From the Department Chair...

It is my pleasure to introduce this year’s issue of the Michigan State University (MSU) Department of Mathematics newsletter. Since our last issue, the department has been singularly focused on one thing: EXCELLENCE. This includes excellence both in educating our students and in producing world-class research. Through this focus, we’ve made incredible gains after an extended period of budget cuts imposed by a difficult financial period in the state of Michigan.

I’d like to briefly touch on a few of the exciting department developments and activities that continue to make us one of the top mathematics departments in the country.

The department is deeply committed to providing our students with the best educational experience possible. Recognizing that many students struggle in their mathematics courses, we have vastly expanded our support operations and network. One novel approach involves taking our Mathematics Learning Center to designated neighborhood centers, which are located in residential halls on campus. The first one at Hubbard Hall became so successful that we opened four more centers last year. Read more about this effort on page 10.

Our Actuarial Science (AS) program is really taking off. This year, we hired Emil Valdez as AS program director. Although this is still a young program, the foundation is in place to make it one of the elite undergraduate actuarial science degree programs in the country. A special section in the newsletter (pages 5-8) has been devoted to this up-and-coming program.

I am also pleased to share with you that we are now in the fourth year of our Advanced Track program, which was created for students seeking a greater challenge in their core classes. This fall saw more than 70 students enroll in the program, and our first four-year cohort will graduate next May. The program has proven to be a great way to involve many dual-major students who enjoy math, yet have their eyes on a career in another area of science (see story on page 9).

Coupled with excellence in teaching, the department continues to improve its research profile. The authoritative National Research Council ranking of Ph.D. programs lists the MSU Department of Mathematics as No. 27 in the country, making it one of the highest ranked departments at MSU and a top Ph.D. program in the country. The department has about $11 million in external funding.

One testament to this excellence is the number of prestigious awards and honors that our faculty members continue to receive. Most recently, one of our assistant professors was awarded the Salem Prize, the top prize in the field of analysis in recognition of outstanding contributions; three faculty members have been named Sloan Fellows; six faculty members were named American Mathematical Society Fellows; one faculty member was awarded the Humboldt Fellowship; and two faculty members received National Science Foundation Early Career Awards.

We will continue to strive for excellence. In addition to what I’ve mentioned above, we now have a novel and vibrant international exchange program through which our undergraduate students get a chance to serve as hosts to exchange students. Our faculty members and students will have a chance to make a reciprocal visit as part of this exciting and innovative effort in the future (see story on page 12).

Finally, a major milestone in mathematics education was reached this fall with the publication of the third edition of the Connected Mathematics Project curriculum. This project has transformed the way middle school mathematics is taught today, with about one-third of all middle schools in the United States currently using it (see story on page 11).

In closing, we are extremely thankful for the alumni and friends who have been central in making a difference by virtue of the many generous gifts and donations made to the department. Now, more than ever, it is our colleagues and friends who will keep MSU mathematics moving forward.

I hope that you find this year’s newsletter informative and enjoyable. I look forward to hearing from you.

Yang Wang, Ph.D.
Chair
Department of Mathematics

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Marjorie (Pickering) Fitting Gifford, mathematics, ’54; Ph.D., curriculum, ’68, is retired after 28 years of teaching and is now an IRS-certified tax preparer.


Wayne Carpenter, mathematics, ’61, has been retired for nearly 10 years after teaching in Michigan for 43 years.

Charles Coltrane, mathematics, ’62, retired in 1996 after 30 years of working in computer systems at several companies including IBM and Volvo.

Thomas Steinfatt, mathematics, ’63; M.A., speech, ’66; Ph.D., communication, ’71, is a professor of communication at the University of Miami in Florida and a Fulbright Scholar.

Robert Golisek, mathematics, ’65, retired from Manatron, Inc., Portage, Mich., in 2008. During his career, he was awarded two U.S. patents related to property records management.

Ron Simon, mathematics, ’67, retired from Auto-Owners Insurance Co. after working many years in systems development and actuarial development. At the time of his retirement, he was CEO & Chairman of the Board.

Douglas Cenzer, mathematics, ’68, is chair of the mathematics department at the University of Florida in Gainesville. During his career, he has published more than 90 articles on mathematical logic and computability theory.

Judith (Harle) Hector, M.A., mathematics, ’69, is retired after 34 years as a mathematics professor and dean at Walters State Community College in Morristown, Tenn. She continues to teach mathematics part-time.

Robert Rietz, mathematics, ’70, is serving his fifth year on the Actuarial Board for Counseling and Discipline and is its chair this year. He also received the Lifetime Achievement Award from the Conference of Consulting Actuaries in 2011.

Ronald Labrocca, mathematics, ’71, completed his 42nd year in mathematics education and has been retained for the second year as the supervisor of Mathematics, Business and Computer Education (K-12) for Hicksville Public Schools in New York.

John Boyer, M.A., mathematics, ’72; Ph.D., statistics, ’76, retired from the Department of Statistics at Kansas State University in 2012 after 31 years. He is a professor emeritus and still teaches an occasional distance education course for the department.

