



2018 Math PUrview

Message from the Department Head

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Fall semester at Purdue this year brings with it a sense of history: 2019 marks the 150th anniversary of Purdue's founding, so in addition to the usual summer construction projects, we've been busily preparing for a year of celebration. The theme for the year is "Giant Leaps," inspired by Neil Armstrong's historic statement on the moon. The centerpiece of the celebration will be a yearlong Ideas Festival, focused on four topics of discussion as Boilermakers everywhere reflect on the past, embrace the present and look to the future.

Looking back on the past year in the Department of Mathematics, we again have much to make us proud. Outstanding faculty, students, and alumni are the core of any university. As you'll read in the pages ahead, we are delighted to celebrate the accomplishments of each of these groups. Our students and faculty have won prestigious scholarships and awards for research and teaching, and our alumni have made their mark on the world and returned to celebrate with us. We've also added to our ranks, with four new faculty members joining us this fall.

Take a look below or check out our webpage at math.purdue.edu to learn more, and stay current with the 150th anniversary at takegiantleaps.com.

Boiler Up!
Greg Buzzard
Professor and Head

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2018 Dreamer Award Professor Rodrigo Bañuelos

Congratulations to Professor Rodrigo Bañuelos, who was one of two recipients of Purdue's 2018 Martin Luther King, Jr. Dreamer Award. The Dreamer Award is presented annually to an individual within the Purdue community whose contributions embody Martin Luther King, Jr.'s vision of service to others and furthers the University's commitment to diversity and inclusion.



Inaugural AWM Fellows class to include Prof. Rodrigo Bañuelos

Also this year, Professor Rodrigo Bañuelos was elected into the inaugural class of Association for Women in Mathematics (AWM) Fellows. The AWM Fellows Program recognizes individuals who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "to encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences."



Fulbright U.S. Student Program *Grant Awardee* Katherine Ceglio

Katherine Ceglio, a recent Purdue graduate who majored in mathematics, was awarded a Fulbright U.S. Student Program grant, along with five other recent Purdue graduates.

Ceglio will teach in Taiwan. She has volunteered with a number of organizations that advocate for the disabled, including the Special Olympics and as president of Best Buddies, a local student organization that partners volunteers with disabled peers.

Local Chapter receives AWM *Professional Development Award*



Association for Women in Mathematics

Congratulations to the Purdue Chapter of the Association for Women in Mathematics (AWM) upon receiving the Professional Development award from the national association. Awardee chapters are selected by nomination annually.

The Professional Development Award recognizes chapters that engage in activities such as implementing mentoring programs for undergraduates heading to graduate programs or development of programs that prepare students for their next professional steps by giving talks, writing expository or research articles, and inviting alumni and other speakers to discuss a range of professional opportunities in mathematics and related fields.

Clare Booth Luce Fellowship Awardee

Natalie Halavick

The Clare Booth Luce (CBL) Program of the Henry Luce Foundation recently awarded Purdue a \$300,000 grant to support two incoming female graduate students, one in the College of Science and one in the College of Engineering, for two years each starting in the 2018-19 academic year.

The Department of Mathematics is pleased to announce Natalie Halavick as the recipient of the Clare Booth Luce Fellowship in Mathematics.

Ms. Halavick received her B.S. in Mathematics in May 2018, from Youngstown State University, with minors in Computer Science and Economics. While at YSU, she won several academic honors and worked on projects related to the optimal location of healthcare facilities, urban revitalization efforts to maximize crime reduction, and emotional awareness in software development.

The Mathematics Department is delighted to welcome Natalie Halavick to our graduate student community!



NSF Graduate Research Fellowship

Alan Min

Congratulations to Alan Min, graduating senior in Mathematics, Statistics, and Computer Science, who is the recipient of a National Science Foundation Graduate Research Fellowship. In his upcoming graduate work at the University of Washington-Seattle, Min will apply Bayesian Statistics to network models, in particular, to models for biological systems.

At Purdue, Min worked on research projects in both mathematics and chemical engineering. During a summer internship with the National Institutes of Health, he worked with fMRI brain scans, which measure brain activity by detecting changes associated with blood flow.

The NSF Graduate Research Fellowship Program (GRFP) recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines. The Fellowship was awarded to 2,000 young scientists out of 12,000 applicants.

