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The Department of Mathematics
Newsletter 2023

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View from the Chair

By Doug Ulmer

Looking back over the last year, I note how we've grown—we've welcomed new faculty and staff, built new degrees and programs, and reworked many policies and structures for the environment we're working in. It's great to see so many new people, efforts, and ideas.

We were fortunate to recruit seven new tenure-track faculty members! Four arrived this Fall 2023 and three more will arrive next Fall. We also welcomed seven new instructors, seven postdoctoral fellows, two global professors, a visiting assistant professor, and a professor of practice. And we've recruited ten new staff members to support communications, the academic office, the business office, the head's office, the CRR, and the Math 100 team. It's a bumper crop of new talent!

There were also many faculty promotions. Lise-Marie Imbert-Gérard was granted tenure, and Bryden Cais and Kevin Lin were promoted to full professor. Brenae Bailey and Steven Foster were promoted to senior lecturer, and Jose Fonseca, Samantha Kao, Tynan Lazarus, and Stephen Reyes were promoted to lecturer.

Several faculty and staff were honored with major national awards. Professor Marta Civil was named Fellow of the American Educational Research Association; Professor Misha Chertkov was named a lifetime Fellow of the American Association for the Advancement of Science; Associate Professor Lise-Marie Imbert-Gérard received a Department of Energy Young Investigator grant of \$875K; and Melissa Hosten, co-director of CRR, received the 2023 Leadership Award from the Arizona Mathematics Leaders.

Internally, Associate Research Professor Guada Lozano's leadership as director of the Center for University Education Scholarship was recognized by an endowed chair funded by an anonymous donor; Associate Professor Jennifer Wolfe was awarded a major University-level teaching prize, the UA Foundation Leicester and Kathryn Sherrill Creative Teaching Award; and Christian Parkinson received an Outstanding Postdoctoral Scholar Award from the Office of Postdoctoral Affairs.

Sadly, our friend and colleague Vladimir "Volodya" Zakharov passed away peacefully in Moscow on August 20. Volodya was an intellectual titan with broad ranging interests, incredible productivity, and warm and enthusiastic engagement with all he met. He joined our faculty in 1992, became Regents' Professor in 2004, and retired in 2021. Among his many prizes and honors are the Dirac Medal of the International Center of Theoretical Physics in 2003, and the Bogolyubov Medal of the Russian Academy of Science, in 2019. We are profoundly affected by the passing of this great scientist and dear friend.

Turning from people to programs, our new professional master's degree in data science has been approved and will recruit its first class in 2024. A new professional M.S. degree in applied math is making its way through the approval process. We are also expanding our successful bachelor's degree in Statistics and Data Science by adding new science tracks. Students will master fundamentals of data science along domain knowledge in areas like astronomy, biology, hydrology, and neuroscience. Finally, our dual degree program with CUEB in Beijing is thriving (see page 10). We look forward to the first class graduating in 2025, and possibly having some of those students join our graduate programs.

In September, we had the first face-to-face meeting of our new Industrial Advisory Board. A vibrant group of recent alumni and professionals with ties to our School, the board helps build student capacity for careers in industry, including companies, national labs and government agencies. The meeting was a great success (see page 4), and we are grateful and excited about all that lies ahead.

Thanks to each of you and our extended community for your interest and support. We hope you'll stay in touch, and we wish you all the best for the coming year. ◀

Doug Ulmer's research emphasizes fundamental, curiosity-driven problems in number theory and algebraic geometry. Doug enjoys building academic programs and institutions with lasting impact.

Contact him at: ulmer@math.arizona.edu



THE UNIVERSITY OF ARIZONA
DEPARTMENT OF MATHEMATICS PRESENTS

A Mathematical Journey Through Literature



With **Sarah Hart**
renowned mathematician & author

2024 Daniel Bartlett Memorial Lecture
Tuesday, March 12, 2024 – 6:30pm

UArizona Campus, ENR2 Building
Environment & Natural Resources 2, Room N120
1064 E. Lowell Street, Tucson, AZ

Dessert & hosted bar reception in
ENR2 Courtyard following the lecture



Looking outside academia: Two days with the new Industry Advisory Board

By Andrew Gillette

The mathematics department at UArizona is not your typical academic environment. Much more than a vehicle for teaching and research, it is a vibrant community with long-standing connections to an expansive applied math program and close integration with the rapidly growing statistics and data science program. Students, postdocs, and faculty intermingle frequently among these groups, and represent an academic unit much larger than the sum of its parts (to borrow a mathematically questionable phrase).