Christine Borgman, mathematics, ’73, spent the 2012-13 academic year on sabbatical at Balliol College, University of Oxford, where her time was largely devoted to writing a book, Big Data, Little Data, No Data: Scholarship in the Networked World, which is slated for publication this year.

John Forslin, mathematics, ’73; social science teaching, ’73, is retired from the Michigan Department of Natural Resources, where he was CIO during Y2K events.

Frederick Rodammer, mathematics, ’74; M.S., systems science, ’76, is a professor of practice and director of the Center for Leadership of the Digital Enterprise at MSU.

David Manderscheid, mathematics, ’76, is executive dean of the College of Arts and Sciences, vice provost for arts and sciences, and professor of mathematics at The Ohio State University in Columbus.

Mike Slattery, mathematics, ’78, is an associate professor in the Department of Math, Statistics and Computational Science at Marquette University, Milwaukee, Wisc.

Amy (Bohucki) Harris, mathematics, ’79; M.S., civil engineering, ’83, program manager for the Palm Beach County (Fla.) Traffic Engineering Division, was selected as the Government Engineer of the Year by the Florida Engineering Society, Palm Beach Chapter.

Brian Gordon, astrophysics, ’85; mathematics, ’87, has a son in the Advanced Math Program at MSU—in the same department that he attended.

Frank Sottile, mathematics, ’85; physics ’85, was inaugurated as a fellow of the American Mathematical Society in January 2013.

Edward Aboufadel, mathematics, ’86, is a professor of mathematics at Grand Valley State University, Allendale, Mich. He was recently awarded second prize in an international mathematical modeling competition.

Gregory Buzzard, applied music, ’89; computer science, ’89; M.S., mathematics, ’91, was appointed head of the Department of Mathematics at Purdue University, West Lafayette, Ind.

Jiu Ding, Ph.D., mathematics, ’90, a professor of mathematics at the University of Southern Mississippi in Hattiesburg, had two Chinese books published earlier this year—one on chaos and fractals, and one on mathematical writing in English.

Edward Hill, Jr., mathematics, ’92, just completed his 21st year in the Southfield, Mich., school district and is currently the principal of Birney K-8 School.

James Authier, mathematics, ’94, is pastor at Faith Lutheran Church, ELCA, in Shelby Township, Mich., and recently celebrated his 15th anniversary of ordination.

George Mark Holmes, mathematics, ’95; economics, ’95, was promoted to associate professor in the Department of Health Policy.
and Management at UNC Gillings School of Global Public Health, Chapel Hill, N.C.

**Dragos-Bogdan Suceava, Ph.D., mathematics, ’02,** is a professor of mathematics at California State University, Fullerton. He also publishes literary work, including the novel, *Coming from an Off Key Time,* which came out in 2011.

**Nathan Dixon, mathematics, ’03,** was named Teacher of the Year for Milpitas Unified School District in Milpitas, Calif.

**Jacob Geyer,** mathematics, ’05, manager of group programs and actuarial liaison for the Accident Fund Insurance Company of America, Okemos, Mich., received its 2013 Leader of the Year award. He is also a visiting instructor with the MSU Department of Mathematics’ Actuarial Science Program.

**Joshua Wallace, mathematics, ’05,** was promoted to director, product management and development at Lafayette Life Insurance Company, which is a member of Western & Southern Financial Group.

**Moose Flores,** mathematics, ’06, graduated with a master’s of divinity from the Lutheran Theological Seminary at Philadelphia, and is pursuing ordination in the Evangelical Lutheran Church in America.

**James Freitag, M.S., industrial mathematics, ’07,** has accepted a job as a National Science Foundation postdoc at the University of California, Berkeley.

**Veronica (Pinkins) Kisor, mathematics, ’07,** is writing the geometry curriculum for the Delta Detroit Preparatory Academy for Social Justice, which is opening this fall.

**Russell Schwab,** assistant professor. Schwab’s research focuses on nonlinear differential equations, multiscale phenomena and applications. He received his Ph.D. from the University of Texas-Austin, in 2009.

**Bang-Yen Chen,** mathematics, ’02, has accepted a job as a National Science Foundation postdoc at the University of California, Berkeley.

**William C. Brown,** Professor of Mathematics, retired in 2011 after 42 years in the department. His research focused on linear and commutative algebra. Brown received his Ph.D. from Northwestern University in 1969.

**Richard O. Hill** retired in 2013 after 46 years in the department. His research focused on numerical linear algebra and the high school-to-college transition. Hill received his Ph.D. from Northwestern University in 1967.

**Izzet Burak Yildiz,** mathematics, ’10, is working as an actuary at Auto-Owners Insurance, Lansing, Mich.

**David Lawlor,** Ph.D., applied mathematics, ’12, finished the first year of a postdoc position at the Statistical and Applied Mathematical Sciences Institute in Research Triangle Park, N.C.

**Jason Middleton,** mathematics, ’12, is a high school mathematics teacher and an assistant varsity football coach at William Chrisman High School, Independence, Mo.

