ContinuUM

University of Michigan
Department of Mathematics
NEWSLETTER • 2026

The Human Compass:

Navigating the Era of AI in Mathematics

For centuries, mathematics has been viewed as a uniquely human endeavor, a discipline relying on sudden flashes of insight, deep intuition, and rigorous, solitary logical deduction. Today, however, a new collaborator has entered the mathematician's office: Artificial Intelligence (AI).

As AI rapidly advances, it is reshaping how mathematical research is conducted. This shift has sparked a spectrum of reactions within the academic community, ranging from boundless enthusiasm to profound anxiety about the future of the profession. To understand what this means for the future of math, we have to look at what AI is actually doing, where its limits lie, and why the human mind remains irreplaceable.

Connecting the Dots vs. Generating New Theory

Recently, AI has made waves by tackling notoriously difficult open problems. In a stunning recent breakthrough, an AI reasoning model was used to disprove Paul Erdős' 80-year-old planar unit distance conjecture. Utilizing tools from algebraic number theory, the machine constructed an unexpected counterexample that human mathematicians had missed for decades. We have seen similar milestones elsewhere: a mathematician at Anthropic used AI to find a counterexample to the long-standing Jacobian conjecture, and programs like DeepMind's AlphaGeometry are now routinely solving Olympiad-level geometry problems.

When observing these breakthroughs, a common question arises: Is AI generating new mathematical theory?

The reality is that, so far, AI has done an amazing job of connecting the dots, but it struggles to generate entirely new theory. Current AI models are unparalleled pattern-recognizers. They can sift through incredibly high-dimensional spaces, optimize bounds, and find obscure connections between known mathematical entities that would take a human lifetime to compute by hand.

Mathematical progress is not just about solving existing problems; it is about inventing entirely new conceptual frameworks to understand the universe. It appears AI is not currently capable of the kind of paradigm-shifting leaps that gave us calculus, topology, or Galois theory. It operates brilliantly within the boundaries of the data and logical tools it has been trained on, but seems to lack the capacity to invent a completely new mathematical universe from scratch.

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From the Chair:

An Extraordinary Year for Michigan Math

It has been an extraordinary year for Michigan Mathematics—one marked by landmark research, ambitious new teaching initiatives, and generous investments in our community.

We are delighted to welcome **Mari Kawakatsu**, an applied mathematician and theoretical biologist joining us from the University of Pennsylvania. For the 2026–27 academic year, she is an LSA Collegiate Fellow and will begin as an assistant professor in fall 2027. Her joint appointment in Mathematics and the Center for the Study of Complex Systems will create exciting new opportunities for interdisciplinary collaboration. You can read more about Mari on page 3.

One of the year's most remarkable research stories comes from **Professor Zaher Hani**. In work growing out of Hani's longstanding collaboration with **Yu Deng**, they, along with Michigan postdoctoral fellow **Xiao Ma** addressed a central part of Hilbert's sixth problem, posed in 1900. They established a rigorous mathematical bridge among three descriptions of gases and fluids at different scales: Newtonian dynamics for individual particles, Boltzmann's kinetic equation, and the Euler and Navier–Stokes–Fourier equations of fluid mechanics. Their work draws on striking new ideas from combinatorics, probability, and analysis. It also helps explain how irreversible behavior at large scales can emerge from microscopic laws that are themselves reversible. Readers interested in learning more will find excellent accessible accounts in Quanta Magazine and Scientific American.

The recognition for this body of work has been extraordinary. In 2026, Hani and Deng jointly received both a Clay Research Award and the AMS Leonard Eisenbud Prize for Mathematics and Physics. At the International Congress of Mathematicians (ICM) in Philadelphia this summer, Deng received a Fields Medal, with a citation that recognized the rigorous derivation of the Boltzmann equation from hard-sphere dynamics.

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Faculty Recognition

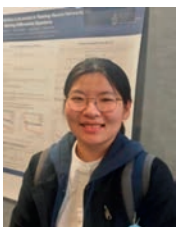
Postdoctoral Assistant Professor **Naghmeh Akhavan** received an AWM 2026 Dissertation Prize for her dissertation, "Mathematical Modeling of Border Cell Cluster Migration in Drosophila Melanogaster." She completed her dissertation under the direction of Bradford E. Peercy at the University of Maryland, Baltimore County. Naghmeh joined the department in Fall 2025 and is currently mentored by Victoria Booth.



Tony Bloch, the Alexander Ziwet Collegiate Professor of Mathematics, received the 2026 W. T. and Idalia Reid Prize from the Society for Industrial and Applied Mathematics. He is recognized for his deep scientific contributions to geometric mechanics and control theory, particularly for nonholonomic dynamics and control. Established in 1994, the prize is awarded annually in the broadly-defined areas of differential equations and control theory.



Postdoctoral Assistant Professor **Chuqi Chen** received an Empowering Research with AI Award from the AI Institutes at Michigan (AIIM). Her project, Making AI Reliable for Scientific Computing: A Study of Neural PDE Solvers, received third place recognition.





Thurnau Professor of Mathematics **Stephen DeBacker** received the Distinguished Service Award from the Michigan Section of the Mathematical Association of America.

