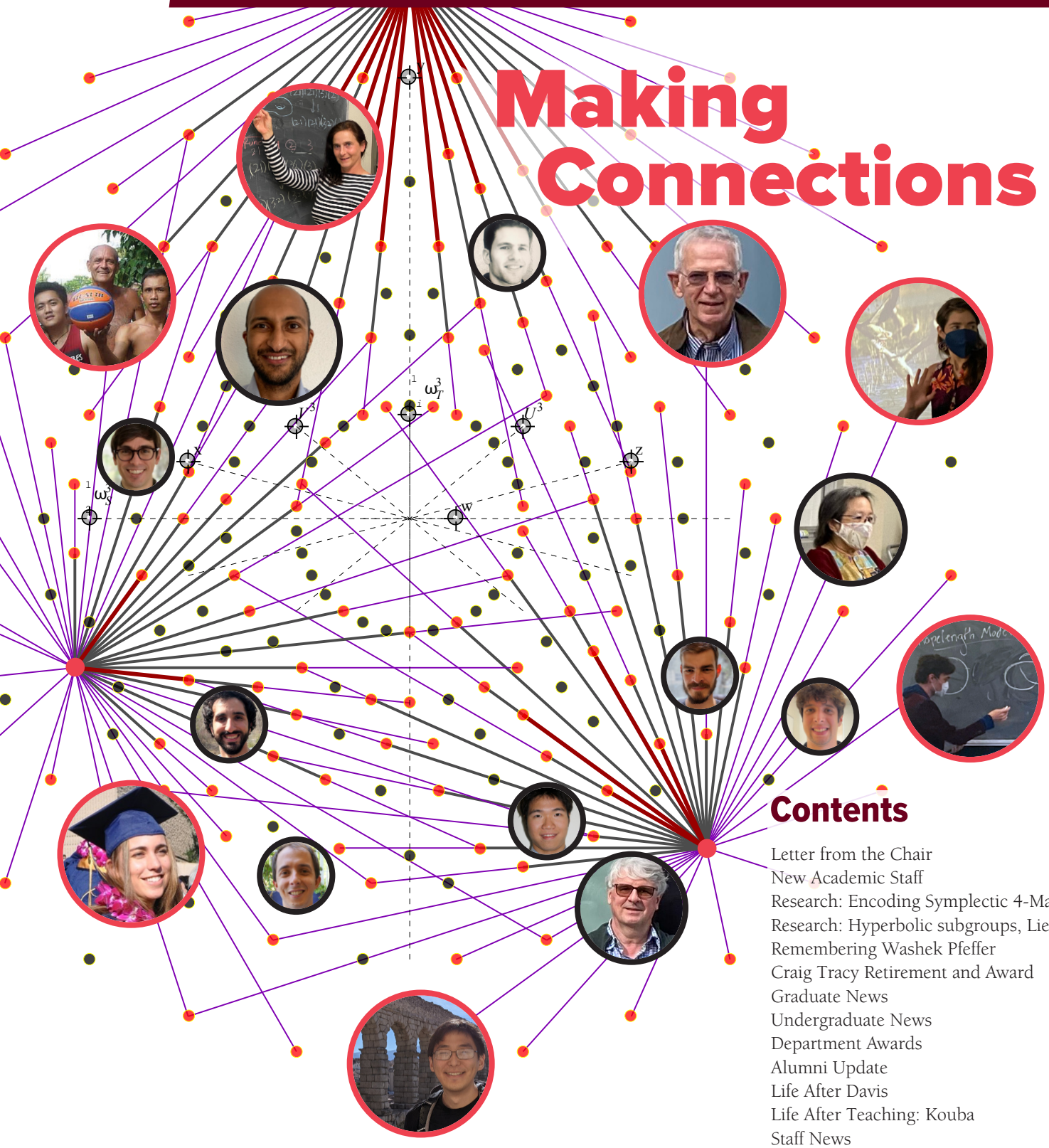
UC DAVIS
MATHEMATICS NEWSLETTER

Making Connections



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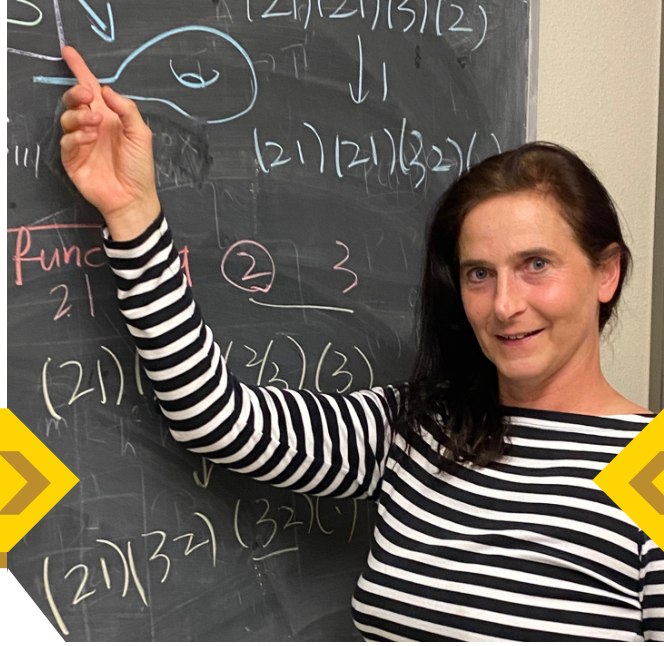
LETTER from the chair



by Anne Schilling, Department Chair

After more than a year of remote operation, I am excited to see many of you in person and to take part in the energy on campus as classrooms and seminars are once again filled with lively discussions. While I acknowledge that returning to in-person activities has been an uncertain time, what I am ever more certain about is the importance of science — and at its core mathematics — to the well-being of our society and planet. Over the last year, I have also learned the importance of working together, communicating with one another, and showing compassion and flexibility to each others' needs to achieve our science and learning goals!

Our long-term colleagues Craig Tracy and Craig Benham retired this summer. We are celebrating their achievements and contributions to the Department this fall with retirement events. Please join if you can! Duane Kouba, who was part of the Department for over 30 years as a lecturer, also retired during the spring. We wish Duane, Craig and Craig all the best!

We hired a record number of seven new Krener Assistant Professors:

- Enrique Guadalupe Alvarado (mentor Qinglan Xia)
- Alex Chandler (mentor Eugene Gorsky)
- Sean Griffin (mentor Erik Carlsson)
- Gabriel Islambouli (mentor Laura Starkston)
- Alex McDonough (mentor Fu Liu)
- Calum Rickard (mentor Steve Shkoller)
- Daping Weng (mentor Eric Babson).

Our KAP Kathryn Link was awarded an NSF postdoctoral fellowship with mentor Bob Guy and Orsola Capovilla-Searle joined us as an NSF postdoctoral fellow with mentor Roger Casals. We wish them all a productive stay in our Department!

The Department continues to attract extramural funding. This year it was over $5.4 million dollars which constitutes a 19% increase from two years ago. Similarly, the enrollment numbers for summer session in 2021 were slightly up compared to 2020, which saw a record increase of 43% compared to 2019. So last year's increase was not an anomaly. Our mathematics major enrollments for fall quarter 2021 are currently also 10% higher than they were last year. Overall enrollments increased by 5.79%.

The past year was extremely successful for awards and recognitions in the Department. Laura Starkston was awarded the 2020 Hellman Fellowship, an NSF CAREER grant, and the 2021 Sloan Fellowship. Rishidev Chaudhuri was also awarded the 2021 Sloan Fellowship. Eugene Gorsky received the UC Davis College of Letters and Science Teaching Award for 2021. Bruno Nachtergaele won the 2021 Humboldt Foundation's von Siemens Research Award. Martin Fraas was named a 2021 Hellman Fellow. Mariel Vazquez was awarded a Sloan grant to advance STEM faculty diversity and Joey Teran was named 2021 CAMPOS Fellow. Congratulations to all!