**Indra Shottland,** M.S., mathematics, ’12, is teaching statistics and college algebra at Indian River State College in Sebastian, Fla.

**Drew Fries,** mathematics, ’13, is working for Towers Watson in Chicago, Ill., doing pension consulting.

Thank you to everyone who submitted news. Due to limited space, we could not include all of the information that we received, however, a more comprehensive update is online at ns.msu.edu/alumni.

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### New Faculty and Staff

The Department of Mathematics has hired a number of new faculty and staff members since its last newsletter.

**2013 hires:**

*Mark A. Iwen,* assistant professor. Iwen’s research interests are computational harmonic analysis, signal processing, scientific computing and approximation theory. He received his Ph.D. from the University of Michigan, Ann Arbor, in 2008.

*Thomas McCollum,* academic specialist. McCollum received his master’s degree from Michigan State University, East Lansing, Mich., in 2011.

*Amir Moradifam,* assistant professor. Moradifam’s research focuses on inverse problems, partial differential equations, medical imaging and reflector-antenna problems. He received his Ph.D. from the University of British Columbia, Canada, in 2010.

*Emil Valdez,* Actuarial Science Program director. Valdez comes to MSU from the University of Connecticut, where he was an actuarial science professor. He received his Ph.D. from the University of Wisconsin, Madison, in 1998.

*Zhenqi “Jenny” Wang,* assistant professor. Wang’s research interests are dynamical systems and smooth ergodic theory, and representation theory and its application in dynamical systems.

**2012 hires:**

*Brian Chadwick,* academic advisor. Chadwick received his master’s degree from Michigan State University, East Lansing, Mich., in 2004.

*Russell Schwab,* assistant professor. Schwab’s research focuses on nonlinear differential equations, stochastic partial differential equations, multiscale phenomena and applications. He received his Ph.D. from the University of Texas-Austin, in 2009.

**2011 hires:**

*Yingda Cheng,* assistant professor. Cheng’s research interests are numerical analysis and scientific computing.

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### Retirements

**Professor William C. Brown** retired in 2011 after 42 years in the department. His research focused on linear and commutative algebra. Brown received his Ph.D. from Northwestern University in 1969.

**University Distinguished Professor Bang-Yen Chen** retired in 2012 after 22 years in the department. His research focused on geometry. Chen received his Ph.D. from the University of Notre Dame in 1970.

**Professor Richard O. Hill** retired in 2013 after 46 years in the department. His research focused on numerical linear algebra and the high school-to-college transition. Hill received his Ph.D. from Northwestern University in 1967.

Brown, Chen and Hill are now emeritus faculty members.
Latest scientific innovations built on foundation of computational modeling

What do water purification systems, renewable fuels and national security systems have in common? They all depend on sophisticated modeling and large-scale scientific computing, some of which is done in Andrew Christlieb’s lab.

“I’m interested in answering basic scientific questions using modeling,” said Christlieb, associate professor of mathematics and electrical engineering. “I’m either a very theoretical engineer or a very applied mathematician—it depends on the day. The synergy between doing basic science and then actually doing something with that basic science is fascinating to me.”

Christlieb earned three bachelor’s degrees from U-M Dearborn and then earned both his master’s degree and his doctorate from the University of Wisconsin, Madison.

“I was diagnosed with dyslexia when I was about four years old,” he said. “I had to repeat kindergarten twice. Words were completely confusing to me, but numbers always made sense.”

At MSU since 2006, Christlieb studies a variety of topics, including plasma-assisted combustion, which can make biofuels more practical as well as improve gasoline engines’ efficiency while reducing emissions, and new models for correlated systems, which have applications in aerospace and national security.

“About 10 percent of my time is spent working with the U.S. Air Force through an interpersonal agency agreement,” he said. “I used to do more with them, but now I have five post-docs and four students in my lab, so I’m pretty busy. I don’t work on classified projects. I work on algorithms that Air Force scientists use in classified research. A lot of what I do is basic research that’s used to build prototypes. Computation helps build better experiments.”

For example, the team Christlieb collaborates with developed a microwave system that fits in a missile’s nose. Used to knock out opponents’ radar, the system originally was in fighter jets; but flying jets in enemy territory left the crew vulnerable to attack. Putting the system in a missile was a more efficient and safe way to accomplish the goal.

“The amazing part of this work was that the source was designed through simulation alone and the first time it was tested was in a live flight from the nose cone of a cruise missile,” Christlieb said. “It worked flawlessly the first time!”

Andrew Christlieb

Faculty Honors

The American Mathematical Society launched a new fellows program in 2012, and its inaugural class included six Department of Mathematics faculty members: Ron Fintushel, Jonathan Hall, Nikolai Ivanov, Peter Bates, Thomas Parker and Christel Rotthaus.

Alexander Volberg, professor of mathematics, was a 2011 recipient of the Humboldt Research Award from the Alexander von Humboldt Foundation. The award recognizes internationally renowned scientists and scholars whose fundamental discoveries, new theories or insights have had a significant impact on their own discipline, and who are expected to produce cutting edge achievements in the future. Volberg was recognized for his work in operator theory, complex analysis and harmonic analysis.