Daniel Forger, the Robert W. and Lynn H. Browne Professor in Science, Director of MCAIM, and Professor of Mathematics, has been named a 2026 Guggenheim Fellow. He is one of only four new Guggenheim Fellows at UM, and among 223 recipients throughout the U.S. and Canada. He is recognized for his project that uses applied mathematics to better understand music. Awarded annually since 1925 by the John Simon Guggenheim Memorial Foundation, the prestigious fellowships recognize mid-career academics, artists, and scientists who have shown exceptional productivity or creative promise in their fields.



Gehring Professor **Zaher Hani**, together with his collaborator Yu Deng (UChicago), has received a 2026 Clay Research Award from the Clay Mathematics Institute. They are being recognized for their remarkable derivation of the Boltzmann equation for long times, starting from a system of hard spheres. The award celebrates the outstanding achievements of the world's most gifted mathematicians. Their work was also awarded the Leonard Eisenbud Prize for Mathematics and Physics from the American Mathematical Society. Yu Deng was recently awarded the Fields Medal for his work on this project.



Professor of Mathematics **Trachette Jackson**, University Diversity and Social Transformation Professor and Associate Vice President for Research-Strategic Partnerships and Inclusive Excellence, along with her team of researchers, have developed a method that greatly reduces the time required for stress-testing virtual tumors via computer modeling. Members of her team who were instrumental in this breakthrough include former UM Mathematics postdoc **Daniel Bergman** and 2008 UM Math PhD recipient **Harsh Jain**.



Professor **Mattias Jonsson** was selected as a "Fellow Ambassadeur" of the French Centre National de la Recherche Scientifique (CNRS). The Fellow Ambassadeurs are chosen for three-year terms and are recognized for their scientific work that has redefined the boundaries of contemporary research.



Teaching Professor **Denise Lee** (CSP) received the Distinguished Teaching Award from the Michigan Sectopm of the Mathematical Association of America.



Professor **Peter Miller** was selected for the 2026 Class of SIAM Fellows. He is being recognized for contributions to nonlinear waves, Riemann-Hilbert problems, and the nonlinear Schrödinger equation. Members of SIAM are nominated as fellows in recognition of their outstanding research and service to the community.



Associate Professor **Ian Tobasco** received the 2025 SIAM Activity Group on Analysis of Partial Differential Equations Best Paper Prize. He received the award for his paper, "Curvature-Driven Wrinkling of Thin Elastic Shells," Archive for Rational Mechanics and Analysis, Vol. 239, pp. 1211-1325 (2021). The



paper "studies wrinkling patterns seen in thin elastic shells. Using tools from the calculus of variations, the paper develops an elegant and deep theory with amazing predictive power." The prize is given every two years to the author(s) of the most outstanding paper, as determined by the prize committee, on a topic in partial differential equations published in the four calendar years preceding the award year.

Lecturer IV and Associate Research Scientist **Nina White** received the



Claudia Joan Alexander Trailblazer Award from the Women in Science and Engineering Program. The award recognizes an individual or team for the development or implementation of a program, innovation, or intervention (within the last 3 years) that supports success for all students in STEM at UM. White is Principal Investigator and Director of MaCSS (Math-Computer Science-Statistics), a program that strives to support and build community among undergraduate students in these disciplines, focusing on those from lower income backgrounds.

Assistant Professor **Jenny Wilson** gave an Invited Address entitled "Configuration Spaces in Algebraic Topology" at the AMS Spring Central Sectional Meeting in Fargo, North Dakota.



Lewis Postdoctoral Assistant Professor **Elad Zelingher** received an



Empowering Research with AI Award from the AI Institutes at Michigan (AIIM). At the MIDAS AI in Research Symposium, he presented the poster "Explicit Formulas for Units of Ideals in Finite Matrix Monoid Algebras," describing his joint work with former IBL postdoc Assistant Professor **Nate Harman,** colleague Professor **Andrew Snowden**, and Anthropic's Claude. The work was cited for its innovative and rigorous use and assessment of artificial intelligence to advance knowledge or practice in the field.

New Faculty

Mari Kawakatsu joined the department as an Assistant Professor. She has been named an LSA Collegiate Fellow for the 2026-27 academic year,



a program designed to recruit new assistant professors into tenured appointments in LSA and support their success early in their careers. She holds a joint appointment with the UM Center for the Study of Complex Systems.

Professor Kawakatsu received her B.S. in physics and sociology from Yale University, and a PhD in applied and computational mathematics from Princeton. Prior to joining UM Mathematics, she was a James S. McDonnell Foundation Postdoctoral Fellow in the Department of Biology and the University of Pennsylvania.

An applied mathematician and theoretical biologist, Professor Kawakatsu uses evolutionary game theory, dynamical systems, and network science to study cooperation, social reputations, and the emergence of hierarchies in complex systems. Her research explores topics such as the role of peer-to-peer gossip in cooperation; interplay between direct and indirect reciprocity; cooperation and polarization in group-structured populations; emergent hierarchies in adaptive networks; and self-organized division of labor in ant colonies.