2017-18 Excellence in Teaching Awards

In keeping with our commitment to excellence, the Department of Mathematics proudly recognizes six Graduate Teaching Assistants for their outstanding efforts.

Congratulations to Ryan Spitler, Katy Yochman, Vianney Filo-Gonzalez, Chris Creighton, Tyler Billingsley, and Roberto Ulloa-Esquivel.



Pictured are award recipients with Professors Greg Buzzard, Dominic Naughton, David Goldberg and Jim McClure



Dr. Sam Huckaba named *Distinguished Alumnus in Mathematics*

We are proud to announce that Dr. Sam Huckaba, Dean of the College of Arts and Sciences at Florida State University,

was named the Mathematics Distinguished Alumnus of 2018.

Dr. Huckaba was raised in Columbia, MO, and graduated from the University of Missouri with a bachelor's degree in Mathematics. He received his PhD in mathematics from Purdue University in 1986.

Dr. Huckaba began his career at the University of Kentucky before joining the Department of Mathematics at FSU in 1987. He is the recipient of two University Teaching Awards, a Teaching Incentive Award, and FSU's Developing

Scholar Award. Prior to joining the dean's office, he participated widely in departmental administration, including four years leading the Mathematics graduate program through a time of rapid growth and change.

Dr. Huckaba was appointed Dean of the College of Arts and Sciences at Florida State University in October 2012 after serving for 15 months as interim Dean. Arts and Sciences, the oldest and largest college at FSU, is home to 18 departments, 15 programs and institutes, 550 faculty members, 250 staff members, and approximately 11,000 students.

Along with the other College of Science Distinguished Alumni, Dr. Huckaba was honored at a reception at Purdue in April, 2018.

Department of Mathematics *Outstanding Alumnus* Gary Cummings

Gary A Cummings, Director of the Technical Center at JTEKT North American, Inc., was named this year's Outstanding Alumnus in Mathematics. After earning his BS in Mathematics with a minor in Industrial Engineering, Mr. Cummings earned his MS in Industrial and Operations Engineering from the University of Michigan in 1979. Mr. Cummings held several positions with General Motors, including Executive in charge of Chassis Product Development for Latin America, Africa and the Middle East. In 2004 won the U.S. Black Engineer of the Year award in the Corporate Promotion of Higher Education category. He has been serving on the Purdue Dean of Engineering Advisory Committee since September, 2003.

Mr. Cummings believes that today's students need to take full advantage of their cultural diversity opportunities. "The world is getting smaller every day. Students who can work effectively in a diverse team environment, converse in multiple dialects, and communicate effectively in both leadership and supporting roles will be able to write their own ticket for career advancement."



Actuarial Science Outstanding Alumnus

Jason Gomberg

Jason Gomberg, FSA, MAAA, was selected as the 2017-18 Outstanding Alumnus in Actuarial Science. Mr. Gomberg has over 20 years of experience in the health care industry. Currently he is an actuary with the Chicago Offices of Milliman, where his focus is on projects related to the pharmaceutical distribution chain in the commercial, Medicare and Medicaid markets.

Mr. Gomberg speaks regularly at healthcare and pharmaceutical conferences on various healthcare subjects. He also is an Adjunct Assistant Professor, University of Southern California, Department of Pharmaceutical and Health Economics and a Fellow of the Society of Actuaries and a member of the American Academy of Actuaries.

11th Annual Women in Math Day



Dr. Jacqueline M. Hughes-Oliver, Professor of Statistics at North Carolina State University, was the featured speaker for the Women in Math Day talk in September, with a talk entitled "Gene Expression Data Analysis Using the Gene Ontology."

Prof. Hughes-Oliver earned her PhD in Statistics from NC State in 1991. After one year at the University of Wisconsin-Madison, Dr. Hughes-Oliver returned to the faculty at NC State. Her research focuses on prediction and classification, analysis of high-dimensional data, optimal design, and spatial modeling. She is a Fellow of the American Statistical Association and was awarded the 2014 Blackwell-Tapia Prize for contributions to the mathematical sciences.

Math is Key Public Lecture

Dr. Eugenia Cheng, scientist-in-residence at the School of the Art Institute of Chicago, gave the Math Is Key Public Lecture in March. Cheng's mathematical interests focus on higher-dimensional category theory. As a scholar, public speaker, and author she has also explored her passion of explaining mathematics to non-mathematicians to rid the world of math phobia - often using food and baking analogies.

