Michigan Tech Math Department Makes the National Science Foundation’s Top 100

The Department of Mathematical Sciences has seen a phenomenal boost in its research program, as reflected in the National Science Foundation’s annual report on research expenditures. In its breakdown of expenditures by field, the NSF publishes only the top 100, and in fiscal year 2005, Michigan Tech’s math department did not make that list. But in FY2006, it rocketed up to 79th. The results were announced in December 2007.

“They didn’t just cross over into the top 100, they burst through,” said Vice President for Research David Reed. “It’s an amazing accomplishment.”

The department’s research program has been building for a number of years, he said, first under the leadership of former chair Al Baartmans and more recently with the support of the current chair, Mark Gockenbach.

“It’s primarily the result of our faculty in statistical genetics,” Gockenbach said. “They have received a lot of funding from the National Institutes of Health to study the genetic causes of disease using statistical techniques. Additionally, other faculty in discrete and applied mathematics have been doing important research that is being supported by funding agencies.”

Max Seel, who recently stepped down as dean of sciences and arts, also commended the department. “This is exciting news for the Department of Mathematical Sciences,” he said. “My congratulations and compliments go to the faculty who made this possible. I also would like to extend my thanks and recognition to the former department chair, Dr. Al Baartmans, who laid the foundation for the statistical genetics group.”

The NSF report lists Michigan Tech 125th among public institutions, up from 127th, and 75th among institutions without medical schools, up from 79th. At 9.7 percent, the University is 19th in the nation in the proportion of research supported by industry.

Michigan Tech has moved up six places in the National Science Foundation’s annual report, to 173rd from 179th. Eight other Michigan Tech departments and areas of study also maintained their standing among the NSF study’s top 100.

Michigan Tech’s research program is continuing to grow, Reed said. “Overall, we increased from $43.1 million to $56.6 million from FY2006 to FY2007,” he said. “Though there is always some up and down, we should be looking at further increases this year in most disciplines, so the news should continue to be good going forward.”


Dear Friends of the Department of Mathematical Sciences,

It has been some years since the department produced a regular newsletter, but with this edition of The Third R I hope to make it an annual event. The department has grown in many ways in recent years: new faculty, more students studying mathematics at both undergraduate and graduate levels, more research and external funding. This newsletter will bring you up to date on some of these changes and highlight recent departmental accomplishments.

We will be including profiles of faculty members, graduate students, and alumni. If you earned a degree from the department, we would love to hear from you and learn what you are doing now. Send us an email to mathdept@mtu.edu; yours could be the next alumni profile!

Best wishes,

Mark Gockenbach, chair
Melanie (McKenzie) Stothers

Hometown grew up in Chestfield, Michigan.

Education BS in Mathematics from Michigan Tech, 1999, and juris doctor from Syracuse University,

College of Law, Syracuse University, 2000.

Why did you choose to study mathematics?

I was an environmental engineering major planning to go to law school, but found I enjoyed math while I was taking it.

My favorite classes were in math. So, as I finished my last math class and grew despondent in having only two years left, I decided to switch to math.

Why did you come to Michigan Tech?

The weather. The Norwegian in me is happiest near snow. Also, I was either going to the University of Michigan or Michigan Tech.

Why did you choose to study mathematics?

Why did you choose this discipline? I started to enjoy studying math in high school. Taking math tests and doing well in college reinforced my interest in mathematics.

What’s the biggest challenge you face?

The development of high-speed computers and statistical software has made that job a lot easier and allowed me to apply statistical analysis that clearly reflected the state of nature and the decisions that are to be made based on the data.

Besides your education, what did it take for you to get where you are now? I was fortunate to have parents who provided me motivation and discipline in my youth. I also had more than a few lucky breaks over the years.

What drives you? I like to see things happening and get completed successfully. The only way a world’s end will be different in ten years is if the world becomes more environmentally conscious and equitable.

What’s the biggest challenge you face in your work? Having a full-time position on his staff. I have now been a full-time position on his staff. I have now been a full-time position on his staff.

What do you consider your strongest trait? Tenacity.