In the past two years, assistant professors Teena Gerhardt, Matt Hedden, Ignacio Uriarte-Tuero and Dapeng Zhan have received National Science Foundation Early Career Development Awards. In 2012, Gerhardt was recognized for her study of algebraic K-theory and related invariants; Hedden was honored for his work on the topology and geometry of low-dimensional manifolds. In 2011, Uriarte-Tuero was recognized for his research studying the interactions between quasiconformal mappings, geometric analysis, Fourier analysis and geometric combinatorics; Zhan's award was conferred for his work on the analysis of the geometric properties of the Schramm-Loewner evolution.

Dapeng Zhan, assistant professor of mathematics, was named a 2012 recipient of the Salem Prize. The prize is awarded annually to young researchers for outstanding contributions to the field of analysis. Zhan received the award in recognition of his work on the Schramm-Loewner evolution and, specifically, for the proof of the reversibility and duality conjectures.

The Alfred P. Sloan Foundation recognized Matt Hedden, Ignacio Uriarte-Tuero and Dapeng Zhan as recipients of Sloan Research Fellowships in 2011. These prestigious two-year fellowships are awarded annually to 126 researchers in recognition of distinguished performance and a unique potential to make substantial contributions to their field. Hedden's research focuses on knot invariants; Uriarte-Tuero's research involves quasiconformal mappings, a generalization of complex analysis, harmonic analysis and fractals; and Zhan's research interest is in the Schramm-Loewner evolution.
As the new director for the Actuarial Science (AS) Program in the MSU Department of Mathematics, I’d like to briefly introduce myself. My name is Emil Valdez, and I come to you from the University of Connecticut, where I spent the past six years teaching and conducting research in actuarial science. My academic experience spans several enjoyable years as an actuarial educator on three different continents: North America, Australia and Asia. My primary research interests involve the application of statistic and financial economic models in actuarial science.

I am excited to join the AS program, which is housed in College of Natural Science (CNS) at MSU, with joint appointments in the Departments of Mathematics, and Statistics and Probability. And I am even more excited to be joining Albert Cohen, AS assistant director, in providing leadership to this growing program.

It’s a very inspiring time to join CNS, as we recently established a bachelor’s degree in actuarial science, with our first cohort of students graduating in May 2013. Time after time, actuaries are considered to hold one of the top jobs in America; the profession is highly regarded for its quality work environment, income potential and very positive job outlook.

Our vision is to move the AS program forward as a global leader in delivering actuarial education, advancing actuarial research and contributing excellence to the profession. We will aim for the highest possible level of excellence in every aspect of actuarial education and research, and produce students with outstanding skills and talent that will make us proud in the actuarial profession, in the state of Michigan and beyond.

To realize our vision, we need to grow, implement some structural changes and experiment with activities that will enhance the AS program. This includes recruiting, admitting and enrolling students with the potential skills and talent to demonstrate success in our program; expanding our enrollment (but doing so without hurting the quality of education and within the limits of our resources); improving student experience in the classroom; and creating opportunities (for example, through the AS student club) to improve their social, leadership and interpersonal skills in an effort to ensure workplace success.

As the actuarial profession evolves and changes over time, we will assess our curriculum and make the necessary changes and modifications to accommodate shifts in the field. We also plan to ramp up efforts around increasing employment opportunities for our students. We will continue to partner with our industry and will look to our program alumni to provide our students with the connections and advice they need to be successful. We will continually seek to improve career services to our students.

Our faculty members will continue to be scholars of change, discovering and advancing actuarial knowledge that benefits the profession. We will embark on activities to increase our research profile and the potential for even more active research participation and collaboration. Such collaboration can be among faculty members, through industry partnerships and with visiting research scholars. The actuarial discipline is interdisciplinary in nature, which helps expand our opportunities for collaborative projects with colleagues in other disciplines such as financial and applied mathematics, and probability and statistics.

Over a period of time, we also intend to showcase our research and program by hosting and sponsoring seminars, workshops and national and international conferences within the discipline.

We have quite an ambitious vision, but with a solid, dynamic structure in place, we are well positioned for success. As we move into this next phase, we ask our leadership, other faculty members, students and alumni to be patient and supportive of our efforts to be a leader in actuarial education and research.

We hope that you enjoy this special section dedicated to the exciting events taking place in our program, and we look forward to sharing our progress and successes with you in the future as we continue to grow. As always, we welcome your feedback on any aspect of our program and its activities. Please feel free to stop by for a visit if you are in the area or to contact me or Albert; we always enjoy the chance to connect with alumni, donors and friends!
Actuarial Science Program takes off

“Up, up and away!” is an apt descriptor for the MSU mathematics department’s Actuarial Science (AS) Program. Building on its previous advances in offering an AS specialization and industry internship opportunities, the department established an AS undergraduate major in fall 2012. The first cohort of AS majors graduated this year—four graduated in the spring and one in the summer—giving the program its first alumni. Most have already secured jobs in the Midwest (some even before graduation), and feedback from recruiters has been very positive. “Recruiters from across the Great Lakes region and the country are visiting us regularly, seeking to hire our graduates,” said Albert Cohen, AS assistant director. “Through rigorous academic preparation and internship opportunities, we are making sure that our students have the technical and soft skills necessary to make immediate contributions to their hiring organization.”