Craig Benham

Duane Kouba

Craig Tracy

incoming Academic Staff

FACULTY

Sameer Iyer

Sameer Iyer began as an Assistant Professor this past July. He was previously an NSF Postdoctoral Fellow in the Department of Mathematics at Princeton University, and got his Ph.D. at Brown University.

Sameer's field of research is Partial Differential Equations, and he specifically focuses on those equations which model fluid flows. Within this large field, he has so far (mostly) focused on the formation and stability of boundary layers which form when a viscous flow at high Reynolds numbers interacts with a solid boundary. This is a classical topic in hydrodynamics that has had important impacts in diverse applied fields and also gives rise to exciting analysis.

Sameer moved to Davis this past summer, and has really enjoyed exploring what California has to offer. His favorite parts so far have been visiting Yosemite National Park and Stinson Beach.

KAP

Enrique Alvarado

Enrique G. Alvarado received his B.S. from Gonzaga University in 2014 and completed his Ph.D in Mathematics (Applied Track) at Washington State University under the supervision of Kevin R. Vixie and Bala Krishnamoorthy in 2021.

Enrique's research interests have largely consisted in applying Geometric Measure Theory and Topological Data Analysis to the different types of geometric optimization problems that are used to find analytic, geometric, and topological structures at varying scales. His thesis work focused on using topological data analysis techniques with the flat norm to investigate a problem in interfacial chemistry, along with a mathematical problem related to the analyst's traveling salesman theorem. Enrique is currently working on a version of Plateau's problem under the mentorship of Qinglan Xia.

Outside of mathematics, Enrique likes spending time with his friends and family.

KAP

Alex Chandler

Alex Chandler was previously a postdoctoral researcher at the University of Vienna, under Anton Mellit, on the Austrian Science Fund project titled *Macdonald Polynomials and Related Structures in Geometry*. He received his Ph.D. in May 2019 from North Carolina State University under Radmila Sazdanovic. His thesis, *On Thin Posets and Categorification,* focused on the topics of knot theory, categorification, topological combinatorics, and graph theory. Before his graduate studies, he received degrees in math and physics at Michigan State University, with concentration in combinatorics and representation theory.

incoming

KAP

Sean Griffin

Sean Griffin received his Ph.D. in math from University of Washington in 2020, where he was advised by Sara Billey, and an A.B. with high honors in math from Dartmouth College. Before joining UC Davis as a Krener Assistant Professor, he was a Visiting Assistant Professor at UC San Diego and a Postdoctoral Fellow at the Institute for Computational and Experimental Mathematics (ICERM).

Sean's research primarily lies in algebraic combinatorics and combinatorial algebraic geometry. He particularly likes to think about representations coming from algebraic geometry and their connections to combinatorics. His most recent joint work establishes a connection between a symmetric function formula in the Delta Conjecture from algebraic combinatorics and geometric representations coming from Springer fibers. At UC Davis, he will be working under the mentorship of Erik Carlsson.

In his free time, Sean likes to rock climb, play ultimate frisbee, and speak and read in Italian.

KAP

Gabriel Islambouli

Gabriel Islambouli got his Ph.D. at the University of Virginia in 2019. He comes to Davis after a postdoctoral fellowship at the University of Waterloo.

Mathematically, he is primarily interested in smooth 4-manifolds, trisections, and stable mappings. He also plays jazz trumpet and enjoys cooking.

Academic Staff

KAP

Alex McDonough

Alex McDonough got his Ph.D. In Mathematics from Brown University.

Alex studies algebraic, topological, and dynamical combinatorics. He is especially interested in algebraic properties of chip-firing on finite graphs and matroids.

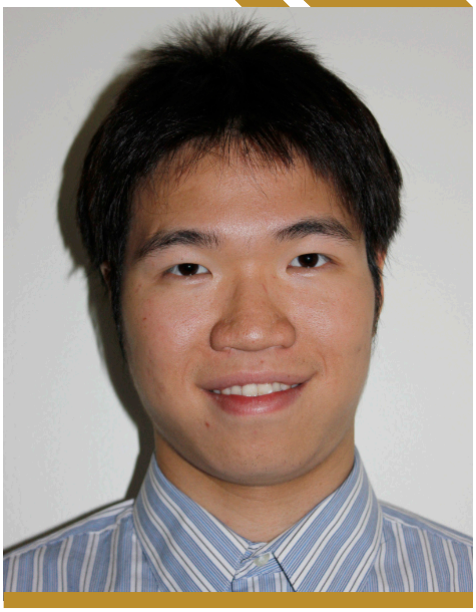
KAP

Calum Rickard

Calum Rickard is interested in analysis and nonlinear partial differential equations, more specifically fluid dynamics and free boundary problems. Questions addressing global well-posedness in the presence of vacuum states have been a central subject of attention in my work. He is also interested in the study of singularities and shock formation.

Calum Rickard recently graduated from the University of Southern California with his Ph.D. in Applied Mathematics, advised by Juhi Jang. At UC Davis, he is being mentored by Steve Shkoller.

KAP



Daping Weng

Daping Weng graduated with a Ph.D. in Mathematics at Yale University, under Alexander B. Goncharov.

He mainly studies cluster algebras and their applications in geometry and representation theory, but is also interested in all sorts of interesting math in general.

Outside of math, he likes playing basketball and hiking.

Encoding Symplectic 4-Manifolds

by Laura Starkston

Symplectic geometry originated from an interpretation of Hamiltonian mechanics, and then developed more generally, finding links to algebraic geometry, modern theories in physics, and gauge theoretic invariants of smooth 4-manifolds. Much of my research studies 4-dimensional symplectic manifolds.

Symplectic means a geometric structure encoded by a differential 2-form–this means that for any 2-dimensional surface inside the 4-dimensional space, we can integrate the symplectic form to get a notion of area of the surface. Unlike our usual notion of area, this symplectic area can be positive, zero, or negative. There are two geometrically special types of surfaces: symplectic surfaces are those with all positive pointwise area contributions to the integral, whereas Lagrangian surfaces have all zero area contributions.

Studying 4-manifolds is difficult because it pushes beyond what we can visualize and there are highly unintuitive phenomena. For example, there are infinitely many 4-manifolds which are not pairwise diffeomorphic, but are all homeomorphic to each other–they can even be homeomorphic to $\mathbf{R}^4$ (this only happens in dimension 4). Keeping track of the symplectic structure adds an extra layer to the problem.

I want to share three ways of breaking down a symplectic 4-manifold with diagrammatic encodings. The first and second ways have the same initial step, while the third differs from the start. The first important result, due to Donaldson and Giroux, is that any closed (integral) symplectic manifold has a *divisor-Weinstein decomposition*. In a 4-manifold, this means that there exists an embedded symplectic surface (the divisor) with a standard neighborhood, whose complement is a Weinstein domain. Weinstein domains are symplectic manifolds with boundary which can be built from symplectic handles. The neighborhood of the surface is classified by its genus and normal Euler number. Therefore, we can encode a closed symplectic 4-manifold by these two integers plus a diagrammatic encoding of the Weinstein domain.

The first way to encode a 4-dimensional Weinstein domain is through handle diagrams, developed by Gompf. These diagrams feature front projections of Legendrian knots, which can pass through wormholes (whose entry and exits are depicted as two spheres aligned horizontally). (See Figure 1.) Gompf and Ding-Geiges developed a complete set of moves which relate different diagrams for the same Weinstein domain.