What’s the biggest challenge you face? I started to enjoy studying math in high school. Taking math tests and doing well in college reinforced my interest in mathematics.

What’s the biggest challenge you face? I started to enjoy studying math in high school. Taking math tests and doing well in college reinforced my interest in mathematics.

What do you hope to be doing five years from now? I hope to be doing five years from now. I hope to be doing five years from now.

What do you want to achieve? I have achieved everything I could have achieved.

What do you consider your strongest trait? Determination, hard work, and luck also played important roles.

Describe yourself in three words. Honest, self-confident, positive.

What drives you? The pleasure of new achievements.

How do you envision the world will be different in ten years? It will be either far better or far worse, depending on...
Kathleen Feigl, Professor

Hometown Chicago Education PhD in Mathematics, Illinois Institute of Technology

Why did you choose this discipline? I enjoy being good at mathematics throughout my schooling. I was also very interested in science and engineering, and math plays a central role in these disciplines.

Talk about teaching. Teaching is one of my most important contributions to society. Teaching is more than lecturing and assigning grades. A good teacher tries to instill in students qualities that help them in life: discipline, strong work ethics, responsibility, and, most importantly, the ability to learn.

What do students mean to you? I do not see or treat students as customers. I see students and, most importantly, the ability to learn.

What is your most significant accomplishment so far in life? Getting a PhD, since everything else has evolved from that.

What is the biggest challenge you face in your work? My biggest mathematical challenge: Developing realistic mathematical models that incorporate the physics of the fluid systems and processes, and developing accurate, stable, efficient computational algorithms to simulate related flow phenomena.

Besides your education, what did it take for you to get to where you are now? Hard work and some luck.

What drives you? My family and my friends. My family and friends inspire me with his wisdom and hard work.

What is your most significant negative trait? Impatience, impulsiveness.

What is your most significant positive trait? Conscientiousness, objectivity, tolerance. Strongest negative traits: impatience, impulsiveness.

What is your most significant hobby or recreation? Hiking, ping-pong, traveling.

What do you hope to be doing five years from now? Getting a PhD, getting a position at a research university.

What's the biggest mathematical challenge you face right now? The biggest mathematical challenge: Developing realistic mathematical models that incorporate the physics of the fluid systems and processes, and developing accurate, stable, efficient computational algorithms to simulate related flow phenomena.

What is your most significant accomplishment so far in life? Getting a PhD, since everything else has evolved from that.

What drives you? My family and my friends.

FACULTY Profile continued

Zhan Ye (Harold) 

Hometown Nanjing, China
Education BS in Applied Mathematics and Education, Soochow University; Soochow, China; MS and PhD in Statistics, Michigan Tech

Why did you choose this discipline? I have loved mathematics since I was a child. My interest is statistical genetics, especially the association studies and other studies connected to genetics and populations.

Dream job? To be a good researcher and manager; to bring knowledge to the real world; to work with other professionals.

What is your immediate goal? To be a good researcher and manager; to bring knowledge; to be a good researcher and manager; to bring knowledge.

What is your most significant accomplishment so far in life? Survived, learned, and gazed of myself.

What is your next goal? To be a good researcher and manager; to bring knowledge; to be a good researcher and manager; to bring knowledge.

What do you hope to be doing five years from now? Working hard, enjoying my life, and having a good time in my future.

What is your most significant hobby or recreation? Cooking, badminton, tennis, watching cartoons, helping people out, and getting new ideas into my life.

How do you define success? Fifty percent of your success is your responsibility, you have to work hard. The other 50 percent of your success derives from your environment and the people around you, so please be good to people around you and to your environment.

Fisher Hall Gets Extreme Makeover

Complaining about Fisher Hall has been a favorite pastime for Michigan Tech students for decades, what with its antiquated wiring, leaky roof, and an ambiance roughly equivalent to that of a minimum security prison. But two years ago, the circa 1964 classroom and office building went through a major metamorphosis.

It needed it, says Jim Heikkinen, assistant director of planning and engineering. “This building was in bad shape,” he says. “It had lot of obsolete stuff that we’ve wiped out and replaced. Fortunately, it was a well-designed building.”

Besides your work, what is near and dear to you? My family and friends.