Mustaţă Receives Hochster Award

Professor **Mircea Mustaţă** was selected as the inaugural recipient of the Mel Hochster Research and Mentoring



Award. This new award recognizes a UM Mathematics professor who has made exceptional contributions to the department through their leadership in building a thriving world-class research group. The award provides funding for the recipient's research group, including support for postdocs and graduate students, seminar speakers, and visitors.

Mustaţă joined UM Mathematics in 2004 as an Associate Professor and was promoted to Professor in 2008. Like Hochster, he is an algebraic geometer, studying singularities of algebraic varieties and the role these singularities play in the global geometry of higher-dimensional varieties. His research has involved invariants of singularities such as log canonical thresholds, minimal log discrepancies, multiplier ideals, Bernstein-Sato polynomials, and *F*-thresholds. During his UM career, he has supervised 15 graduate students who have proceeded to active research careers, including recent Fields medalist June Huh. Mustaţă has been recognized as a Simons Fellow, ICM speaker, Packard Fellow, and Clay Research Fellow.

This new award was established by a former UM Math postdoc and mentee of Mel's who sought a way to honor Mel while helping the department. More than 125 individual donors—including many current and former students and faculty, as well as other admirers—contributed to the Mel Hochster Award campaign, which is still ongoing. The department is grateful for the tremendous support we received from the extended Michigan Math community.

MCAIM Expands to Include Algorithm Core

The Michigan Center for Applied and Interdisciplinary Mathematics (MCAIM) has established a new initiative to further bridge the gap between advanced mathematical and computational research and its practical application to large-scale scientific datasets. Through its new Algorithm Core, MCAIM will adapt, maintain, and deploy cutting-edge algorithms developed by U-M faculty, turning theoretical advances into practical tools for researchers across campus. The core is especially focused on areas such as single-cell genomics, neural connectomics, physiological signal databases, genetics, immunology, and other data-intensive bioscience fields.

This initiative will allow MCAIM to support research across departments and institutes by providing access to sophisticated computational methods and mathematical expertise. It also positions the university to pursue funding from external agencies, as well as potential industry collaborations through Innovation Partnerships.

Central to the Algorithm Core are the new research scientists, two of whom joined the department this fall.

Kai Shimagaki received his PhD in Information Science in 2021 from Sorbonne University. His work focuses



on genetics, evolution, genotype-phenotype relationships, microbial populations, immunology, statistical inference, statistical physics, and efficient algorithms. At MCAIM, Kai will support the development and application of algorithms that address complex biological problems and deepen understanding of evolutionary processes.

Sunia Tanweer received her PhD in Mechanical Engineering and Computational Mathematics in



2026 from Michigan State University. She develops interpretable algorithms for complex biological systems using mathematical theory. At MCAIM, Sunia is translating foundational research into scalable tools for real-world bioscience applications, with an emphasis on algorithms that reveal structure, transitions, stability, and failure modes.

Established with funding from the UM Biosciences Initiative, the Algorithm Core will soon add two additional research scientists to help expand its support beyond the biosciences. By making sophisticated computational methods and infrastructure more broadly available, MCAIM aims to accelerate discovery in the biosciences, strengthen interdisciplinary collaboration, and transform theoretical advances into high-impact research tools. To sustain that growth, MCAIM will pursue additional support through grants, foundations, and philanthropic partnerships.

MCAIM was founded in 2016 and serves as the focal point for activities that integrate mathematics with the sciences and engineering across UM. MCAIM manages the Van Loo Postdoctoral Fellowship Program, organizes topical workshops to identify and explore issues at the forefront of applied mathematics, holds advanced summer schools for graduate students and postdoctoral fellows, brings leading voices to its colloquia, and hosts a short-term visitors program.

MCAIM Website

DeBacker Named Parekh Director of IBL Center

Arthur F. Thurnau Professor Stephen DeBacker has been named the Mahendra Parekh Director of the Center for Inquiry Based Learning (IBL). In his inaugural lecture for the directorship, DeBacker traced the history of inquiry based learning and highlighted its development within UM Mathematics.

The idea and methods of IBL as currently practiced can be traced back to **R.L. Moore**, a professor at the University of Texas from 1920 to 1969. Moore emphasized the process of mathematical discovery rather than simply presenting subject matter. Students worked through mathematics themselves, discussed one another's ideas, and developed proofs independently. This approach became known as the Moore Method.

R.L. Wilder introduced the method to UM Mathematics in the 1920s. Other faculty members—including **Edwin Moise, G. S. Young, and Paul Halmos**—later incorporated IBL techniques into their courses. Halmos famously captured the philosophy behind IBL: "The best way to learn is to do; the worst way to teach is to talk."

From the 1960s through the early 2000s, **Mort Brown** taught many courses in the IBL style. When UM developed its reformed calculus program in the 1990s, **Mort Brown, Pat Shure**, and later **Karen Rhea** followed the spirit of Halmos' dictum by instituting collaborative group work in the core calculus classes, which has proved to be an effective method of teaching.

The UM IBL Center was established in 2004, largely through the support of **Harry Lucas, Jr**. and the EAF (Educational Advancement Foundation). Lucas, who took one course with Moore while pursuing a mathematics degree at Texas, credited his success in business to his experience with Moore, specifically the development of his "ability to be inquisitive and self-searching in solving challenging math problems."