The second way to encode a 4-dimensional

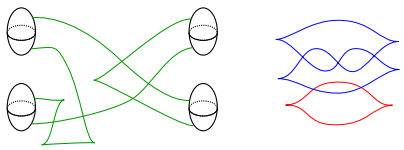


Figure 1: Weinstein handle diagrams.

Weinstein domain is via an arboreal skeleton. This is a 2-dimensional complex, where 2-cells, 1-cells, and 0-cells can only meet in a few prescribed ways (see Figure 2). Arboreal singularity were defined by Nadler. I proved that each arboreal singularity has a unique symplectic manifold thickening, so each arboreal skeleton determines a Weinstein domain, and conversely, that every Weinstein 4-manifold is the thickening of some arboreal skeleton. Therefore we can represent any 4-dimensional Weinstein domain with an arboreal 2-complex. Developing a calculus for equivalences of such arboreal 2-complexes is the next step.

A third way to decompose a symplectic 4-

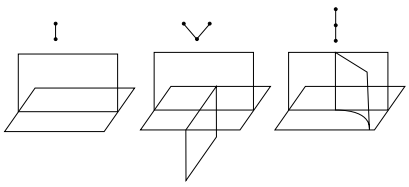


Figure 2: Arboreal singularities.

manifold, is through Weinstein trisections. Here, the 4-manifold is decomposed into three pieces, each a standard symplectic thickening of a wedge of circles. These pieces are glued along their 3-dimensional boundaries in a special way, so that the intersection of any two is a 3-dimensional thickening of a wedge of circles, and the intersection of all three pieces is a surface. With Lambert-Cole and Meier, I proved that every closed symplectic 4-manifold admits such a decomposition (a symplectic upgrade of Gay and Kirby's results). The smooth topology of the 4-manifold is diagrammatically encoded by three collections of curves on a surface (Figure 3). To encode the symplectic structure, we need to keep track of three foliations on the surface. I'm currently interested in reducing these foliations to more discrete data to encode the symplectic geometry.

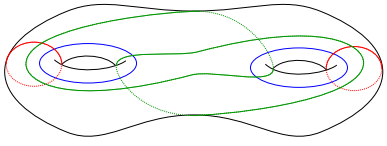


Figure 3: Trisection diagram.

Laura Starkston

Professor Starkston was awarded a Sloan Fellowship and a Hellman fellowship this year, for further studies on Weinstein manifolds.

This year, she also received an NSF Early Career Grant and hopes to provide ways to mathematically represent or visualize 4-dimensional spaces. As part of the grant, she hopes to start a program to help connect with students interested in math.

Washek in 1991

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Remembering Washek Pfeffer

Washek in 1968

Photographer G.M. Bergman

Our colleague Washek Pfeffer passed away on January 3, 2021, he was 84. Born in Prague as Václav Franticek Pfeffer on November 14, 1936, he changed his name to Washek Pfeffer when he became a US citizen in 1970. He joined the UC Davis Department of Mathematics in 1966, retiring in 1994.

One of Washek's middle school classmates later rose to prominence, Václav Havel, the famous playwright and President of Czechoslovakia (1989-1992) and of the Czech Republic (1993-2003). Washek and Václav became close friends in the 1950s.

The son of an inventor and a high-end seamstress, Washek spent his first year of high school in a hospital bed, studying largely independently, with homework assignments delivered through classmates. Classmate Zdenek Bažant, eventually a professor at Northwestern, described Washek as popular, gregarious, irreverent, a regular visitor to pubs and nightclubs, who still managed to score top grades. Washek received his Doctor of Natural Sciences in 1960 from Charles University and a Ph.D. under the direction of Joaquin Basilio Diaz from the University of Maryland College Park in 1966 with a dissertation entitled An Integral in Topological Spaces.

Washek's zest for life translated into mathematical productivity: He published over 100 research articles, including one last year, *Comparing chains in Banach space*. One of his heavily cited articles, joint with Eric van Douwen, concerns *Some properties of the Sorgenfrey line and related spaces*.

He will be missed.

Alumni Update

Mostafa Ghandehari

Ph.D. — 1983

At UC Davis, my thesis was titled *Geometric inequlities in the Minkowski plane*, and my advisor was professor Don Chakerian. My committee included Tom Sallee, David Barnette, and Evelyn Silvia. I am proud to have worked with Don Chakerian as my thesis advisor.

After graduation, I taught mathematics and computer science at eight colleges and universities in Northern California until Fall semester of 1993.

For the summer of 1983, I immersed myself in French culture, language and literature at the Institute of European Studies.

I left California and moved to Salt Lake City for two years, visiting family, friends and playing tennis. In 1995, I left Utah and started teaching mathematics, computer science, civil engineering and electrical engineering at the University of Texas in Arlington. I attended an institute for retraining in computer science at Clarkson University. I later obtained a professional engineering license in Texas in May of 2017. I retired in June of 2020 from UT Arlington.

I enjoy participating in sports. These days I continue playing soccer a couple of times per week. I enjoy learning science, engineering, literature, modern languages and poetry. I have written numerous poems since 1983.

Dennis G. Simmons

B.S. — 1998

Dennis Simmons has been a teacher at five different schools, finally settling at Millswood Middle School in Lodi, California since 2014. He is currently living in Elk Grove. The last year, during the shelter in place, was reportedly "pretty boring."

Hyperbolic subgroups of Lie groups

by Michael Kapovich

Michael Kapovich

The origins of the theory of infinite discrete subgroups of Lie groups go back to the 19th Century, with motivations coming from diverse fields of mathematics including differential geometry, topology, number theory, complex analysis and ordinary differential equations. Let me tell you about a recently developed notion of discrete subgroups exhibiting hyperbolic behavior, focusing, for simplicity, on subgroups of $SL(n, \mathbf{R})$.

The definition of a discrete subgroup of $SL(n, \mathbf{R})$ is simple enough: It is a subgroup Γ which forms a discrete subset with respect to the matrix topology. In other words, a subgroup is discrete if every sequence of distinct matrices γ_i in Γ diverges to infinity, $\|\gamma_i\| \to \infty$. Equivalently, the sequence of highest singular values of the γ_is diverges to infinity.

Looking at the singular values of these matrices arranged in decreasing order, $\sigma_1(\gamma_i) \geq \sigma_2(\gamma_i) \geq \ldots \geq \sigma_n(\gamma_i)$, and their asymptotics as $i \to \infty$, one realizes that this divergence to infinity can happen in qualitatively different ways. For instance, a sequence of matrices is called *regular* if each sequence of successive quotients

$$\frac{\sigma_k(\gamma_i)}{\sigma_{k+1}(\gamma_i)}$$

diverges to infinity. Accordingly, *regularity* of a discrete subgroup Γ means that every unbounded sequence in it is regular. (The regularity condition can be weakened to *partial regularity* by looking at the ratios of *some* of the successive singular values, leading to an interesting theory as well, but I limit myself to regular subgroups.) Regularity is equivalent to discreteness if $n = 2$ but not for $n \geq 3$. For instance, the subgroup of matrices with integer coefficients, $SL(n, \mathbf{Z})$, is discrete but is not even partially regular if $n \geq 3$.