To serve the needs of this diverse group of scholars, Department Head Doug Ulmer and External Relations Director and Associate Research Professor Guada Lozano envisioned and recently inaugurated the School of Mathematical Sciences Industry Advisory Board (SMS-IAB), which convened in person for the first time in September 2023. The board consists of nine professionals working in a variety of sectors including large tech companies, small start-ups, government contractors, and national laboratories. The board members are geographically dispersed (hailing from 7 different states!) and are spread across the career stage spectrum. All members have former affiliation with UArizona (many are alums) and share an interest in bolstering the success of the UArizona mathematical sciences community.



▲ **Popular Q&A time.** All nine IAB members address student questions during the panel event moderated by mathematics doctoral students Abigail Dirdak and Dan Lewis just before the career fair.



▲ **Speed dating with the IAB.** Toby Shearman, IAB member, UArizona Applied Math alum and Senior Robotics Engineer at May Mobility talks with a student interested in learning more. Toby's was one of nine stations in the room.

The inaugural meeting of the SMS-IAB was a two-day event held in Tucson, at the UArizona campus. Four public events featuring the board were held: a colloquium talk on mathematics for artificial intelligence, a “blitz” of short talks by board members, a Q&A career-focused panel with the board, and a “speed dating” event in which students had the opportunity for a brief one-on-one chat with board members of their choice. These were accompanied by invite-only events for the board members to interact at length with faculty, postdocs, students, and the College of Science Dean Carmie Garziona. In the words of student attendees:



My favorite event was the IAB member panel. Having the opportunity to ask questions anonymously and ask clarifying questions helped me voice what was really weighing on my mind. Since the panel came right before the speed dating event, it also helped me prepare to ask good questions.

What was most impactful for me were the IAB messages about being interested in your research and that your current endeavors are not limiting. It built a lot of confidence in how valuable I am.

At the end of the meeting, the board members began scoping out initiatives for the board to pursue in the coming years. In addition to the in-person board meetings, which will recur annually each fall, the board aims to expand its ability to connect students with industry colleagues, via professional connections of the board members and other friends of the School of Mathematical Sciences. There is a strong desire by the board to provide career advice and networking opportunities, matched only by a similar eagerness from students and faculty to learn more about mathematical activities in industry and government.

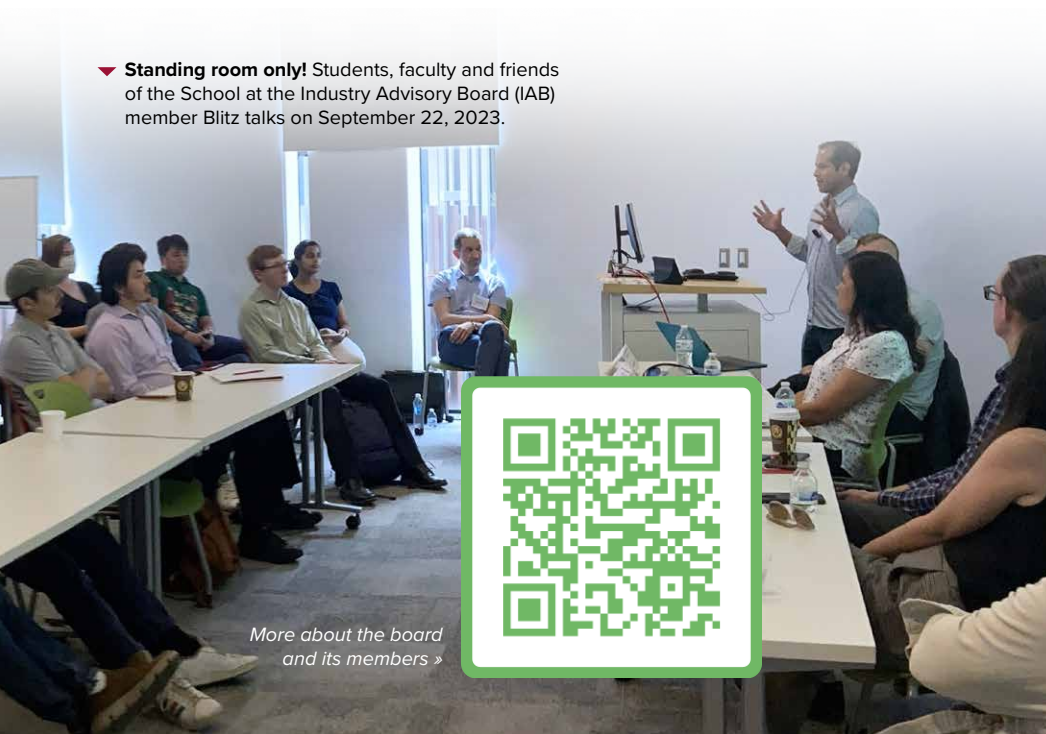
On a personal note, the board meeting was my first time back in Tucson since I stepped down from my faculty position in the UArizona Mathematics department in 2020. It was a privilege to be able to return to campus as the Chair of the Industry Advisory Board and reconnect with many faculty colleagues and former students. While many aspects of campus looked different, the collaborative energy of UArizona felt the same; I am very glad to be able to contribute back to this energy through my new role. I welcome your input and feedback as I help the board grow into a long-lasting complement to an already outstanding mathematical community. ◀