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From the Chair

(*continued from page 1*)

Michigan Mathematics was exceptionally well represented at the ICM. **Professors Dick Canary, Andrew Snowden, and Thomas Lam** were invited to deliver sectional lectures in their respective fields. **Professor Daniel Forger** also led Math, Music and the Mind, a public discussion of J. S. Bach's Trio Sonatas followed by an organ performance at Philadelphia's Cathedral Basilica of Saints Peter and Paul, whose instrument contains 4,648 pipes.

In 2026, we also presented the inaugural Mel Hochster Research and Mentoring Award to **Professor Mircea Mustaţă**, recognizing his outstanding contributions to research, mentorship, and the intellectual life of the department (see page 3). The award provides flexible support that Mircea can use to strengthen his algebraic geometry group. I look forward to seeing the new ideas and opportunities this support will make possible. We are deeply grateful to the anonymous donor whose generosity enabled us to establish this award in Mel Hochster's honor.

As you might imagine, there is considerable buzz in the department about AI—both its potential to advance mathematical research and the changes it may bring to our curriculum and practices. Two of our postdoctoral faculty received 2026 Empowering Research with AI Awards from the AI Institutes at Michigan. **Lewis Postdoctoral Assistant Professor Elad Zelingher** received second-prize recognition for joint work with **Professor Andrew Snowde**n and former Michigan postdoc **Nate Harman** that made innovative use of Anthropic's Claude in discovering explicit formulas in algebra. **Postdoctoral Assistant Professor Chuqi Chen** received third-prize recognition for her project, Making AI Reliable for Scientific Computing: A Study of Neural PDE Solvers, which seeks to make AI-based methods for solving partial differential equations more reliable, efficient, and interpretable.

Professor Alex Wright began a series of departmental conversations on AI and mathematics this summer, and this fall our department AI lead, **Professor Asaf Cohen**, together with our embedded AI consultant, **Postdoctoral Assistant Professor Gokul Nair**, is carrying those conversations forward. See page 1 for an article that further examines the potential of AI in Math. I am excited to see how these rapidly developing tools will open new possibilities for mathematical research and teaching!

Our teaching programs are evolving as well. In collaboration with the College of Engineering, we are piloting a new two-course, first-year mathematics sequence. Math 124 launched this fall with an introduction to linear algebra, developed by a team led by **Professor Kartik Prasanna**. Math 125 will follow with a modern calculus course for engineering students, emphasizing numerical and computational perspectives suited to a world of abundant data and powerful computational tools. We are beginning with a small pilot, but I am optimistic that the sequence will be successful.

Our Center for Inquiry Based Learning continues to grow and thrive. **Professor Stephen DeBacker** has been appointed the inaugural Mahendra Parekh Director of the Center. In our inquiry-based courses, students work as practicing mathematicians do: posing questions, testing ideas, explaining their reasoning, and learning through sustained collaboration at the board. The program currently supports 10 postdoctoral fellows, 25 courses, and more than 420 students each year. We are deeply grateful to the Parekh family for the generosity that makes this work possible. An inaugural lecture and opening celebration was held in September (see page 4). Learn more about the IBL center on their webpage https://sites.lsa.umich.edu/ibl.

These initiatives illustrate the remarkable difference that philanthropy makes. I offer my heartfelt thanks to the alumni and friends who made gifts to the department this year. Your generosity helps us support students, advance ambitious research, expand outreach, and strengthen our community. At a time when traditional sources of support for basic research face increasing uncertainty, the flexibility your gifts provide is especially valuable.

Finally, we marked an important transition this fall: our longtime Chief Administrator, **Doreen Fussman**, retired from the University after 41 years, with the last 26 years spent in the department. Doreen guided Michigan Mathematics through decades of growth and change with wisdom, steadiness, and deep commitment. She leaves the department strong and well prepared for the future, although it will be quite an adjustment without her at the helm. We are profoundly grateful for all she has done.

Please stay in touch—we are always glad to hear from you.

Go Blue!

- Karen E. Smith, Chair and Wiilliam Fulton Professor of Mathematics

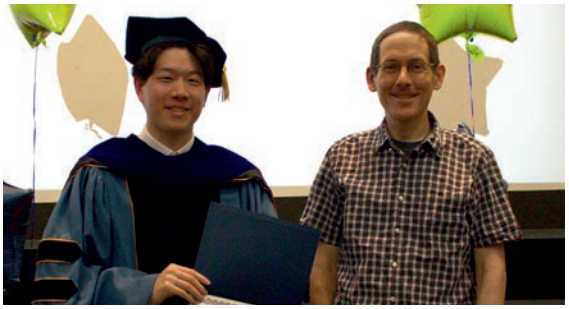
Math Problem

Let f be a continuously differentiable map from the unit interval $I = [0, 1]$ to the unit square $J = [0, 1] \times [0, 1]$, and suppose that the boundary ∂J is in the image of f. Prove that there exist $0 \leq s < t \leq 1$ such that $f(s) = f(t)$, and the arc length of $f|[s,t]$ is greater than or equal to 2.