So far, our discussion was in terms of linear algebra; in order to gain hyperbolic behavior of Γ, one connects linear algebra with the combinatorial (or algebraic) structure of Γ itself. Assuming that Γ is finitely generated, one defines its Cayley graph, C_Γ, which is a certain connected graph of finite valence, with the vertex-set equal to Γ itself. Like any connected graph, C_Γ admits a graph-distance d_Γ that measures the combinatorial length of a shortest edge-path connecting two vertices. As it turns out, the ratios of singular values as above cannot diverge to infinity at a rate faster than exponential with respect to $d_\Gamma(1, \gamma_i)$, but they *can* diverge to infinity subexponentially, even linearly. (This happens, for instance, in the case of $SL(2, \mathbf{Z})$.) This observation leads to a definition, which (in a more geometric form) first appeared in my work with Leeb and Porti:

Definition. A (discrete) finitely generated subgroup $\Gamma < SL(n, \mathbf{R})$ is called *URU* (uniformly regular undistorted) if there exists $A > 0$ such that for every $\gamma \in \Gamma$,

$$\frac{\sigma_k(\gamma_i)}{\sigma_{k+1}(\gamma_i)} \geq A^{-1} \exp(A d_\Gamma(1, \gamma)),\ k = 1, \ldots, n-1.$$

As it turns out, subgroups satisfying this condition are both plentiful and interesting, because they satisfy certain algebraic, dynamical and geometric properties. How does this relate to hyperbolicity? For instance, as we proved with Leeb and Porti, URU subgroups are *intrinsically hyperbolic*, meaning that geodesic triangles in their Cayley graphs C_Γ are thin, i.e., are uniformly close to triangles in tree-graphs, just as triangles in the classical hyperbolic plane are uniformly thin. Another hyperbolicity feature of URU subgroups is that URU is equivalent to the Anosov property, formulated in terms of expansivity of a certain flow associated with the Γ-action on the flag-manifold corresponding to $SL(n, \mathbf{R})$, originally formulated by Labourie, Guichard and Wienhard.

There are other notions associated to subgroups of $SL(n, \mathbf{R})$ acting hyperbolically, which generalize the URU definition. For instance, in recent work with my former Ph.D. student Jaejeong Lee and a current visitor at our Department of Mathematics at UC Davis, Sungwoon Kim, we developed a more dynamical notion of hyperbolicity, exhibited, for instance, by cocompact discrete subgroups of $SL(n, \mathbf{R})$ (which are not URU, unless $n = 2$). A common feature that these different notions of hyperbolicity exhibit is structural stability with respect to small bi-Lipschitz perturbations of the group-actions on flag-manifolds.

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A New Research Prize in honor of Craig Tracy

To honor Professor Emeritus Craig A. Tracy, the Department of Mathematics at the University of California, Davis announces the creation of the Craig A. Tracy Research Prize to be awarded annually for research by one of its postdoctoral researchers or Krener Assistant Professors (KAPs). This fund is building toward endowment. Help us reach the $50,000 endowment level! If we are unable to reach endowment level, your gifts will be used for the immediate research needs of our KAPs and postdocs.

To contribute to Craig A. Tracy's annual Research Prize program, please give your donation using one of the following options.

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At the UC Davis Mathematics donation link below, click on Donate To This Fund. Under *Special Instructions*, please indicate:

Contribution is to be used to fund the Craig A. Tracy Research Prize.

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The memo line of the check should read:

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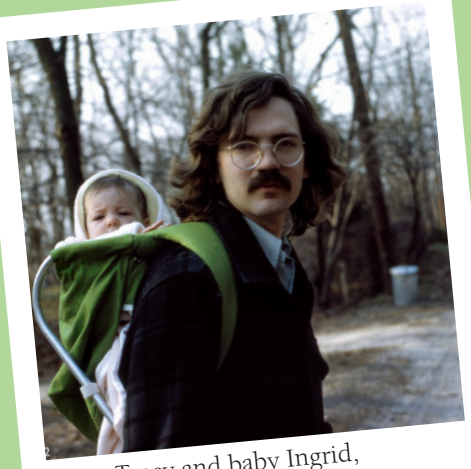


Craig Tracy and baby Ingrid, 1972

Craig Tracy at the Faroe Islands, 2016

For Craig Tracy's Retirement

by Barry McCoy,
Distinguished Professor
Stony Brook University

Craig was my first graduate student. He has had an extremely productive and distinguished career. Over the decades since I first met Craig we have shared many adventures together. It is hard to believe that he is retiring.

Craig walked into my life 50 years ago in the early 1970's when T.T. Wu and I were working on Ising model correlations and Painleve equations. In the 4 years from 1973 to 1977 Craig and I wrote 8 papers together which brought Painleve functions and equations into physics in totally unexpected ways. Craig was a pioneer in these discoveries and I remember these times with great fondness.

The discoveries of these early days have had a significant impact on both mathematics and physics and Craig has been a driving force in these developments. Craig turned his attention from statistical mechanics to random matrix theory and building on his previous discoveries on Painleve three functions he and Harold Widom discovered what have become known as the famous Tracy-Widom distribution functions which express probability distributions of the eigenvalues of random matrices in terms of Painleve functions. It is completely fair to say that Craig's work has revolutionized the study and applications of random matrix theory.

Craig has great mathematical power and deep physical insight. His work is a model of what can be achieved when mathematics and physics are combined for the solution of physical problems.

It has been an enormous pleasure to have worked with Craig. I will always treasure our collaboration.

Craig Tracy Workshop, 2021

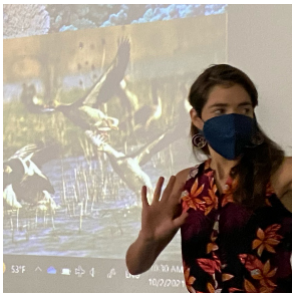
Graduate Group in Applied Mathematics

by Jesús De Loera, Chair of the Graduate Group in Applied Mathematics

Jesús De Loera

Despite the limitations imposed by the pandemic on creative work, education, and collaboration, our Graduate Group in Applied Mathematics (GGAM) continues to thrive. Together with the rest of the university we are slowly reclaiming the chance to gather in person (not in Zoom) and share mathematics with each other. It is wonderful to see students back on campus, even when we do not recognize them wearing a mask!

Not only are courses in person, but we just gathered to celebrate the 40th anniversary of the creation of GGAM, on Saturday, October 2nd 2021. We were honored to be joined by the very first GGAM chair, Prof. Richard Plant, who shared some memories of how GGAM came to be established. Also joining us were other former chairs of GGAM: Prof. Angela Cheer, Prof. Alan Hastings and Prof. Arthur Krener. They shared their memories and remembered key faculty who contributed to GGAM.



Prof. Valdovinos' speaking at the 40th Anniversary

Krener, Hastings, Plant, and Cheer sharing memories at the GGAM Anniversary.

Later we had four visionary lectures by young GGAM faculty that spanned a wide range of topics. Fernanda Valdovinos spoke of the importance of mathematical models to guide decisions about the ecological and environmental problems our society faces. Prof. Rishidev Chaudhuri spoke of mathematical opportunities in the study of the brain. Prof. Mariel Vazquez went to the molecular level and discussed topological tools in the study of DNA and recent applications on the study of evolution the SARS-COV2 virus responsible for the pandemic. Finally, Prof. Joseph Teran entertained the audience of students and faculty with amazing simulations of real physical effects on virtual reality and computer graphics that have been used in many Disney-Pixar movie animations. As always mathematical methods are everywhere!

Xiucai Ding, new faculty

We were still able to hold our GGAM Mini-Conference online in February. We had lectures by GGAM faculty and then gathered virtually using the platform Gathertown. Our GGAM miniconference showcased the breadth of research that GGAM offers, with short talks from GGAM faculty members.

This year, GGAM also had a joint conference with Lawrence Livermore National Laboratories discussing collaborations and internships.

Fall 2021 started for GGAM with an incoming class of 10 new Ph.D. students, selected from a highly competitive pool of applicants. This class is highly diverse and full of energy.

Our program's graduates continued to go on to impressive careers in academia and industry (see the list of graduates included in this newsletter). Even during the pandemic we continued our series of Ph.D. exit seminars, each with an online reception to celebrate the research achievements of the graduating doctoral students.