Andrew Gillette is a computational mathematician at Lawrence Livermore National Laboratory in California. He was a tenured mathematics professor at UArizona up until 2020. His expertise includes numerical simulations, scientific visualization, and machine learning.

Contact him at: gillette7@llnl.gov



▼ **Standing room only!** Students, faculty and friends of the School at the Industry Advisory Board (IAB) member Blitz talks on September 22, 2023.



More about the board and its members »



BIOGRAPHIES

Global Faculty



Qurat Ul An Sabir works as Global Professor at UArizona's Beijing Campus. She earned a Ph.D. focused on mathematical modeling through a joint program between Dalhousie University, in Canada, and the National College of Business Administration & Economics, in Pakistan. Her educational philosophy has evolved over time. She advocates for innovation and views failures as opportunities to grow. She aims to empower each student, fostering self-belief and a learning journey that is both enriching and enjoyable.

Tenured Faculty



Patrick Shipman is returning to his hometown after 15 lovely years as a faculty member at Colorado State University. He studied mathematics and linguistics as an undergraduate and mathematics as a graduate student at The University of Arizona and looks forward to collaborations in applied mathematics.

Tenure Track Faculty



Pedro Aceves Sanchez grew up in central Mexico. He received his Ph.D. in Mathematics from the University of Vienna. After a few postdoctoral positions he joined UArizona. He is an applied mathematician with expertise in computational mathematics, mathematical analysis, and mathematical modeling. His research focuses on the study of physical and biological processes. Pedro enjoys sports of all kinds, especially soccer, and has a passion for traveling and cooking.



Serin Hong was born in Seoul, Korea, where he lived for 19 years before moving to the U.S. for college. Hong received a B.S. in mathematics and M.S. in electrical engineering at Stanford University, then a Ph.D. in mathematics at Caltech. Before coming to Arizona, he spent 5 years as a postdoc at the University of Michigan. For his research, he studies how algebra and geometry interact through number theory. While not doing math, Hong enjoys watching baseball and football or traveling to new places with his family.



Henry Scharf is a statistician who works on developing new methodology to answer scientific questions in ecology. Some of his recent projects include dolphins' social behavioral response to

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Explorations in the colorful world of plants

By Patrick Shipman

In their leaves, flowers, and fruits, plants offer us a beautiful array of colors. Try a simple experiment with these colors: Find a purple flower and rub it onto a piece of paper. What do you see? What changes if you add vinegar to the pigment you collected? What if you add a solution of baking soda? Can you devise a way to return the color back to the original purple?

Upon trying this, you'll have transformed the red, purple, and blue pigments of plants into each other. These pigments are anthocyanins, water-soluble chemicals that play diverse and crucial roles in plant cell biology and ecology. Together with chemist Stephen Thompson (Colorado State University), we have been observing color changes in space and time in live plant cells, aided by spectroscopy and fluorescence microscopy (Fig. 1). These observations, together with mathematical models of pigment kinetics and optics in conical plant cells, allow us to probe the fascinating world of plant color. One particular focus of our work has been understanding how anthocyanins, when in high enough concentrations, come out of solution to form nanoparticles of nearly uniform size that may act as optical "quantum dots" (Fig. 1d).