Brain Chadwick, mathematics academic advisor, said that the program’s enrollment numbers speak to its growing momentum. “Currently, there are 144 students enrolled in the program, at least 40 of whom are incoming freshmen,” Chadwick said. “Additionally, we have 61 students coded to receive an AS specialization, which will soon become a minor in actuarial science. These are very promising numbers—numbers speak to its growing momentum.”

Cohen added that AS students have been equally excited about the program and are doing more than just taking the required classes. “They are immersing themselves in the AS culture,” he said. “We have a very strong actuarial student club [see story below], and the group uses every opportunity to deepen their understanding of the technical side of actuarial life. They are also hungry for research ideas and tackling practical problems in their field, so we collaborate with our industry partners to provide real-world experience through student internships. It’s a ‘win-win’ equation.”

Actuarial Science Club expands students’ personal, professional networks

While not every student in the MSU Actuarial Science Club started college with a plan to become an actuary, most of them now couldn’t imagine doing anything else. “When I started college, I was a psychology major, but I wasn’t positive it was the best fit for me,” said Victoria Saferian, actuarial science senior and club vice president. “During my first semester at MSU, I had several classes, but the one I enjoyed most was my math class.”

After ruling out engineering from the math-focused careers she was exploring, Saferian discovered MSU was starting a new program in actuarial science the next fall. She enrolled in some courses that would be part of the program and began attending AS Club meetings to learn more about what actuaries actually do. “I realized it would be a lot of hard work, but it was a career that I would enjoy and was the perfect fit for me,” she said.

“If it weren’t for the actuarial science major, I probably wouldn’t have attended Michigan State,” said Juliette Mochol, actuarial science senior and club president. While people mistakenly believe that actuaries work only in insurance, many analyze the consequences and opportunities of risk in a variety of fields, including finance, investment and health care, as well as insurance.

Saferian’s and Mochol’s summer jobs illustrate the rapid changes happening in the actuarial field. Saferian worked at Auto-Owners Insurance in Lansing as an underwriting intern, collaborating with the actuarial group at times to complete projects. Mochol was a mortgage banking intern at One Reverse Mortgage, a sister company of Quicken Loans. While Mochol was there, Quicken Loans hired its first actuary and plans to hire more.

Currently, the club has about 20 active members and primarily sponsors company visits so students can learn about the actuary exam process, gather interview tips and find out what’s expected of actuaries at specific companies.

Mochol and Saferian hope to increase the club’s size and offerings in the coming year. “We’d like to have a couple meetings each term where we can get to know one another better and expand our personal networks,” Mochol said. “I’d also like to offer resume critiquing sessions and tips on how to prepare for an interview.”

“The company visits are important. I think the best experience I had in the AS club was the opportunity to hear many different companies talk about the process of getting hired—but we want to offer more,” Saferian said.
Internships lead to job placement for actuarial science graduates

E
xperiential learning opportunities are paramount for the 144 students currently enrolled in MSU's actuarial science program, which is just two years old.

“Our industrial partners very much value work-ready graduates, so one of the degree requirements is a corporate internship,” said Albert Cohen, assistant director of the actuarial science program.


Each summer, one or two MSU students are placed at Accident Fund for a 12-week internship. A few students work during the fall and spring semesters. Towers Watson generally supports two interns per year from MSU, split across its Chicago and Detroit offices.

“One of our top goals for the summer is to have our interns understand what type of work they would be doing full-time,” said Nathan Crum, consulting actuary with Towers Watson in Chicago and MSU alumnus (B.S., ’07, mathematics, with a specialization in actuarial science).

“Interns at Towers Watson do the same work as our full-time associates and attend at least one client meeting,” Crum explained. “We provide robust training, as well as social activities to help our interns network within the organization. Plus, getting paid well for a summer position is a great thing!”

“Accident Fund interns experience day to day life as an actuary—without taking on a full-time job and then realizing it’s not the path for them,” said Jacob Geyer, manager of group programs and actuarial liaison at Accident Fund, who is also a visiting professor in MSU’s actuarial science program.

“From the company’s perspective, it’s certainly better than a 60-minute interview; it’s a three-month interview,” Geyer said.

“We can determine if that student has what it takes to come on as a full-time employee once they graduate. It’s a low-risk, high-reward situation.”

Geyer estimates that approximately 30-40 percent of students who complete internships at Accident Fund are hired as full-time employees.

“At Towers Watson, we place interns with the hope that the internship can lead to full-time employment,” Crum said. “An internship is treated as a trial period to make sure the intern and Towers Watson work mutually well together. As long as the fit is good for both parties, there is a job offer at the end of the summer.”