During the past year we had Prof. Xiucai Ding (Statistics) join GGAM. Dr. Ding is an expert in Random Matrix Theory and its statistical and algorithmic applications, non-stationary time series analysis, statistical analysis for algorithms (machine learning and manifold learning) for complex, high dimensional and noisy data.

The GGAM faculty continues to increase our reputation and prestige by winning awards, grants, and making contributions to the university. In addition to Department of Mathematics faculty achievements discussed in this newsletter and GGAM's website, I would like to mention that our esteemed colleague Rishi Chaudhuri won the prestigious Sloan fellowship, and Prof. David Woodruff won the INFORMS Computer Society Distinguished service award for his great service to the Operations Research community, particularly his efforts as Editor-in-Chief for the INFORMS journal on Computing. Woodruff's work on mathematical software and algorithmic heuristics is widely known.

Graduate Program

by Becca Thomases, Vice Chair for Graduate Affairs

After a tough year and a half of remote learning we are back in person. This fall the Mathematics Graduate Program welcomed 16 new students, bringing the total number of graduate students in the program to 76. One big change this year was the addition of a new preliminary exam subject area: Geometry/Topology. Students are now allowed to choose two out of three subject areas: Algebra, Analysis, and Geometry/Topology for their preliminary examinations. We are excited to offer this new flexibility in our program.

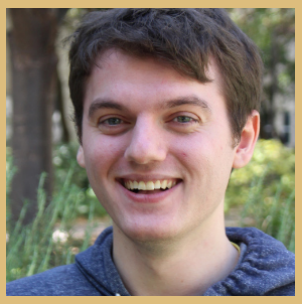
Despite the challenges of 2020-2021 our students continued to do excellent work. We awarded 10 Ph.D.'s in 2020-2021, and our graduates have continued on to Postdoctoral Fellowships and Assistant Professor positions as well as jobs in industry, and we're proud of their achievements. You can see details of our recent graduates, their dissertations and post-degree placement on the next page.

Our current graduate students have received many awards and fellowships. Alex Black was awarded the National Science Foundation's Graduate Research Fellowship. Edgar Jaramillo Rodriguez received an NSF Alliances for Graduate Education and the Professorship award for his work with Jesús De Loera. Jenny Brown was awarded the UC Davis Dissertation Year Fellowship. Black Jiang and Girish Kumar won Graduate Studies Research Awards. Stephanie Gaston and Houbo Wang received an L&S summer stipend.

Our new students have also been recognized for their excellent potential and hard work. Travell Criner, a first year student, was awarded the campus-wide Eugene Cota-Robles Fellowship. Another new student, Daniella Cortes Rodriguez, was awarded the Dean's Distinguished Graduate Fellowship from the College of Letters and Sciences. Brittney Marsters was awarded the Mathematics Department Jacoby Fellowship.

We also want to acknowledge the achievements of our staff. Tina Denena, our Student Services Supervisor, was awarded the 2021 UC Davis Outstanding Advising Administrator Award. Finally, we welcome our recently hired Graduate Programs Coordinator, Vanessa Bravo. The 2021-2022 academic year is off to a great start!

Becca Thomases



Alex Black

Edgar Jaramillo Rodriguez

Daniella Cortes Rodriguez

Brittney Marsters

Mathematics for the Future

The Department of Mathematics wishes to thank all alumni, parents, students, faculty, staff and friends who support the Department each year.

For a list of our endowed funds, please see our web site:

http://www.math.ucdavis.edu/about/donation/

Your gift to the Department is tax deductible as allowable by law, and you can choose to have your name published or remain anonymous.

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Please click on "Donate to this Fund" and follow the prompts.

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Matching

Disclosures

Graduate Degrees 2020-2021

Fleischer, Samuel • Applied • *Eco-Evolutionary Dynamics of Predators and Prey*
Post Ph.D. Placement: Systems Engineer, NASA Jet Propulsion Laboratory
Advisor: Schreiber

Haley, David • Applied • *Design and Verification of Modular Components in Thermodynamic Binding Networks*
Advisor: Doty

Hannon, Nathan • Math • *Space of Random Plane Triangulations and the Density of States*
Advisor: Babson

Harvie, Brian • Math • *The Inverse Mean Curvature Flow: Singularities, Dynamical Stability, and Applications to Minimal Surfaces*
Post Ph.D. Placement: Postdoctoral Researcher, National Taiwan University, National Center for Theoretical Sciences
Advisor: Jacob

Jarvis, Katelyn • Applied • *From Molecular Interactions to Whole Muscle Strength: connecting small-scale interactions to muscle fiber function through mathematics*
Post Ph.D. Placement: NASA
Advisors: Walcott/Lewis

Johnson, Carter • Applied • *Neuromechanical Mechanisms of Locomotion in C. elegans*
Post Ph.D. Placement: Wylie Research Assistant Professor, University of Utah
Advisors: Lewis/Guy

Lee, Yonggyu • Math • *On Ehrhart positivity and deformations of Tesler polytopes*
Advisor: Liu, Fu

Li, Haotian • Applied • *Natural Graph Wavelet Dictionaries: Methods and Applications*
Post Ph.D. Placement: Research Scientist, Facebook Inc.
Advisor: Saito

Liu, Ning • Applied
Advisor: Fan, Yueyue

Liu, Xiaochen • Math • *Cellular Automata with Random Rules*
Post Ph.D. Placement: Post Doctoral position, Yale University
Advisor: Gravner

Meyer, Alexander • Applied • *Great Risk, Grave Uncertainty, and Making Your Own Luck: The Dispersal of Coastal Marine Invertebrate Larvae in Heterogeneous Environments*
Post Ph.D. Placement: Postdoctoral Scholar, University of Notre Dame, Department of Biology
Advisors: Hastings/Largier

Meyer, Emily • Applied • *Mathematical Modeling of Sinoatrial Node Dynamics at the Subcellular, Cellular, and Tissue Scales*
Post Ph.D. Placement: Research Development Associate, University of Arizona
Advisor: Lewis

Mou, Lang • Math • *Wall-Crossing Structures in Cluster Algebras*
Post Ph.D. Placement: Newton International Fellow, University of Cambridge
Advisor: Babson

Nguyen, Anthony • Applied
Advisor: Balasubramanian

Pan, Jianping • Math • *Crystal Combinatorics and Grothendieck Polynomials*
Post Ph.D. Placement: Postdoctoral Research Scholar, North Carolina State University
Advisor: Schilling

Scherer, Robert • Math • *Topics in Number Theory and Combinatorics*
Advisor: Romik

Shao, Yiqun • Applied • *The Extended Generalized Haar-Walsh Transform and Applications*
Post Ph.D. Placement: Research Scientist, Facebook
Advisor: Saito

Shemetov, Dmitry • Applied • *Concerning Some Statistical Problems on Graphs*
Post Ph.D. Placement: Statistical Developer, Delphi Research Group at Carnegie Melon University
Advisor: Sharpnack

Sumpter, Joshua • Math • *Pair Dependent Linear Statistics for Circular Random Matrix Ensembles*
Post Ph.D. Placement: Assistant Professor, University of Rochester
Advisor: Soshnikov

Wang, Jiawei • Math • *Subadditivity of Piecewise Linear Functions*
Post Ph.D. Placement: Data Scientist, Uber Technologies Inc.
Advisor: Koeppe

Zhao, Yue • Math
Post Ph.D. Placement: Math Teacher, Foreign Language School of South China Normal Univ.
Advisor: Vazirani