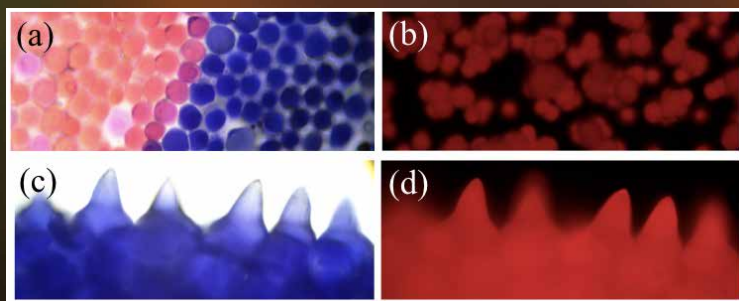


Fig. 1: Microscopic images of pigmented plant cells and anthocyanin complexes. Panel (a) shows red geranium cells turning purple and then nearly blue as ammonia vapor was allowed to diffuse across a live petal. Panel (b) shows a fluorescence image of these cells excited with a 530-nm green laser. Ripple patterns, which may act as diffraction gratings, may be observed at the tips of the conical cells of the red rose petal shown in panel (c). Allowing a solution of pure anthocyanin extract to evaporate results in the formation of the small particles shown in panel (d). Samples were prepared and imaged by S. Thompson.

What mechanisms and rate laws allow for the creation of nanoparticles with narrow size distributions?

The assembly of millions of anthocyanin molecules into observable particles is one of many processes of nanoparticle formation in natural and laboratory systems. Nanoparticles (particles of diameter 1-100 nm) have a wide range of applications that depend on the particle size distribution (PSD). Narrow PSDs are desired for nanoparticle applications such as drug delivery to cells and solar-energy conversion systems. Yet, how to control the PSD during nanoparticle synthesis has been a mystery in materials science.

Our mathematical approach to understanding nanoparticle formation utilizes integral-differential equations informed by data sets consisting of space- and time-dependent PSDs. A critical finding of these studies, together with chemist Rick Finke (Colorado State University), is that continuous nucleation, combined with a particle growth rate that decreases with particle size, is required

to produce narrow PSDs. This is in stark contrast to predictions of classical nucleation theory: nucleation is not “instantaneous,” as postulated by the accepted paradigm.

In our current work, Bayesian inversion (BI) statistical methods help us answer the question of “how well do we know our parameter estimates, including their error bars?,” enabling us to design experiments with the goal of predictably controlling nanoparticle syntheses to achieve the sizes required for a given application.

Can plant pigments and microtornadoes assist in applied mathematics pedagogy?

Applying mathematics to understand nanoparticle formation became an interest of mine while co-teaching applied mathematics courses with Thompson. In these courses, taught in our Laboratory for Mathematics in the Sciences, we aim to intertwine mathematics and science learning in an approach that we call “Smart-Scale, Sustainable Science and Mathematics (S4M).” Using small drops of materials that they can spatially manipulate with cotton swabs, students probe complex processes such as pigment kinetics.

Atmospheric chemistry provides another fascinating system accessible to S4M methods. In these experiments, nanoparticle formation, charging processes, and turbulence result in patterns such as pulsing crystals, oscillating fronts, and what we call “microtornadoes” or “microstalagmites” (Fig. 2).

These research and teaching collaborations, begun when I was a faculty member at Colorado State University, have a special connection to UArizona, where they are now continuing: Thompson was a postdoc here and worked with Quintus Fernando, who taught the first course (a summer course in analytic chemistry) that I took at UArizona. In developing the interactive approach to applied mathematics instruction that is at the heart of S4M, I was inspired by the teaching style of Fred Stevenson, who taught my first undergraduate math course. I always looked forward to Stevenson’s spontaneous and interactive classes which encouraged students to explore mathematics together. ◀



Fig. 2: A “microtornado” comprised of nanoparticulate atmospheric aerosols, and produced by the interaction of vapor-form ammonia and hydrochloric acid.



Patrick Shipman studied mathematics and linguistics as an undergraduate at UArizona, and stayed on to write his Ph.D. dissertation under the guidance of Alan Newell. He is grateful for 15 years as a faculty member at Colorado State University, as well as for the opportunity to return home.

Contact him at: patrickshipman@math.arizona.edu



Biographies continued from page 5...

naval sonar, changing distributions of forest vegetation, and wild primate behavioral responses to increasing interactions with humans. Henry is originally from Tucson. He studied math, physics, and education at UArizona, over 2003-08. He’s very happy to once again be riding his bike to campus.