What is your most significant accomplishment so far in life? Survived, learned, and gazed of myself.

What is your next goal? To be a good researcher and manager; to bring knowledge.

What's the biggest challenge you face right now? High winds, high winds, high winds.

Quickly describe yourself in three words. Consistent, hard-working, kind.

By going to all the trouble of renovating Fisher 139, “we spruced up the lighting and did some work on the acoustics,” Heikkinen said. “Acoustically, 139 was OK, but overall, it looked hideous.”

For the 2006-07 academic year, the chair costs $300 for the first year and $250 for each subsequent year, with a maximum of $500 per person. Fisher 135 is unrecognizable, and the roof doesn’t leak. All this makes Heikkinen very happy.

What is the biggest mathematical challenge you face right now? The biggest mathematical challenge: Developing realistic mathematical models that incorporate the physics of the fluid systems and processes, and developing accurate, stable, efficient computational algorithms to simulate related flow phenomena.

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What do you hope to be doing five years from now? Working hard, enjoying my life, and having a good time in my future.

What is your most significant hobby or recreation? Cooking, badminton, tennis, watching cartoons, helping people out, and getting new ideas into my life.

How do you define success? Fifty percent of your success is your responsibility, you have to work hard. The other 50 percent of your success derives from your environment and the people around you, so please be good to people around you and to your environment.

The University spent about $2.5 million on the classroom renovation, which includes twenty classrooms as well as three lecture halls. “We also have a $300,000 life safety project that added fire alarms, door hardware, and other safety items to Chem Sci and Fisher,” Heikkinen said.

The new lighting is part of a broader, $1.2-million project that involved several buildings. “It’s sometimes called full-spectrum lighting,” he said. “It has a lot of nothing to do with what’s visible, and it feels like a skylight.”

Aside from giving a sunshine lift to the building occupants, the lighting boosts the bottom line. “The University is saving gobs on electricity.” A number of faculty and staff worked long and hard to figure out what could make Fisher a better place for students and faculty. You can see the results of their long hours, he says, with a wave of his arm that encompasses the entire building. “It’s been very gratifying.”

Fisher 135’s comfortable seating and cutting-edge multimedia capabilities typify the improvements made to Fisher Hall, home of the Department of Mathematical Sciences and one of Michigan Tech’s primary classroom buildings.
Statistical Geneticist Zhang Receives 2008 Research Award

Shuanglin Zhang is this year’s recipient of Michigan Tech’s prestigious Research Award.

Zhang was selected for his groundbreaking work in statistical genetics, which has been instrumental in mapping the profile of his department nationally and boosting it into the top 100 in the US in terms of research funding.

The department in terms of advising graduate students and postdocs—he’s kicked that up to a new level.”

Zhang and his team have identified eleven genetic associations with type 2 diabetes using a novel statistical method that first narrows the field of potentially dangerous genes and then determines which act on their own and which act in combination. This test compares the genomes of unrelated groups with and without a specific disease; in this study, they analyzed the genomes of over a thousand people, half with type 2 diabetes and half without.

They have also developed a powerful new statistical tool that can cast back through the generations of a family to determine which genetic associations are inherited with diabetes.

Zhang has authored or coauthored sixty papers in refereed publications, many in the top journals in his field. He has been the principal or co-principal investigator on over $2 million in research funding from the National Institutes of Health and the National Science Foundation.

Zhang received the mathematical sciences department’s Outstanding Research Award in 2002, 2004, 2005, and 2006 and the Outstanding Research Award three times at Heilongjiang University, in Harbin, China. He came to the US in 1999 as a postdoctoral associate at the Yale University School of Medicine and joined the Michigan Tech faculty in 2001.

Daniel Schaid, a professor of genetics at the Mayo Clinic, wrote in support of Zhang’s nomination. “Throughout the years, I have closely followed Dr. Zhang’s publications on statistical genetics because of his impressive insights into genetic problems and sophisticated statistical skills,” he wrote. “When I was editor of the journal Genetic Epidemiology, Dr. Zhang’s submitted publications often received highly favorable reviews, resulting in important publications. . . He is well deserving of the Research Award.”