In addition to internships, other aspects of Towers Watson’s partnership with MSU include meeting with the Actuarial Science Club and working with the director of the actuarial science program to help ensure that the curriculum is in harmony with what the industry expects of students. Each fall, Towers Watson conducts on-campus interviews for both internship and full-time positions.

For the second year in a row, Accident Fund will sponsor a fall project as a course at MSU, looking to ensure that these students are ready to go out in the workforce,” Geyer said.

“MSU has good leadership in place and they have a great group of students who are interested in continuing to grow,” Geyer added. “There are currently more than 100 juniors and seniors in the actuarial science major, which is phenomenal—considering it’s only a couple of years old. I’m excited about where things are headed and I’m glad to be part of that.”

“We are always looking for committed students to join our group and to continue to lay the foundation of our new major,” Cohen said.

Chad Williams, who received his bachelor’s degree in mathematics from MSU in May 2013, recently completed six months as an actuarial intern at Accident Fund.
Actuarial Science Endowment and Scholarship Funds

Radcliffe Family Endowment for Actuarial Science - Expenditures from this endowment will be used to support the Actuarial Science Program in the College of Natural Science (CNS).

Ronald H. and Mary E. Simon Endowment for Actuarial Science - Expenditures from this endowment will be used for the Actuarial Science Program and for other purposes that further raise the program's visibility and success.

Paul Buben Actuary Science Scholarship Fund - Expenditures from this endowment will be awarded to a recipient pursuing a degree in actuarial science who is in good academic standing.

William and Lydia Falk Scholarship - Recipients will have a major (or preferred major) in actuarial science and be a citizen or permanent resident of the United States. Successful recipients will be in good standing in the Honors College, demonstrate financial need, and have passed at least one actuarial examination offered by the Society of Actuaries or the Casualty Actuarial Society.

Actuarial Science Exam Prize - Recipients must be enrolled in CNS and are encouraged, but not required, to be enrolled in the actuarial science degree or specialization programs. The Department of Mathematics will select award recipients using the following criteria: Documentation of successful completion of actuarial exams administered by the Society of Actuaries or the Casualty Actuarial Society.

Actuarial Science Advisory Committee

William J. Falk
(B.A., mathematics, ’70)
Retired, Principal
Towers Watson
Arlington Heights, Ill.

Jacob J. Geyer
(B.A., mathematics, ’05)
Groups Manager/Actuarial Liaison
Accident Fund Insurance
Company of America
Lansing, Mich.

Joan P. Ogden
(M.A., mathematics, ’68)
Actuary
Joan Ogden Actuaries
Salt Lake City, Utah

Robert J. Rietz
(B.S., mathematics, ’70)
Retired, Director
Deloitte Foundation
Detroit, Mich.

Michael W. Ringueette
(B.A., statistics, ’87)
Consulting Actuary
Towers Watson
Detroit, Mich., area

Ronald H. Simon
(B.S., mathematics, ’67)
Retired, Chairman & CEO
Auto-Owners Insurance
Company
Lansing, Mich.

Michael Webb
Reruiter, College Programs
Humana, Inc.
Louisville, Ky.

Mark Wenger
Assistant Vice President and
Chief P&CEO
Auto-Owners Insurance
Company
Lansing, Mich.

Lisa M. Winters
(B.S., mathematics, ’86)
Senior Vice President
Scottish Re
Charlotte, N.C.

Dale F. Woods
(B.S., geological sciences, ’84)
Actuary
Towers Watson
Chicago, Ill.
Advanced Track Math Program ramps up student experience

Take bright students, offer them challenging courses, and you have a rewarding undergraduate experience for students with ramifications beyond a bachelor's degree. That pretty much sums up the Advanced Track Mathematics Program, now in its fourth year.

“Many students find our Advanced Track program appealing, and some come to MSU specifically because of the program,” explained Jeanne Wald, associate chair of MSU’s Department of Mathematics. “There are other places with programs designed for students who are very bright, but not many that have as comprehensive a program as MSU.”

Many faculty members talk with prospective students during the Alumni Distinguished Scholarship weekend in February. Wald and instructor Julie Cioni work hard to find students who are a good fit for the program.

“If you put students together who are excited to be challenged and they get together to help each other, you get a stimulating environment full of energy,” Wald said.

Kellie Stilson agrees.

“Advanced Track really forces you to delve deep into the theory behind computational mathematics,” said Stilson, a senior from Roscoe, Ill., who is not only pursuing an Advanced Track degree, but also will have minors in physics and music when she graduates.

By design, the Advanced Track program enables students who may be interested in additional majors to use several advanced courses in other disciplines to meet program requirements.

“The program helps them get an extremely good mathematical background that they can use in whatever area they want. That is one of the unique aspects of this program,” Wald said. “Their Advanced Track degree will stand out on their resumes because it means that they are qualified in a way most people are not.”

Stilson, who plans to teach math or physics for grades 6 to 12, sees numerous benefits to the program.

“With about 10 to 20 students in every class, you really get to know the faculty and, in Advanced Track, the professors are some of the best at MSU,” Stilson said. “This really helps when it comes to finding research positions, work and scholarships.”