Instructional Faculty



Armando Albornoz-Basto

earned a bachelor’s degree in mathematics teaching from the University of Yucatan in Mexico and a master’s degree in applied mathematics from CIMAT, also in Mexico. He is currently a student in the GDP Program in Applied Mathematics at UArizona, working under the supervision of Moysey Brio. When not thinking about math, Armando likes playing electric guitar, reading history books, and grilling carne asada with friends.



Emily Banks

recently completed her Ph.D. at the University of Arizona, writing about problems in geometry. In her free time, she has been known to quilt, write poetry and crosswords, and perform with a mariachi.



Thomas Doehrman

was recently a graduate student at UArizona and is very happy to be remaining here to teach. Over his years in Tucson, he has come to love both the city and the unique natural beauty which surrounds it. Thomas’ research interests include geometry and probability. For fun, he enjoys cooking, biking, and playing and composing music for the piano.



Jaehui Lim

received a Ph.D. in Statistics from Florida State University in 2021. Lim’s research interests include machine learning, spatial statistics, functional analysis (wavelets), and Bayesian statistics.



Derek Lowenberg

received his Ph.D. in mathematics at the University of California, Riverside in 2021; his doctorate focused on representation stability theory. In 2023, after teaching math

online at several schools, he started as an instructor at UArizona. He enjoys music, gaming, baking, Scrabble and cats.

Visiting Assistant Professors



Rossana Capuani’s research focuses on the mathematical modeling and analysis of complex systems characterized by the presence of a large number of agents satisfying

Continued on page 8...

Biographies continued from page 7...

multiple constraints. Her mathematical work draws from many areas of pure and applied mathematics, in particular, multi-agent system modeling, optimal control theory, mean field games theory, financial models, and traffic problems in operations research. In her free time, she enjoys cooking, reading and in general any type of outdoor activity.

Postdoctoral Research Associates



Shay Gilpin comes to Arizona from Colorado. She earned her Ph.D. from the University of Colorado, Boulder in applied mathematics. Her love for mathematics stems from its ability

to describe the world around us. Shay's research focuses on modeling covariances using partial differential equations, whose direct applications include air quality prediction and weather forecasting. Outside of research and teaching, Shay enjoys cooking, baking, watching sports, and woodworking.



Zhengning Hu grew up in Yichang, a small city in central China where the Three Gorges Dam is located. She completed her bachelor's degree in China and received her master's and

Ph.D. in mathematics from University of Missouri-Columbia. Her research focuses on algebraic geometry, particularly algebraic curves and their moduli. During her free time, Zhengning enjoys reading detective fiction, playing video games, biking, and hiking.



Frédéric Marazato was raised in Paris, France. He completed a Master's of Science and a Ph.D. at Ecole Nationale des Ponts et Chaussees before being a postdoctoral researcher at

Louisiana State University. Frederic focuses on problems at the intersection of modeling, computation and mechanical engineering. His most recent work consists of computing the deformation of structures composed of origami patterns. When he is not busy proving theorems, Frederic is regularly seen sport climbing all around Mt. Lemmon.



Debaditya Raychaudhury works on problems in algebraic geometry. Previously, he was a Postdoctoral Fellow at the University of Toronto and a Simons Postdoctoral Fellow at

the Fields Institute. Debaditya earned his Ph.D. from the University of Kansas, in 2021. Outside of mathematics, he is interested in sports, literature, listening to music, and watching movies.

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<p>SEPTEMBER 28</p>  <p>Markus Pflaum <i>University of Colorado Boulder</i></p>	<p>OCTOBER 12</p>  <p>Lise-Marie Imbert-Gerard <i>University of Arizona</i></p>	<p>OCTOBER 19</p>  <p>Jon Wilkening <i>University of California Berkeley</i></p>	<p>OCTOBER 26</p>  <p>Yuri Bakhtin <i>Courant Institute, New York University</i></p>
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FALL 2023
MATHEMATICS COLLOQUIUM

THURSDAYS / 4-5PM / MATH ROOM 501

<p>NOVEMBER 9</p>  <p>Bryjna Kohler <i>Utah State University</i></p>	<p>NOVEMBER 16</p>  <p>Chris Henderson <i>University of Arizona</i></p>	<p>Additional Speakers and Talk Details</p>  <p>www.math.arizona.edu/events</p> 
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Valentijn Karemaker - *Moduli spaces of abelian varieties in characteristic p*

Ben Moonen - *Algebraic cycles on abelian varieties*

Rachel Pries - *The Torelli locus and Newton polygons*

Joe Silverman - *Canonical heights on abelian varieties*

Barry Mazur, Clay Lecturer

TUCSON, MARCH 2-6, 2024

Funded by the National Science Foundation and organized in partnership with the Clay Mathematics Institute

Biographies continued from page 8...