Arroyo Esquivel, Jorge • M.S., Applied
Bechtloff Weising, Milo • M.A., Math
Brawley, Emi • M.A., Math
Chickering, Kyle • M.S., Applied
Chou, Raymond • M.A., Math
Corbelli, Matthew • M.A., Math
Dimand, Gal • M.S., Applied
Enriquez, Sabrina • M.A., Math (Strohmer)
Godkin, Benjamin • M.S., Applied (De Loera)
Hu, Xiaohan • M.S., Applied
Jackson, Thomas (Andrew) • M.A., Math
Kim, Jeonghoon • M.S., Applied
Li, Haotian • M.S., Applied
Nguyen, Anthony • M.S., Applied
Nichols, Jeffrey • M.S., Applied
Niu, Wenjun • M.A., Math
Py, Victor • M.A., Math
Ren, Lifeng • M.S., Applied (De Loera)
Wang, Houbo • M.A., Math (Strohmer)

Life After Davis
Lily Silverstein

I graduated in Spring 2019 with a Ph.D. in Mathematics. My dissertation was on computational and combinatorial methods in commutative algebra. Since then, I've been an assistant professor at Cal Poly Pomona. I get to teach a wide range of fun and challenging courses, including undergraduate and graduate algebra. I'm continuing to do research, sometimes with students. COVID was life-altering in both personal and professional ways, but I still submitted, revised, and made progress on several research papers, and wrote software packages for the Macaulay2 computer algebra system.

One of my priorities is mentoring early-career women in math. In 2019, 2020, and 2021, I led summer courses on measure theory for the EDGE program, an immersive month-long program of coursework and community-building for underrepresented women at the start of math Ph.D's. I've met many exceptional students through EDGE, and I wish them the best as they navigate a very challenging but rewarding time of their careers.

In 2020 I became an advisor for Sophie's Circle, the Cal Poly Pomona student chapter of the AWM. The students who started the club named it for Sophie Germain, a mathematician from the 18th century who made important discoveries in number theory. Germain was self-taught and discouraged by her family from choosing a career in math, and she never received the recognition her work deserved. I want to make sure that the women I meet in my field can find the support they need to overcome the discrimination they will face, even in this day, two hundred years after Sophie. This year the club won an MAA Tensor Women & Mathematics Grant which funds, among other activities, a research mentoring program connecting Sophie's Circle students with faculty from the Math and Stats Department at Cal Poly Pomona.

In 2021, I started working with my first master's degree student, Nikita Campos, who is also a BAMM! Scholar. We are making good progress on computational problems in Groebner basis theory, and I'm excited to see what she accomplishes in the future.

Further information on outreach programs can be found online at these websites:

EDGE: A Program for Women in Math
https://www.edgeforwomen.org/

Sophie's Circle, Cal Poly Pomona AWM
https://linktr.ee/SophiesCircle_CPP

Association for Women in Mathematics
https://awm-math.org/

EDGE Sophie's AWM

Life After Davis
Haleigh Miller

I graduated from UC Davis in early 2020 with a B.S. in Applied Math, with focus on Scientific Computing and Computational Math. My undergraduate thesis was titled *Modeling Gene-Tree-Species-Tree Conflict with Migration Using Continuous-Time Markov Chains*, with advisors Bruce Rannala and Gerry Puckett.

After graduation, I was accepted to the Biological and Medical Informatics Ph.D. program at University of California, San Francisco. This was wonderful, as it was where I was hoping to live, and this was my dream graduate program!

I worked for a year remotely as a Junior Specialist at UCSF on developing bioinformatics methods for single-cell RNA-sequencing. In September, I started my graduate program and have been working in lab in person every day. I have even been doing some "wet-lab" work, which is a little overwhelming as a math girl.

After a few more years, I hope to graduate and get a job. For now, I'm in my own studio apartment, living in student housing.

I miss so much from UC Davis! Biking, the farmers market, the Co-op, math classes, my undergraduate research lab in the EVE Department. I miss UC Davis, but I'm excited to learn and use my math degree every day!

Undergraduate Program

by Tim Lewis, Vice Chair for Undergraduate Affairs, and the Undergraduate Program Committee

Math Club

Details on Math Club, including scheduled events and meetings, can be found on Facebook or their website.

FB: facebook.com/groups/ucdmathclub

AggieLife: tinyurl.com/ucd-ag-math

Association of Women in Mathematics, UCD

For more information and meeting times, see the UC Davis AWM website:

http://awm.math.ucdavis.edu/

Undergraduate Research: The Blue Whale IBM

Undergraduate Research: Knots

The 2020-2021 academic year - The year everything was remote. Despite the many challenges that the year presented, the undergraduate program in Mathematics continued to grow and thrive.

The Department of Mathematics awarded 263 degrees (216 majors and 47 minors) – up by 50 from the previous year! 82 students graduated in Mathematics, 71 students graduated in Applied Mathematics, 14 students graduated in Mathematical and Scientific Computation, and 49 students graduated from our Mathematical Analytics & Operations Research major. Fourteen of these graduates received special Department citations, scholarships, and prizes for their exceptional performance, found on our Department Awards page in this newsletter.

Furthermore, many of last year's graduating students went on to graduate school at prestigious institutions, including UC Berkeley and Stanford, and many other graduates went on to jobs as K-12 teachers or got jobs in industry as data analysts and software engineers. These achievements testify to the commitment and dedication of our students.

We began the 2021-2022 academic year by welcoming the largest incoming class in the history of the Mathematics Department. With this large influx, the total number of students in our four majors is now a whopping 1068!

Information Sessions and Advising

The Department of Mathematics places great importance in providing our students with a supportive and encouraging environment throughout their time with us … This starts with good advising.

At the beginning of every academic year, we now host an Orientation Session and an Undergrad Welcome Event. At this fall's online Orientation Session, panels consisting of faculty (Bob Guy, Roger Casals, Eugene Gorsky), Alumni (Victoria Quijano, Oliver Yau, Kyle Chickering), and current students (Rahul George, Sydney Clowdus, Noppakan Sirikul, Ivy Huynh, Emily McPherson, Annie Ngo) provided insight and advice to being a math major at UC Davis and life at UC Davis in general. At the in-person 2021 Undergrad Welcome Event, we discussed the great things that one can do with a major in mathematics. We also talked about the importance of students starting to plan their individual study programs in concert with the staff and faculty advisors as soon as possible. We stressed that we are here to help all our students succeed, and we described the multiple sources of support that are available when needed. … and then we ate good food!

To meet the challenge of advising all of our >1000 majors and the many other students taking our classes, we have a multi-pronged advising approach. Students can make appointments for in-person or online meetings with our faculty or staff advisors, and there is drop-in advising with our staff advisors (online) and peer advisors (online or in-person). We also run a series of Advising Workshops that provide group advising.

On the topic of great advising, I am extremely happy to say that our very own Tina Denena was awarded the university-wide Outstanding Advising Administrator Award, which recognizes administrators or directors who oversee an academic advising program. Congratulations, Tina!

The Department of Mathematics also hosts clubs and events that help to create a welcoming, supportive, and educational environment for our students.

Math Club

The Math Club is dedicated to advancing mathematics by building a strong community among people who enjoy math. In addition to fun math puzzles, snacks, and networking opportunities, Math Club meetings often include short presentations by guest speakers. Meetings are in-person on Wednesdays 5-6PM in MSB 1147. For more information, see contact links at left.

Association for Women in Mathematics

Our student chapter of the Association for Women in Mathematics (AWM) is a group that encourages and supports women, girls, and otherwise underrepresented minorities

to study mathematics and pursue related careers. The AWM hosts networking, professional development, and outreach activities, and is open to everyone - all gender identities, and to faculty, researchers, and non-math majors, as well as to undergraduate and graduate math students. For more information and meeting times, see the links at left.