Based on her recent book, "*How to Bake Pi: An Edible Exploration of the Mathematics of Mathematics*," her talk presented mathematics both as a way of thinking that grows out of everyday activities and also as something that is simultaneously a creative art akin to poetry and music and an incredibly powerful tool for understanding the world. She used a variety of unexpectedly connected examples including music, juggling and baking to show that math can be fun, intriguing and relevant for people of all ages.



Prof. Freydoon Shahidi's 70th birthday honored by journal special issue

The August 2017 issue of the *Bulletin of the Iranian Mathematical* was published in honor of Professor Freydoon Shahidi's 70th birthday. The issue included articles by many of his postdocs, students, and others who have been inspired by his work.

Prof. Shahidi, Distinguished Professor of Mathematics, was born in 1947 in Tehran. He received his PhD in 1975 from Johns Hopkins University. His many honors include selection as Honorary Member of the Iranian Mathematical Society and Fellow of the American Mathematical Society and of the American Academy of Arts and Sciences.

Professor Kenji Matsuki receives *Most Distinguished Faculty for Academics Award*

Kenji
was awarded the Most Distinguished Faculty for Academics through
Residential Life and University Residences.

Professor
Matsuki



Nominations for this award are made by students living in university residence halls, giving students a chance to recognize outstanding faculty who have influenced them. Nominations cited his engaging lecture style, clear examples and emphasis on student focus and learning in the classroom.

“Students are given time to write what he is writing and think about what he has said. Finally, the best demonstration of how effective his teaching style is a completely packed lecture hall every day of class, with students from his lecture and other lectures.”

Professor Kenji Matsuki being presented the Most Distinguished Faculty Award from University Residences Favorite Faculty committee members.

Professor Jianlin Xia named *University Faculty Scholar*

Congratulations to Prof. Jianlin Xia on being named a University Faculty Scholar.

The University Faculty Scholars Program recognizes outstanding faculty members at the West Lafayette campus who are on an accelerated path for academic distinction.

Xia was recognized for his fundamental contributions to algorithms for linear algebra, which has a wide range of applications from geophysical simulations to deep neural networks.



The Department of Mathematics Welcomes New Faculty

Theresa (Tess) Anderson joined the Department of Mathematics faculty as a tenure-track assistant professor in August 2018. Tess received Bachelor's degrees in Mathematics, Chemistry, and Spanish literature from the University of Wisconsin-Madison in 2010. She then went to Brown University on an NSF Graduate Research Fellowship in Mathematics and graduated with a PhD in Mathematics in 2015; her advisor was Dr. Jill Pipher. She returned to UW-Madison with an NSF Postdoctoral Fellowship in the fall of 2015.



Professor Anderson's research interests are in harmonic analysis and number theory, especially the interface of these two areas. Her past work has ranged from bounding singular integrals – operators which incorporate delicate cancellation properties and have applications to a variety of scientific and medical areas – to determining quantitative information about the distribution of prime points on curved surfaces. She has always loved researching a variety of areas and is eager to take on more new directions.

Tess speaks three languages and loves to travel, having given mathematical talks around the world. She is always excited to discuss mathematics with students and faculty alike.

Isaac Harris joined the Department of Mathematics as a tenure-track assistant professor in August 2018. A native of New Jersey, Professor Harris was a McNair and LSAMP scholar at Kean University, where he graduated with honors. He received his PhD in Applied Mathematics at the University of Delaware under the direction of Fioralba Cakoni. During his time as a graduate student, he also spent a summer at the Ecole Polytechnique in Palaiseau, France, where he studied transmission eigenvalues and their relationship to certain material properties.

For the past three years, Professor Harris has been a Postdoctoral Visiting Professor at Texas A&M University under the direction of William Rundell. In 2016, Isaac was invited to the Oberwolfach Research Institute for Mathematics as a Junior US Fellow.

Professor Harris's main research interests are in direct and inverse problems for partial differential equations, specifically those arising in acoustic and electromagnetic scattering. These problems are frequently found in medical and engineering applications of non-destructive testing, where physical measurements on the surface of an object are used to infer the interior structure. He focuses on using qualitative/direct methods to solve inverse source and shape reconstruction problems which require little to no prior information.



Linquan Ma joined the Department of Mathematics as a tenure-track assistant professor in August 2018.