Xiaolong Zhang received his Ph.D. in scientific computing from Duke University. He is interested in applied mathematics and high-performance computing, as well as their applications to AI/ML for real-world science/engineering problems. Particularly, he has been focusing on physics-informed diffusion models for data reconstruction and generation (e.g., images, videos, and complex physics processes such as turbulence). In his spare time, Long enjoys nature, hiking, and reading about East Asian philosophy.

Staff



Christian Avila grew up in Tucson and graduated from UArizona with a degree in accounting. He enjoyed an internship in the mathematics business office as a student and happily accepted a full-time position in the department upon graduation. He is currently training for his first marathon and hopes to one day compete in a triathlon. He also enjoys playing video games with friends, watching UFC, and spending time with his cat, Alfie.



Andrea Barton started working as an Assistant Coordinator for Math 100 in June. She recently moved to Tucson from College Station, Texas, where she earned a master's degree in mathematics from Texas A&M University. As a graduate student she studied algebra and topology, taught calculus, and served as an AWM officer. In her free time, Andrea enjoys reading (mostly science fiction/fantasy), watching sports (especially college football), and music (she plays the piano and organ).



Katherine Horan graduated from UArizona and has worked in education for 20 years. She started her career at Pima Community College, and transitioned to high school teaching about 9 years ago. This summer, she joined the Math 100 team and is finding the work of supporting students' transition into college level math rewarding. Getting to know and work with our approximately 40 undergraduate teaching assistants has been a true highlight for her.



McKenzie Meza is a Tucson native and recent UArizona graduate. She holds a bachelor's degree in communication with minors in Spanish and public relations. She previously worked in outreach, marketing, and communication for the College of Science as well as various other UArizona departments including Cooperative Extension, Arizona Public

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Teaching and living in China: Reflections on our first dual degree kickoff

By Jason Aubrey

Last Spring of 2023 marked the launch of the new joint undergraduate degree program in Statistics and Data Science (SDS), an effort between UArizona Mathematics and the Capitol University of Economics and Business (CUEB) in Beijing. As a dual degree program, graduating students will actually earn two bachelors in SDS, one from UArizona and one from CUEB.

Ahead of my semester in China, Ruhul Ali Khan, our inaugural Global Professor, spent the Fall of 2022 learning how our classes are taught in Tucson. Then Ruhul and I went to Beijing to teach the first classes for the program abroad.

Ruhul and I arrived in early February of 2023 to teach three of our core SDS courses—statistical methods, linear algebra, and financial mathematics (DATA 363, 412 and 462, respectively). We were delighted to encounter a first cohort of about 70 students, ahead of an incoming class of about 120. It is exciting to envision the program reaching 500 students over the next few years.



▲ Hanging out with rock climbing friends outside of Beijing.

The start of the program offered opportunities to forge bonds in creative ways. Teaching in English, for example, was not new for us but learning in English was new for the students. We worked on streamlining our mutual communication while exploring math concepts and ideas in English. The students' previous mathematics preparation was a great tool to address this initial challenge. Even if learned in Mandarin, mathematics is still mathematics, something the students, Ruhul and I were able to recognize and leverage as we went along.

One of the biggest surprises I took away from the experience was how many similarities there are between students in the U.S. and in China. Yet there are also many differences in academic culture and expectations. For example, running DATA 363 as a flipped classroom was a new experience for the students. So, the start of the semester challenged us to learn about and adapt to each other's expectations about classroom dynamics, providing many opportunities for discussing and learning from our differences and similarities.



▲ Group photo of students, faculty, and staff from the new joint program in Statistics and Data Science.



▲ Ruhul Ali Khan and Jason Aubrey at the summit of Mount Hua Shan, near Xi'an.



▲ CUEB students visiting a self-driving car company in Beijing.