Brandon Alberts, an Advanced Track student from Grand Blanc, Mich., graduated in June. Alberts liked math in high school, but did not see himself doing much with math besides applying it to engineering or another science.

“The Advanced Track program gave me a chance to experience math differently and in a more challenging setting. I started to see a larger picture, which convinced me to major solely in math,” said Alberts, who is now working on a Ph.D. in mathematics at the University of Wisconsin, Madison. “I absolutely believe that Advanced Track played a major role in getting me here.”

Jeanne Wald, associate chair of MSU’s Department of Mathematics, visits with a group of Advanced Track students—many of whom are incoming freshmen—at the program’s first meeting this fall. More than 70 freshmen enrolled in the program for fall semester.

WeBWorK online homework system improves learning

Patricia Lamm, a professor in MSU’s Department of Mathematics, began using WeBWorK—an open-source online homework system specifically designed for mathematics coursework—in her Calculus II classes in 2007. Now, the department has adopted the system for use in several courses, including college algebra and calculus.

MSU is one of the biggest users of WeBWorK; more than 9,000 MSU students used the system in the 2012-2013 academic year.

WeBWorK was developed in the mid-1990s by two mathematicians. It is currently used at more than 550 institutions, including universities, community colleges and high schools.

“The old way of doing math homework involved a student turning in a homework set that he or she naturally assumed had been done correctly,” Lamm said. “By the time the student received the graded homework back, he or she was already focused on the next assignment. With WeBWorK, students are able to make multiple attempts at a problem and they get immediate feedback, which gives them the encouragement to keep trying until they get it right.”

MSU’s WeBWorK team has written more than 2,000 problems (some with graphs and drawings) and more than 500 linked examples.

The department is currently developing the system for use in two additional courses.
Math Learning Center initiative boosts student confidence, grades

Get help! This could be the motto of the Math Learning Centers (MLCs), but the centers deliver much more than help with math homework. They offer a relaxed, friendly atmosphere with experienced staff to help students better understand the concepts covered in all 100- and 200-level mathematics classes and some higher-level classes. The MLCs provide individual tutoring, small group problem sessions and exam review sessions.

Jeanne Wald, professor and associate chair of the MSU Department of Mathematics, started the original MLC in Wells Hall 20 years ago. During the past three years, the MLCs expanded to include satellites in five additional locations on campus: Brody, Holden, Hubbard and McDonel Halls, and the MSU Union.

“What makes our program different from many others is the high quality of our tutors (most of whom are departmental teaching assistants) and our emphasis on providing a welcoming environment for the students,” Wald said. “We pick people for their math knowledge and focus on how they can tutor effectively so that students are comfortable asking questions.”

Erik Bates, an Advanced Track math major who is a supervisor at the Brody MLC, helps Tracey Jabbour, a junior majoring in statistics, with a problem from the Math 320 class.

The MLC at Wells Hall is open 40 hours a week and the five neighborhood centers are open evenings for 10 hours per week. From fall 2012 through this past summer, the MLCs received just under 60,000 student visits.

Students coming to the MLCs for help typically are not math majors. Those already doing well in class often come to do better; students who struggle often come to find the help they need to successfully complete courses. According to surveys, those students most at risk of not passing, attribute their improvement—up to a 2.5 point increase in their grade (on the standard 4.0 scale)—to MLC assistance.

Erik Bates, an Advanced Track senior, is a supervisor at the Brody MLC, nicknamed “MathSquare.”

“I started tutoring in my freshman year and have continued doing so because it’s a whole lot of fun,” said Bates, a 2013-14 Goldwater Scholar. “Students benefit by having free, quality tutoring close to where they live. In turn, I enjoy teaching and helping others understand mathematics.”

Dan Diroff, also a senior Advanced Track student and an MLC supervisor, sees the two-way benefits of the program.

“The students benefit from help with math classes while the tutors stay sharp in all of their prior math subjects,” Diroff said. “Tutoring at MLC has helped me tremendously in my current math courses.”

Outreach Programs

In addition to its longstanding Cooperative Highly Accelerated Mathematics Program, or CHAMP, which targets gifted middle and high school students, the MSU Department of Mathematics offers numerous outreach programs.

Math Circle: Originally inspired by Eastern European traditions of faculty engaging children in challenging mathematical discussions, the Math Circle Program in the United States began in 1994. In East Lansing, Math Circle activities occur regularly throughout the year at Glencarrin and Whitehills Elementary Schools, and at the East Lansing Library. Lesson plans include topics such as topology, encryption, proofs and logic—subjects not generally explored in the classroom.

Julia Robinson Mathematics Festival: This festival, held each March, offers a half-day of intriguing activities touching deep mathematical areas offered at levels accessible to young children.

Kinawa Math Circle (formerly known as Kids’ Math): Years ago, MSU math professor Michael Shapiro started Kids’ Math for 5th- through 8th-graders in the area. Currently, Kettering University professor Leszek Gawarecki directs the program at Kinawa Middle School in Okemos, with key support from middle school staff and several MSU mathematics faculty members. After introductory lectures on various topics outside of typical school curricula, students actively engage on working through solutions to the lectures’ exercises, which are designed to expose them to high-level math problems and help them develop their analytical thinking.

