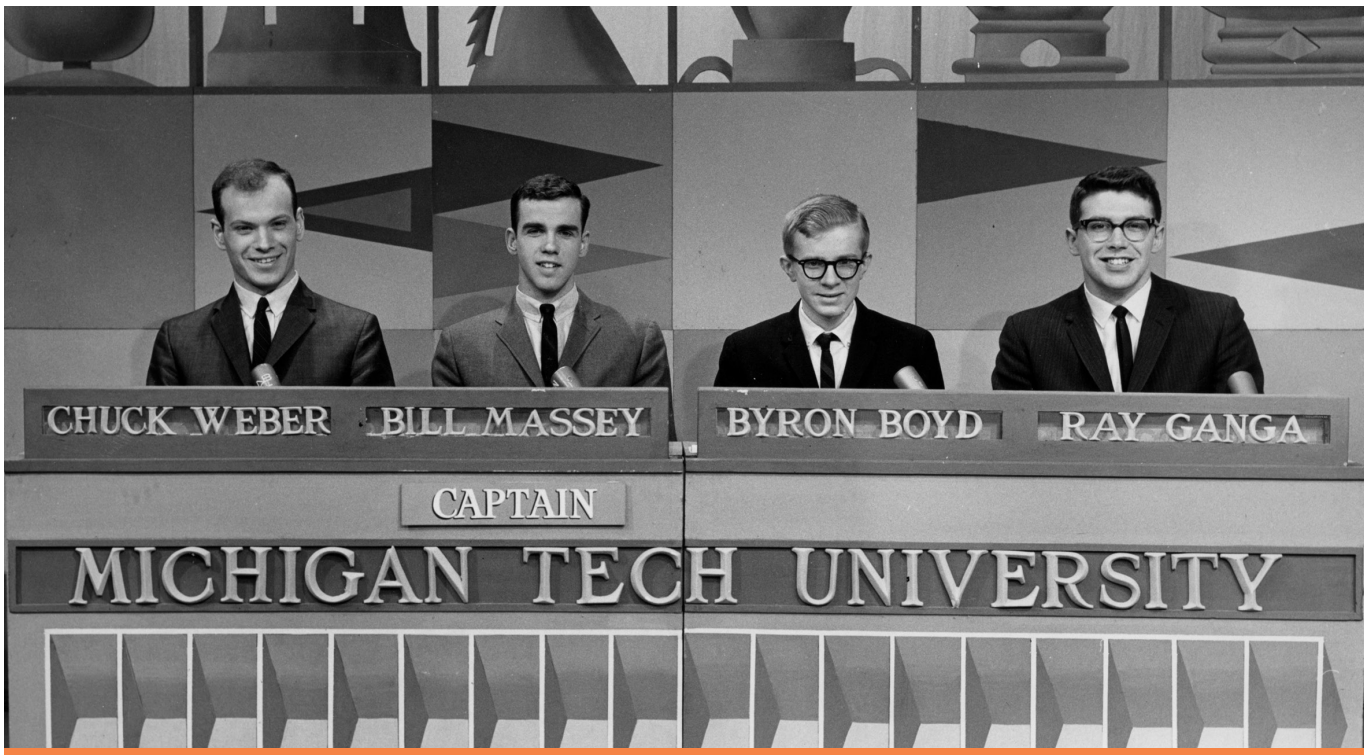

The 1964 College Bowl Team

Coached by legendary Chemistry Professor Myron "Doc" Berry, Michigan Tech's College Bowl team lost a close game to Ohio Wesleyan. After their television appearance, they returned to a nice crowd waiting for them at the Houghton County Airport. Chuck Weber '64 was a chemistry grad.