Learning happened for all of us, teachers, and students. And after the first couple of months there was a definite shift. Things began to feel surprisingly natural and easy. For one, I began to see more similarities, not just differences between U.S. and Chinese classroom cultures. There were eager and hardworking students, students that needed more reassurance and support, and everything in between. And, as I got to know the students on a personal level, I learned about their hopes and dreams, their family and social lives, their hobbies, and other interests.

Living in Beijing felt wonderful in many ways. The staff at CUEB were very friendly and helpful and made a lot of effort to make sure we had everything we needed. China is an immense country with a fascinating history and culture, and everywhere we visited was fantastic. People were absolutely wonderful to us everywhere we traveled. It is impossible to list all of the must-see historical and cultural landmarks in Beijing and nearby, from the Forbidden City and the Temple of Heaven, to Tiananmen Square and the National Museum, and of course the Great Wall. In Beijing you can find food from all over China and the world, and its local cuisine has many delicious dishes. There are also very active nightlife and live music scenes in Beijing.

On a personal level, the most valuable part of the trip was the people I met and the friends I made. We went rock climbing in the mountains outside of Beijing, as well as caving, riding bikes across Beijing in the middle of the night, and even golfing. My intention was to totally immerse myself—to eat all the food, try to speak the language, and mostly, meet new people and make new friends. That approach really paid off. It was an amazing experience, and I'm excited to return, when possible, to teach math or just continue exploring China. ◀

Jason Aubrey is the Director of the Math Center and an Associate Professor of Practice. He joined UArizona in 2013, after working at the University of Missouri in Columbia, MO. He was an undergraduate at Purdue University and earned his Ph.D. at the University of Michigan, where he studied set theory.

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Biographies continued from page 9...

Media, and Molecular and Cellular Biology. She strives to grow her career in marketing and communications while also supporting the community she calls home.



Makenzie O'Bleness graduated Suma Cum Laude from ASU with a bachelor's degree in English and has professional experience writing, editing, teaching pre-k, and working with the public. She is currently working on publishing her novel as well as her Master's in English. In her spare time, she enjoys making art, including miniature-making, crocheting, sewing, cross-stitching, and anything else that strikes her fancy. As a newlywed, she is new to Tucson, but has lived in Arizona her whole life.



Celine Teso started working for the Mathematics Department in June after recently moving back to Arizona from California. In her free time she enjoys all fall and holiday activities, hanging out with friends and family, and spending time with her German shepherd, Ava.



Mariella Rodriguez is currently an undergraduate student at UArizona, set to graduate in December 2023 with a B.A. in Spanish and a B.S. in public health. She has worked closely with the Math 100 Team these last couple of years and is full of joy to be taking on a bigger role. She hopes to pursue a Master's in public health and her main interest is research epidemiology.



Vicki Correa is originally from Fresno, California, and graduated from Northern Arizona University with a degree in business administration. She worked in hospitality and restaurant management with her family in Phoenix, AZ, before moving to Tucson. She works as an Accountant in the business office of the Mathematics Department. During her free time she enjoys mountain biking, puzzles, cooking and exploring Tucson. ◀



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UArizona Mathematics 2023 Master's and Ph.D. recipients

Doctoral degrees

Emily Banks

Improving PL Approximations of Harmonic Maps and a Penalty-Function Approach to Harmonic Maps

Advisor: David Glickenstein

Employer: The University of Arizona

Position: Instructor

Thomas Doehrman

Spaces of Spheres, Duality Structures, and the Finite Volume Laplacian

Advisor: David Glickenstein

Employer: The University of Arizona

Position: Instructor

Rachel Knak

Kisin Varieties Associated to Reducible Galois Representations of Dimension 2

Advisor: Brandon Levine

Spencer Nelson

On the Arithmetic Gan-Gross-Prasad Conjecture for $U(2) \times U(3)$

Advisor: Hang Xue

Tristan Phillips

Counting Rational Points of Bounded Height on Some Genus Zero Modular Curves

Advisor: Bryden Cais

Employer: Dartmouth College, Hanover, NH

Position: NSF Postdoctoral Researcher

Master's degrees

Ruchi Dahiya

Splines, Bezier Curves, and Schoenberg Problem

Advisor: Ibrahim Fatkullin

Lee Sidbury

Curvature on Piecewise Flat Manifolds

Advisor: David Glickenstein



A complete list of graduates since 1992, including links to recent theses, may be found online »