Hongyu Zhao, a professor of biostatistics and genetics at Yale, praised Zhang’s research contributions. “He has established himself as one of the leaders in a highly competitive field that holds the promise of helping geneticists identify targets to treat human diseases,” Zhao said. “His work has been truly path-breaking and highly influential, reflected by his publications, the grants that he has been awarded to him, the presentations he has been invited to give, and, most importantly, the highest respect he commands among his peers in the community.

“It would be impossible to enumerate all the contributions he has made,” Zhao added. “In addition, he has demonstrated the highest level of integrity, both in his interactions with people and in the quality of his work.”

Math PhD Graduate to Represent Michigan Tech for the 2008 Distinguished Dissertation Competition

Huaizhen Qin is Michigan Tech’s nominee for the 2008 Council of Graduate Schools/University Microfilms International Distinguished Dissertation Award in the Mathematics, Physical Sciences, and Engineering division.

Qin was advised by Associate Professor Shuanglin Zhang and received a PhD in Mathematical Sciences in 2008. His dissertation, “Statistical Approaches for Genome-Wide Association Study and Microarray Analysis,” developed three statistical techniques that are useful in mapping complex genes. The results of his research could be used to analyze complex genome sequences and identify genetic causes of disease. Qin will continue his research as a postdoctoral fellow at the University of Wisconsin-Madison in the Department of Biostatistics and Medical Informatics.
Departmental Award Winners for 2007–08

Faculty
Outstanding Research (Assistant Professor): Fabrizio Zanello
Outstanding Research (Associate or Full Professor): Vladimir Tonchev and Shuanglin Zhang
Outstanding Teaching (Lecturer or Assistant Professor): Ann Humes and Melissa Keranen
Outstanding Teaching (Associate or Full Professor): Todd King and Tami Olson

Graduate Students
Outstanding Teaching: Alex Schaefer, Lisa Thimm
Outstanding Research: Huaizhen Qin

Undergraduate Students
Rathke Receives Norman E. Scholz Award
Norman Scholz received his bachelor’s degree in mathematics in 1958 and later earned a master’s degree from the University of Michigan. Upon his untimely death on October 13, 1977, his parents established an award in his memory. The Norman E. Scholz Award is given each year to the most outstanding senior in mathematics. The winner this year was Kristine Rathke. Kristine graduated summa cum laude with a GPA of 3.97, both overall and in her math courses. She plays several musical instruments and also knits. (This is not your mother’s knitting; for instance, she crocheted a hyperbolic plane.) She has concentrations in statistics and actuarial science and minors in German and economics.

Charles Knobloch Award Presented to Ken Riedel
Charles Knobloch graduated from Michigan Tech with a degree in geological sciences and established an award to promote the use of higher mathematics in industry and to encourage future alumni contributions. This award is given for outstanding performance in upper-level math courses, especially Abstract Algebra and Real Analysis. The winner of the Charles Knobloch Award for 2007–08 was Ken Riedel.
Ken graduated magna cum laude in December 2007 with a concentration in applied and computational mathematics. He had an overall GPA of 3.86, with a 3.92 GPA in his math courses. He is now pursuing a master’s degree in applied mathematics here at Michigan Tech.

Mathematics Achievement Awards
Department faculty established the Mathematics Achievement Award to recognize students who have demonstrated excellence and/or creativity in mathematics courses, projects, or activities.
This year we recognized four students:
Brett Fox: Brett has a 3.95 overall GPA, with a perfect 4.0 GPA in his math courses. He graduated summa cum laude with a concentration in secondary education.
Jizhou Li: In his first two years at Michigan Tech, Jizhou made a name for himself by his outstanding performance in algebra and other subjects. He has a 3.96 cumulative GPA, with a perfect 4.0 GPA in his math courses.
Anthony Hegg: Tony graduated with a double major in physics and mathematics. He had an overall GPA of 3.93, with a GPA of 3.86 in his math courses.
Melissa Petrelius: Missy graduated in December 2007 with a concentration in actuarial science. She was a magna cum laude graduate with an overall GPA of 3.86 and a GPA of 3.76 in her math courses.