Final Exam Study Night

We plan to host another Final Exam Study Night at the end of the fall quarter. On Final Exam Study Nights, we invite students to come study with their peers and form spontaneous study groups in a comfortable and welcoming space with delicious snacks. Appearances by our faculty members and graduate students help keep the atmosphere lively and productive.

Career Night

In spring quarter, we plan to hold our annual Career Night. Career Night features mathematicians working in industry, in education/academics, or in public service — usually UC Davis alumni — who talk to our current students about their experiences pursuing their career, what their profession looks like from the inside, what skills are needed for the career, and general career advice. At the 2021 Career Night last spring, which was held virtually, we were lucky to have Dannie Kiel (Patent Law; Applied Math, UC Davis 2020), Gwen McKinley (Postdoctoral fellow; Math, UC Davis 2015), Jiayi (Carrie) Lei (Business Analyst; Applied Math, UC Davis 2019), Jackie Sun (Senior Data Analyst; Math, UC Davis 2018), Boren Xu (Product Growth Analyst; Statistics, UC Davis 2018), and Jason Cox (Data Engineer; Statistics, UC Davis 2016).

Coffee with a Prof

… and how about Pizza with a Prof too? In 2021-2022, we will continue the "Coffee with a Prof" program. Coffee with a Prof was started to facilitate undergraduate students connecting with faculty in a relaxed atmosphere. Students can ask questions of the Professors about careers, life-work balance, studying mathematics, or just about anything else. The coffee is on us! Last year, meetings were held in a virtual setting, but this year, we're moving back to in-person meetings. Because of the popularity of the Coffee with a Prof program, we will be adding a new program this year: "Pizza with Professors".

Undergraduate Research

Every year, many of our majors have the opportunity to take part in undergraduate research experiences (REUs). Last year, six of our students (Trevor Oliveria-Smith, Zhijie Wang, Akshita Sharma, Sameerah Helal, Victoria Quijano Beck, and Zihao Zhu) spun their research experience into their senior theses. Theses topics included techniques to model animal migration, using Kalman filtering for audiovisual tracking, and developing a physical theory of braids. These theses, as well as theses from past years, can be found on our website.

On October 15, we hosted the Mathematics Undergraduate Conference 2021 in person. The conference was organized by our undergraduate research coordinator, Professor Greg Kuperberg. Following a pizza dinner, Professor Joseph Biello kicked things off by describing the benefits of doing an undergraduate research experience and giving tips for how to get started in research. After this introduction, six undergraduates (Trevor Oliveira-Smith, Yuan Chang, Sameerah Helal, Tejes Srivastava, Chen Liang, and Yutong Liang) gave presentations on research projects they conducted over the summer or the previous year. About 75 interested students attended the conference!

Special Topics Courses

Each year, the Department of Mathematics offers a set of special topics courses (MAT 180) that give our undergraduate students the opportunity to learn fascinating material that is beyond our non-standard courses. This year, we are offering three special topics courses. In the fall quarter, Professor Misha Kapovich is giving a course on topics related to the topology and geometry of surfaces; in the Winter, Professor Matthias Köppe will run a course on computer-assisted theorem proving; and in the Spring, Professor Rishi Chaudhuri will give a course on information theory with applications to biology, physics, and machine learning.

Directed Reading Program

Following its successful inaugural year in 2020-2021, the Directed Reading Program (DRP) will continue this year. The DRP is a primarily graduate-student run program that pairs undergraduates and graduate students to study advanced mathematics that are not typically covered in our undergraduate classes. Like our special topics courses, the DRP not only provides undergraduates an opportunity to explore fun new topics; it also provides them a possible entry point to research, graduate school, and beyond. This fall there were over 75 undergrads interested in the DRP. The DRP plans to host a poster session in the winter quarter and a conference for undergraduate presentations in the spring quarter.

New Events and Programs

We are introducing four new events/programs for our undergraduates this year. Besides the Pizza with Professors program mentioned above, we will host Winter Career talks given by the UC Davis Internships and Career Center and TED-like talks by some of our alumni. We are also starting the Student Spotlight program. Each month throughout the academic year, we will be selecting one of our students to be featured on our social

…continued on next page.

Directed Reading Program

To join, either as mentor or mentee:
https://www.math.ucdavis.edu/~drp/

Undergraduate Program

2021

continued from page 15

media channels and in our undergraduate newsletter. It is an opportunity to highlight the achievements of some of our amazing undergraduate students and celebrate their hard work.

New Undergraduate Website

Last spring, we launched a new undergraduate website, and so far, we have received enthusiastic feedback about it. The look, feel, and organization of the website has been completely revamped to make it easier for our undergraduate students to find what they are looking for. A special thanks goes out to Stephanie Zarate, who was key in making the new website happen! If you haven't seen it already, please check it out at the link below.

As you can see, our students, faculty, and staff have been extremely active with a variety of enriching activities that foster learning, engagement, and community, which is especially important in these extraordinary times.

In closing, I want to thank all of the people who make these activities possible. Thank you to the wonderful faculty who volunteer their time and the many students who take leadership positions in our math community! Thanks to our tireless peer advisors (Sydney Clowdus, Annie Ngo, and Noo-pakan Sirikul) and our absolutely magnificent staff! I am especially grateful for the creativity and dedication of my "go-to people" - our undergraduate program coordinator Cydney Matteson and our student services supervisor Tina Denena. All of you make our undergraduate program vibrant and successful

Visit our redesigned Undergraduate Website

Details about our Undergraduate program can be found on our website:

https://www.math.ucdavis.edu/undergrad

www.[redacted].edu

G. Thomas Sallee Mathematics Teaching Award

The G. Thomas Sallee Mathematics Teaching Award honors Professor Emeritus Tom Sallee's 40-year career with the Department, his dedication to being an excellent teacher, and his life goal of developing and supporting talented mathematics educators. The prize recognizes the best teaching of lower-division mathematics courses on an annual basis.

Recipients – Edward Tavernetti, Anastasia Chavez

G. Thomas Sallee Mathematics Prize

This prize recognizes exceptional undergraduate students of junior or senior standing who competed in this year's Spring Mathematics Competition.

Recipient – Feng Cheng
Honorable Mention: Liang Guo

Henry L. Alder Award

Professor Henry L. Alder was at Davis from 1948 till 1994, serving as Department Chair from 1992 to 1994.

Professor Alder was a strong advocate for quality teaching. This award provides support to mathematics graduate students at UC Davis and is given each year to the graduate students in mathematics who are deemed to be the top performing teachers.

Recipients – Matthew Litman, Raymond Chou, Jeff Nichol

William K. Schwarze Scholarship in Mathematics

William Karl Schwarze received a bachelor's degree at UC Davis and went on to become a mathematics teacher in San Francisco. After his death in 1988, a trust he established has donated to the Schwarze Scholarship to be presented today. This award is given to graduate students in Mathematics who have demonstrated outstanding mathematical scholarship and exceptional promise of making a strong professional contribution as a mathematics teacher and educator at the pre-college or college level.

Recipients – Cooper Jacob, Xiaotie Jessie Chen

McCurdy Family Scholarship

The McCurdy Family Scholarship is awarded to undergraduate students in the College of Letters and Sciences at UC Davis. Selection of recipients is based on academic merit and promise. The Scholarship is restricted to students with junior or senior class standing, and may include any undergraduate major offered in the Department of Mathematics.

Recipients – Emily McPherson, Reshmika Singh

Department Awards

Robert Lewis Wasser Memorial Scholarship

Robert Lewis Wasser began studying mathematics at UC Davis in 1991. After his tragic death in an automobile accident in 1993, prior to his Junior year, his grandmother, Vera May Wasser, initiated the Robert Lewis Wasser Endowment in his memory. Its goal is to benefit promising mathematics students at UC Davis.