Math Camp: Initiated this summer, the “From Zero to Infinity” camp drew students entering grades 3 to 7. Camp activities fostered curiosity, creativity and enjoyment of math. One day included a trip to Spartan Stadium where campers, using calculators and yardsticks, estimated the number of blades of grass on the field.
Glenda Lappan has come a long way—from farm girl in southern Georgia to Michigan State University Distinguished Professor. Due to her perseverance, and her dedication as a mathematics teacher and researcher, there has been a startling transformation in the way middle school mathematics is taught today.

Lappan, an only child, grew up in a family that didn’t have a lot of financial resources. Whenever she was asked about going to college, she’d respond: “I know that we don’t have money, but I have a plan. I’m going to work really hard, I’m going to save my money, and some day I’m going to get to go to college.”

And she did. She was awarded a full scholarship and earned her bachelor’s degree from Mercer University in 1961. She taught high school mathematics in Douglas, Ga., and then earned her master’s and doctoral degrees from the University of Georgia in 1963 and 1965, respectively.

Lappan joined the MSU mathematics department as an assistant professor in 1965. After teaching mathematics for two and a half decades, she turned her attention to mathematics curriculum research.

She and colleagues Elizabeth Phillips and the late William Fitzgerald felt that middle school mathematics teaching materials were “woefully inadequate at capturing the imagination of students.”

“Elementary school students were not learning a lot about mathematics. Unfortunately, students were not learning a lot about mathematics in middle school, either. Consequently, they were not well prepared for entering high school,” Lappan said.

And incoming MSU freshmen were failing the math department entrance exams.

“We felt that if we could do something that would improve students’ learning of mathematics, then our university and other universities across the United States would benefit,” Lappan said.

“We began to visit middle school classes in Michigan to see if we could design more interesting ways to engage students in learning mathematics,” Lappan explained. “We found that classroom discussions were focused on teachers telling students what they should see in the mathematics. Classes were arranged to promote students staying in their seats and thinking alone about the problems.”

So Lappan and her colleagues created a three-unit set of problems that they felt would interest the students and promote deeper engagement with mathematics.

“They were an instant hit,” Lappan said. “Teachers began telling us: ‘You got us hooked with these three units; you must give us more. You can’t open the door to something that makes this kind of difference and not do more.’”

Those three units—originally referred to as the Middle Grades Mathematics Project (MGMP)—segued into the Connected Mathematics Project (CMP). Development of the curriculum, supported by a $5 million grant from the National Science Foundation (NSF), began in 1991 and took five years to complete.

“NSF felt the same as we did; if we didn’t do something about middle school math, we were never going to get high school graduates into STEM fields in college,” Lappan said.

In 1998, Lappan was designated a University Distinguished Professor in recognition of the importance of her work. In 2002, the Lappan-Phillips-Fitzgerald Endowed Chair in Mathematics Education was created in honor of CMP’s three founders.

The third iteration of the curriculum—CMP3—has just been released. And today, approximately 30 percent of all middle schools in the United States use the curriculum.

After nearly 50 years at MSU, Lappan will retire this spring.

“I’ve had a remarkable career,” Lappan said. “To say this has been a labor of love is an understatement.”

She believes that CMP will be in good hands after her departure.

“CMP is a brand in the nation,” she said. “In order for that brand to continue, we have to have people involved who understand the great care that has gone into creating materials that raise the ante for kids and for teachers.

“We’re trying our best to leave a legacy that can continue,” Lappan said.
International Exchange Program Connects Cultures

Mathematics Department Chair Yang Wang is the mastermind behind the department’s International Exchange Program, now in its second year. The program involves three Chinese universities, all known for their excellent mathematics departments. Wang and associate chair Jeanne Wald coordinate the program.

“The Chinese government has established generous scholarships to support its best and brightest undergraduates for a study abroad experience,” Wang explained. “So far the program is a huge success, and it’s now viewed as the gold standard by many in China.”

As a result of Wang’s personal efforts, top mathematics students from Xi’an Jiaotong University (Xi’an, China), Zhejiang University (Hangzhou, China) and Beihang University (Beijing, China) have come to MSU. These undergraduate students, most in their junior year, take classes, attend seminars and work with faculty on independent research. MSU Advanced Track students join Chinese students for lectures and breakout sessions, during which they work through problems together (and along the way, became better acquainted with one another).

The program provides both mathematical and cultural education. In addition to course work, Chinese students with their MSU counterparts experience music festivals, camping, sporting events, hikes, trips to Detroit and Chicago, and local events. They also cook for one another and talk about their differing traditions and lifestyles.

Already this semester, mathematical and cultural activities are underway, and the possibility of sending MSU students and faculty to China is also under discussion.

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International Exchange Program participants “strike a pose” while waiting to take the People Mover to the 2013 Detroit Jazz Festival.