This problem is from the 2019 UM Undergraduate Mathematics Competition. The answer is available on our website https://myumi.ch/mVee3.

Recent Doctorate Degrees

Samuel Boardman completed the dissertation "*Combinatorial Optimization Problems Arising from Graph-Based Models*" under the direction of Mahdi Cheraghchi and Martin Strauss. Sam has a position at Federated Hermes.



Anthony Chen (pictured above with Professor Silas Alben) completed the dissertation "*Fast Summation for Geophysical Fluid Dynamics*" under the direction of Christiane Jablonowski and Robert Krasny. Anthony is a Peng Tsu Ann Assistant Professor (Visiting Fellow) at the National University of Singapore.

Havi Ellers (pictured below with Professor Karen Smith) completed the dissertation "*Bounding HSL Numbers: A Measure of the Nilpotency of Frobenius*" under the direction of Karen Smith. Havi is a postdoc in UM Math.



Liwei Huang completed the dissertation "*Dynamic Contracting: Sequential Payments, Stochastic Target Problems, and State-Constrained Control*" under the direction of Ibrahim Ekren and Vijay Subramanian. Liwei is a postdoc instructor at NYU Shanghai campus.

Chinmaya Kausik completed the dissertation "S*equential Decision Making with Offline Data and Under Partial Observability*" under the direction of Martin Strauss and Ambuj Tewari. Chinmaya is a Quantitative Researcher at Two Sigma.

Hyunsuk Kim completed the dissertation "*Some Analytic and Topological Aspects of the Theory of Hodge Modules*" under the direction of Mircea Mustaţă. Hyunsuk is a Research Assistant at Imperial College London.

Yutong Li completed the dissertation "*Privacy for Structured Data Release: Time-Discounted Continual Release and Randomized Quantization*" under the direction of Martin Strauss.

Preetham Mohan completed the dissertation "*Learning with Quantum Examples: Multiclass, Online, and Smoothed Settings*" under the direction of Ambuj Tewari and Shravan Veerapaneni.

Moise Mouyebe completed the dissertation "*Structural Effects in Network Dynamical Systems: Stability and Nonlinear Reduction*" under the direction of Anthony Bloch and Indika Rajapakse. Moise is a postdoc in UM Math.

Lukas Scheiwiller completed the dissertation "*Modular Degree of Elliptic Curves over Function Fields in Relation to Jacquet-Langlands*" under the direction of Kartik Prasanna.

Amanda Schwartz completed the dissertation "*Invariants of Plabic Links*" under the direction of Thomas Lam. Amanda is a Krener Math Fellow at the University of California, Davis.

Ekaterina Shchetka completed the dissertation "*Mixing at Double Exponential Rate and Rigidity in Analytic Dynamics*" under the direction of Ralf Spatzier. Ekaterina is a GC Evans Instructor of Mathematics at Rice University.

Gleb Terentiuk completed the dissertation "*Geometrization in Algebraic and Arithmetic Geometry*" under the direction of Bharghav Bhatt and Alexander Perry. Gleb is a MPIM Bonn & Postdoctoral fellow at the University of Toronto.

Lu Vy completed the dissertation "*Optimal Transport and Informed Trading*" under the direction of Ibrahim Ekren and Uday Rajan. Lu is a lecturer in Operations Research and Financial Engineering at Princeton University.

Katie Waddle (pictured at right with Professor Karen Smith) completed the dissertation "*Spherical friezes*" under the direction of Sergey Fomin. Katie is a postdoc at Leibniz University Hannover.



Jayden Wang completed the dissertation "*Tropical Linear Incidence Geometry, Lorentzian Polynomials, and Linear Series*" under the direction of Sam Payne. Jayden is a postdoc at Georgia Tech University.

Diya Yang completed the dissertation "*A Novel Construction for sl_4 Webs*" under the direction of David Speyer.

2026 Graduate Fellowships & Awards

Allen L. Shields Fellowship
Erin Song

G. Cleaves Byers Award
Nathan Li

Luther Claborn Fellowship
Benjamin Baily

Arthur H. Copeland Memorial Fellowship
Shend Zhjeqi

Wirt and Mary Cornwell Prize
Hyunsuk Kim

Cameron & John Courtney Scholarship
Alexandra Du

Carroll V. Newsom Fellowship
Bisna Mary Eldo

E.S. & A.C. Everett Memorial Fund
Joao Pedro Carvalho

A. V. Flint Memorial Scholarship
Khola Jamshad

Donald J. Lewis Fellowship
Oscar Gonzalez

Alice Webber Glover Scholarship
Yu Jun Loo

Juha Heinonen Memorial Fellowship
Yuchuan Yang

Daniel J. Hathaway Graduate Student Fellowship
Henry Talbott

Marjorie Lee Browne Scholars
Ian Augsburger
Ari Benveniste
Ammar Eltigani
Zoe Markman
Jonah Robinson
Nicholas Simafranca