He received a Bachelor's degree in Mathematics from Peking University in 2008, then went to the University of Michigan for graduate studies, where he obtained a PhD in Mathematics in 2014 under the direction of Prof. Melvin Hochster. From 2014-2015 he was a Golomb Visiting Assistant Professor at Purdue University and then served as a Research Assistant Professor at the University of Utah from 2015-2018.

Prof. Ma's research is primarily concerned with various topics in commutative algebra and algebraic geometry, including singularity theory, local cohomology and multiplicities. He specializes in using positive characteristic methods to attack problems and recently applied some perfectoid space techniques to study singularities in mixed characteristic.

He is very excited to discuss all mathematics with students and faculty.



Jing Wang joined the Department of Mathematics as a tenure-track assistant professor in August 2018. Jing received her PhD degree in Mathematics from Purdue University in 2014 under the guidance of Professor Fabrice Baudoin. She spent one year at the IMA (Institute for Mathematics and its Applications) at the University of Minnesota as a postdoctoral fellow. Since 2015, Jing has been a J. L. Doob research assistant professor at the University of Illinois at Urbana-Champaign.

Dr. Wang's research interests lie in the intersection of probability, analysis, and differential geometry. She studies degenerate diffusion processes and the underlying (sub-Riemannian) geometric structure. Research topics include limiting behaviors of degenerate diffusion processes, heat kernel estimates, and heat content asymptotics for domains in sub-Riemannian manifolds. Dr. Wang is also interested in applications of her results in math finance and machine learning.

During her spare time, Jing enjoys dancing, cooking, and traveling.



Fun Facts

As early as 1958, the math department taught some sections of calculus by closed-circuit TV.

In 1961, the Department of Mathematics was placed into the Schools of Engineering, at least in part for the University President to circumvent the Dean of the School of Science, Education, and Humanities, who rejected a proposal for math to grow in the areas of applied math, statistics, and computer and information science.

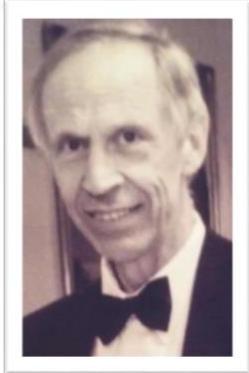
Faculty Promotions

Birgit Kaufmann was promoted from Associate Professor to Professor. Her research focuses on mathematical physics and condensed matter theory. She's been a member of the faculty since 2007 and in 2013 received an NSF CAREER grant and a Simons Fellowship in Theoretical Physics. Prof. Kaufmann has also been named a Purdue University Faculty Scholar and received the Teaching for Tomorrow Award from the Office of the Provost. She received her PhD at the University of Bonn, Germany.



Victor Lie was promoted from Assistant Professor to Associate Professor. Prof. Lie's research focuses on harmonic analysis and fluid dynamics. He received his PhD from UCLA in 2009 and came to Purdue in 2013 after spending several years at Princeton as a Veblen Research Instructor. Victor has received three NSF research grants and is the recipient of several awards including the AMS Simons Award and the Clay Liftoff Fellowship.

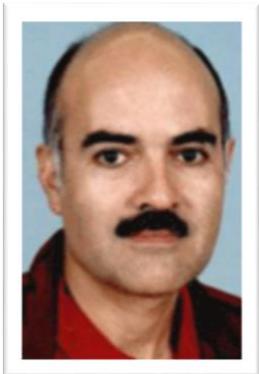
Faculty Retirements



David Catlin was named professor emeritus, retiring in May 2018.

Prof. Catlin received his PhD from Princeton University and came to Purdue in 1984 as an associate professor. He had previously been an instructor at University of Chicago and assistant professor at Princeton University. He was named a Sloan Fellow in 1983 and was promoted to professor in 1987.

His research interests are in several complex variables and PDEs.



Juan Santos was also named professor emeritus at Purdue in 2018.

Prof. Santos earned his PhD at the University of Chicago, where he worked with Prof. Jim Douglas, who later moved to Purdue and recruited Prof. Santos onto the faculty. Juan was named a full professor in 2002.

Professor Santos continues his career as a professor at the Universidad Nacional de La Plata in Argentina, where he has supervised six PhD students to completion and currently has two PhD students. His research interests are in numerical analysis and applied mathematics.

Keep us up to date

Send us news of your professional accomplishments, adventures in mathematics, and any other noteworthy items.

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