Edwin Wilkinson Miller Award
Urshita Pal

Mathematics Alumni Scholarship
Cyril Cordor

Maxwell Reade Award
Shivani Prabala

National Science Foundation Fellows
Kausik Das
Barry Henaku
Simran Khunger
Neil MacLachlan
Gahl Shemy
Ajay Srinivasan
Henry Talbott
Bailee Zacovic

Peter Smereka Thesis Award
Jiajia Guo

Prasad Family Fellowship
Dawei Shen

President's Challenge
Joanne Dong

Proquest Distinguished Dissertation Award - Honorable Mention
Jiajia Guo
Katja Vassilev

Rackham One-Term Fellows
Shabarish Chenakkod
Zach Deiman
Ethan Huffman
Liwei Huang
Yu Jun Loo

Rackham Outstanding GSI Award
Amanda Schwartz
Katie Waddle

Rackham Predoctoral Fellowship
Saket Shah

Rackham Predoctoral Fellowship
Saket Shah
Ying Wang

Barbour Scholarship
Ying Wang

Rackham Science Award
Ian Augsburger
Joanne Dong
Ram Ekstrom
Ammar Eltigani
Nick Freeman
Jordan Grant
Barry Henaku
Hana Lang
Erick Padilla
Renato Pinto Reveggino
Shivani Prabala
Aditya Priya
Jonah Robinson
Javier Santiago
Bridgett Slone
Mia Smith

Gabrielle & Sophie Rainich Fellowship
Sicheng Zhao

Joel Smoller Graduate Fellowship
Tony Qing

Usha Sharma Bhalla Fund
Ryuichi Man

Sumner B. Myers Memorial Prize
Scott Neville

Department of Mathematics Outstanding Teaching Award
Jasper Liang

The Karen Rhea Excellence in Teaching Award
Kexin Li

The Pat Shure Excellence in Teaching Award
Mia Smith

The Mort Brown Excellence in Teaching Award
Joao Pedro Carvalho

2026 Undergraduate Awards

UM Undergraduate Mathematics Competition
Spencer Danese - First Place
Matthew Zhang - Second Place
Nicholas Frieler - Third Place

86th Annual Putnam Mathematics Competition
Spencer Danese
Bohang Yu
Peter Ahlin

Evelyn O. Bychinsky Award
Kareem Abbasi
Evan Assmus
Spencer Danese
Nicholas Frieler
Beinuo Guo
Demitri Lawrence
Mateo Palomares
Ethan Parker
Brendan Pawlicki
Zhiwu Wang

Marc Altschull Actuarial Award
Anthony Nichols

Marilyn and Stewart Gloyer Award
Cassidy Flick
Samhita Kashyap (*pictured below with Dr. Hanna Bennett*)
Bradley Yeh



Leon P. Zukowski Prize for Math Lab Mentoring
Anna Wentling

Mathematics Alumni/Alumnae Scholarship
Peter Ahlin
Niko Hanson

Jack McLaughlin Award in Algebra
Shaotian Sun

Wilfred Kaplan Award in Applied Mathematics
Corey Gui

William LeVeque Award in Number Theory
Aleksey Lopez

Frank Raymond Award in Geometry and Topology
Taran Knutson

George Piranian Excellence in Mathematical Writing Award
Uma Malde

Irving Wolfson Award
Nikhil Kori

Lois Zook Levy Award for K-12 Teaching
Benjamin Warner

Sumner B. Myers Award in Analysis
Mingyuan Zhang

CIGNA Award
Isabella Cruz
Alexandria Davis

Margaret S. Huntington Prize in Actuarial Research
Eric Fradkin
Eason Lin
Jing Lin
Macy Morphew
Abhinav Nikam
Aaron Steinhart
Adhvaith Suresh
Kellan Wilder
Angelina Yang

Natarajan Family Award for Actuarial Science
Mitchell Fuchs

Otto C. Richter Memorial Prize
Carey Wang

Thomas S. Solomon Actuarial Award
Bryce Poss

Outstanding Achievement in Mathematics
Rohan Athreya
Zachary Duah
Sophia Han
Ethan Harr
Albert Li
Hitanshu Patel
Ryan Wang
Martha Rose Wolf
Steven Zanetti
Ilir Ziba



Donald J. Lewis Mathematical Merit Scholar Award
Otto Janke
Shuge Ouyang
Michael Williams



Mathematical Citizenship Award
Gavin Bell
Ethan Harr
Xiaoyao Huang
Steven Najor
Naomi Sowa

Outstanding Graduating Seniors
Yuyang Wang
Chunye Yang
Tianyong Yao
Bohang Yu

Wirt and Mary Cornwell Prize in Mathematics
Devayani Pradhan (*pictured below with Professor Karen Smith*)





2026 Undergraduate Scholarships

During the 2026-27 academic year, the department will provide more than $1 million in scholarship support to undergraduate students.

Allotta Family Scholarship
Nihal Shetty

Martha Cavanagh Cameron Scholarship
Kevin Ge

Richard and Dorothy Carter Scholarship
Henry Kostbade
Joshua Lassaline
Angie Nguyen

Alan Kaylor Cline Scholarship
Thomas Dicken
Yeji Kim
Paul Norrigan

Arthur H. Copeland Scholarship
Spencer Danese
Kathleen Cotterill
Zachary Shah
Tony Zhang

L.C. Cortright Memorial Scholarship
Zabelle Bobelian
Nikhil Kori
Bryce Poss
David Lyu
Rishabh Mahale
Vennela Naga Santhoshini Manepalli
Mukund Shiva
Clair Wang

Frank H. and Agnes A. Davis Scholarship
Panna Akter
Alejandro Amariels Palacio
William Banfield
Thomas Bednarz
Max Bian
Tanner Buck
Raena Burton
Biela Bustos
Andrew Castelucci
Heather Cicholski
Rowan Drew
Alexander Ehlert
Benjamin Filias
Eric Fradkin
Isabella Gallagher
Jose Gamino-Alvarez
Braden Garrish
Mia George
Rishabh Gowda
Charley Guzman-Gomez
Jordan Hoffner
Mason Holst
Ashni Kansara

Carl Hahn Fischer Scholarship
Sara Gonzalez
Raegan Gothard
Elias Grimsley
Anjali Hareesh
Benjamin Heemer
Blake Holmgren
Evelyn House
Christian Kerfoot
Brady Koenig
Jing Lin
Eason Lin
Krain Meng
Vasudha Marur
Anthony Nichols

A.V. Flint Scholarship
Mingxian Han

Alice Webber Glover Scholarship
Ashton Howard
Joshua Lynch
Ava May
Nicole Membrere
David Mokaya
Abhinav Nikam
Sanika Ogale
Mya Orner
Sarah Rose Patero
Owen Persinger-Lampela
Carter Pisocky
Ashley Pittel
Brandon Prater
Landon Ramage
Pablo Razny
Solomon Roda
Sharon Santosh
Dayoung Song
Mason Spencer
Aaron Steinhart
Adhvaith Suresh
Dalton Vican

James W. Glover Scholarship
Shirley Lee

Marilyn & Stewart Gloyer Scholarship
Lucy Dickson
Benjamin Fredal

David G. Hartman Actuarial Scholarship
Maansi Kandula
Ayaan Shah

Miner S. Keeler Scholarship
Kenny Deng
Evan Fitzjohn
John Foret
Nicholas Frieler
Ethan Fu
Chang Gong
Zicong Gong
Corey Gui
Beinuo Guo
Mark Hong
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AI in Mathematics

(*continued from page 1*)

The Evolution of AI: A "Stream of Thoughts"

One of the most fascinating recent developments in AI is how it approaches problem-solving. Early chatbots operated by simply predicting the next most likely word, which is disastrous for rigorous mathematics where a single wrong symbol invalidates an entire proof.

Today, advanced AI models are beginning to produce a "stream of thoughts." Before outputting an answer, these models generate hidden chains of reasoning. They effectively "ponder" a problem, explore different logical branches, recognize when a line of inquiry has hit a dead end, and backtrack to try a new approach. This mimics the human trial-and-error process of doing math. By breaking down complex theorems into a stream of logical steps, AI can catch its own errors and produce much more reliable mathematical arguments than it could even a year ago.

Formal Verification and the Silicon Valley Boom

This shift toward strict logical deduction is precisely why Silicon Valley is suddenly pouring tens of millions of dollars into pure mathematics. AI companies are hiring pure and applied mathematicians to train models to interact with "proof assistants"—specialized coding languages like Lean that rigorously verify every logical step of a proof.

This process, known as "formal verification," has massive applications outside of academia. If an AI can perfectly verify a complex mathematical theorem, it can use the exact same logic to mathematically prove that a critical piece of software, a cybersecurity cryptographic protocol, or a hardware chip design has absolutely zero bugs.

The Future: AI as Euclid, Humans as Archimedes

Despite these advances, integrating AI into pure mathematics comes with the hurdle of "hallucinations": flawed proofs that look highly convincing. Mathematics is not just about knowing that a statement is true; it is about understanding why it is true. Understanding is fundamental to identifying patterns and generalizing theory. If a neural network churns out a massive, unreadable proof for a conjecture, we may have the answer, but we have gained no human understanding.

So, what is the future of the mathematician in the age of AI?

We can look to history for an analogy. Over two millennia ago, Euclid established the rigorous, proof-based foundation of mathematics with his Elements. Roughly concurrently, Archimedes pushed the boundaries of the known world with wildly original, intuitive leaps of imagination that eventually led to modern physics and calculus.

Today, it appears we are in a similar phase. AI and formal verification are acting as a modern Euclid: standardizing an unprecedented level of rigorous logic and automating the tedious mechanics of proof generation. But rigor is only part of the equation.

The future of mathematics will rely more heavily than ever on human intuition. As Fields Medalist Terence Tao has suggested, we should view AI as a highly competent, eager graduate student. As this tool handles the mechanical lifting of connecting the dots, we need human researchers to be our modern Archimedes. We need mathematicians to provide intuitive guidance, to know which theorems are beautiful and worth pursuing, and to leap into the unknown to develop ideas outside the scope of what any machine has been trained to see. Ultimately, AI is the engine, but the human mathematician remains the compass.

- Contributed by Associate Professor Asaf Cohen

Jack Goldberg ~ 1932-2026

Associate Professor Emeritus **Jack Goldberg** (Lessing) passed away in May 2026.

Originally from New York, Professor Goldberg received his B.S. degree in 1954 from the City College of New York, and his M.S. and Ph.D. degrees from the University of Illinois Urbana-Champaign.

After two years on the technical staff at Bell Laboratories, Professor Goldberg joined the mathematics faculty at UM in 1961 as an instructor. He was promoted to assistant professor in 1963 and associate professor in 1966. During his career, Professor Goldberg studied areas of complex variables and special functions.

Known as a popular and dynamic teacher, Professor Goldberg was an active member of the department and the university. He was an Associate Chair in the mathematics department for two years, and served on several university committees. He was awarded the Amoco Foundation Good Teaching Award in 1980. He retired in 1999.

Professor Goldberg supervised five PhD students in his career, and wrote four textbooks stemming from his teaching in the areas of linear algebra, matrix theory, differential equations, and related topics in applied mathematics. He held visiting appointments in Turkey twice, the last one as a Fulbright Scholar at Boğaziçi University in Istanbul.

Frank A. Raymond ~ 1932-2026

Professor Emeritus **Frank Raymond** passed away on November 1, 2026. A 1958 UM mathematics PhD recipient, he joined the mathematics faculty in 1962, and retired in 1997. During his 35 year career, Professor Raymond directed 25 PhD students and was widely known for his work in geometry, topology, and Seifert fiberings. A full memorial will be published in the next newsletter, and more information is available on this page: https://donate.umich.edu/8PwAQ.

Math T-Shirts and Hoodies

T-Shirts:

Order your own Math T-Shirts and Hoodies on our website. Scan the code to the left for our T-shirt order site (https://myumi.ch/nyXqb). Math hoodies are available to order by scanning the code to the right. Proceeds from the hoodies support Math Corps at U(M), the summer math enrichment program for middle school students and their high school student mentors. Please continue to document where in the world the Michigan Math T-shirt has traveled by sending your photos to um.math.tshirts@gmail.com!

Hoodies:



Top row, l-r: Alex Wang (2020) Summit of Mount Kinabalu in Malaysia; Math Student Services Director Teresa Stokes at the Diamond Hill Summit in Ireland; Nicole Membrere (2028) at Taughannock Falls State Park, NY; Statue of Claude Shannon (1936) on UM North Campus. Bottom row, l-r: Steve Zanetti (2026) and Steven Miller at the Maine Quebec Number Theory Conference; Veronica Lang (MS 2025, future PhD) at the Dragon and Tiger Pagodas, Pidong Village, Taiwan; Jonah Nan (2022) on the Appalachian Trail; Abby DeVaughn (2024) at a Habitat for Humanity build in San Cristóbal, Dominican Republic.

DeBacker Named IBL Director (*continued from page 4*)

Led by **Ralf Spatzier** from 2004-24, the UM IBL center developed inquiry-based curricula and instruction techniques for about 20 core mathematics courses. These courses emphasize group work in classes, carefully designed problem sets, and the importance of articulating the reasoning behind a solution. Students learn to learn to explain their solutions both orally and in writing. The goal of the process is to empower students to think and learn on their own, create an environment for this to happen, and create communities to support the process.

The center's influence extends well beyond UM. Many postdoctoral scholars and graduate students have received training and teaching experience in inquiry-based instruction while at UM. As they have moved to positions around the world, they have brought that knowledge to other institutions and generations of mathematics students. In this way, IBL's commitment to independent thinking has had an impact far beyond campus.

The IBL Center now has a permanent home on the first floor of East Hall. The endowed directorship was made possible through the generosity of the Parekh family.

IBL Center: https://sites.lsa.umich.edu/ibl

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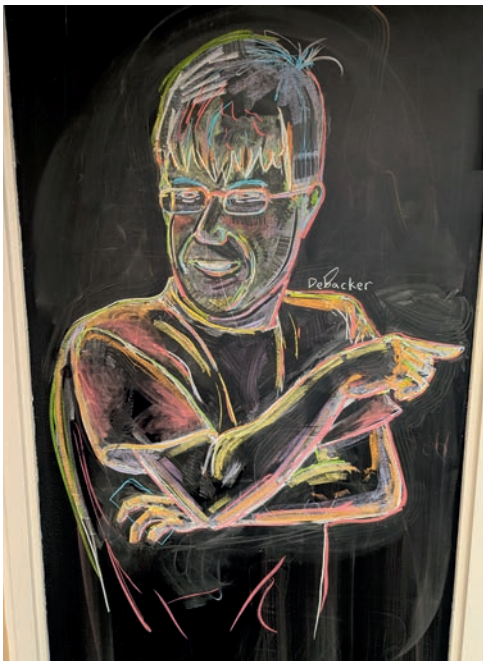
Watch for our email on March 24, 2027!



Mathematics students hold many surprising talents. These images, created by honors math student Yone Lim, appeared one morning on the chalkboards of the Nesbitt Undergraduate Room. They truly capture the likenesses of Professors Stephen DeBacker and Sarah Koch. Hopefully more surprises are in store from our talented students.



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