Recipient – Chen Liang
Honorable Mention: Rahul George

Hazel B. Jacoby Fellowship

The Jacoby Fellowship is awarded by the Department of Mathematics for the purposes of both recruiting intellectually promising graduate students entering their first year of graduate-level study and retaining outstanding continuing graduate students.

Recipients – Kelli Loritsch, Brittney Marsters

Alice Leung Scholarship in Mathematics

Alice Siu-Fun Leung received a Master's degree in Mathematics in 1975 from UC Davis, and remembered this time in her life fondly. This award is given to graduate students in Mathematics who have shown exceptional promise in all aspects of mathematics, including research, scholarship and teaching.

Recipients – Ander Aguirre, Shaofeng Deng

Eric C. Ruliffson Scholarship in Mathematics

Eric Canady Ruliffson attended UC Davis from 1964-1968, where he both loved the study of math and excelled in it. The Eric C. Ruliffson Scholarship in Mathematics is awarded annually to students of junior or senior standing majoring in mathematics.

Recipient – Alina Kotova

Evelyn M. Silvia Scholarship for Future Mathematics Teachers

Professor Evelyn Silvia came to the UC Davis Department of Mathematics in 1973. The focus of Evelyn's passion and unwavering commitment was to develop talented mathematics teachers at the K-12 grade level. This scholarship recognizes a junior or senior with a major in mathematics, applied mathematics or statistics who has shown an interest in teaching mathematics.

Recipient – Emily McPherson

Jim Diederich Scholarship for Mathematics Majors

Made possible from an endowment that was initiated by a contribution by Jim and Paula Diederich. In making this gift, they wished to provide benefit to students whose interest in mathematics is not measured by grade point average alone, but who have special gifts deserving of support

Recipient – Emily McPherson

Yueh-Jing Lin Scholarship in Mathematics

Yueh-Jing (Jean) Lin and Chau-Hsiung (Mike) Chuang are alumni of UC Davis who met while they were graduate students on campus. This endowment provides scholarship support to one or more mathematics students each year who are high-achieving mathematics students, either undergraduate or graduate.

Recipients – "Black" Fushuai Jiang, Alexander Black, Girish Kumar, Jianping Pan, Matthew Litman, Warut Thawinrak, Gregory DePaul, Gal Dimand, Shawn Ho, Victoria Quijano Beck

Galois Group Service Award

The Galois Group represents the voice of graduate students in the Department. Every year, the Galois Group presents an award to recognize outstanding service and/or sustained commitment to the graduate group.

Recipient – Laura Starkston

Departmental Citation Awards

These Departmental awards recognize undergraduate students of exceptional ability who have taken both a very strong selection of mathematics courses and have made substantial contributions to the Department or their program.

Recipients – Xitlalli Jimenez, Shawn Koa Ho, Daniel Sandoval, Akshita Sharma, Oliver Yau

Citation for Outstanding Performance

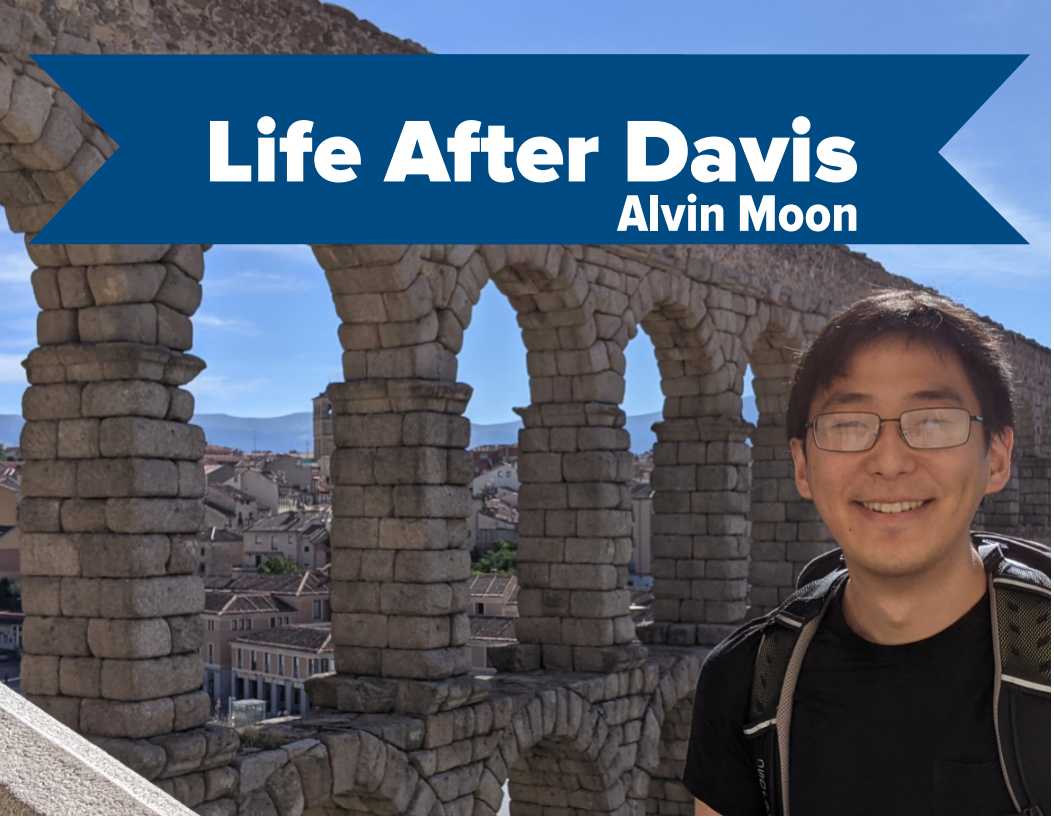
These citations honor undergraduates who have taken a very strong selection of mathematics courses and distinguished themselves with exceptionally high grade point averages.

Recipients – Victoria Beck, Hongrui Li, Trevor Oliveira-Smith, Matthew Sotoudeh, Jared Trok, Yuehe Wen, Hanzhi Zhang, Chenyao Zhu

Honors and Awards

List of past award recipients — plus descriptions of all active endowments, programs, and awards — can be found on our website:

https://www.math.ucdavis.edu/about/donation/



Life After Davis

Alvin Moon

Like several of my friends at UC Davis, I wrote my dissertation from home — in my case, from an apartment in Los Angeles, which I shared with my wonderful partner and a loving cat. I finished my Ph.D. in June 2020. In October, I started a postdoc at the University of Copenhagen, in the QMATH Centre. Since then I have been a fortunate recipient of an EU-funded Marie Sklodowska Curie fellowship, which currently keeps me employed at QMATH working on problems in quantum statistical mechanics.

It's impossible to describe the past year without talking about the pandemic. At the very least of consequences, it introduced a lot of uncertainty in my plans. For example, I didn't know whether I could start my postdoc in Denmark until a few weeks before my flight. But my time at Davis went a long way in helping me deal with that uncertainty. A couple of online weekly meetings organized by Bruno Nachtergaele and Greg Kuperberg helped me stay connected to mathematical research during shelter-in-place in California. After I moved to Copenhagen, Martin Fraas' online seminar kept me from being too isolated during Denmark's second lockdown.

These days, I'm seeing more and more in-person seminars attended by my colleagues at QMATH and the rest of the Department of Mathematical Sciences. In August 2021, we spent a couple of days in Hornbæk discussing math and enjoying the rainy weather. The International Congress on Mathematical Physics met in Geneva this summer. I'm looking forward to resuming collaborations on the projects which drew me to postdoctoral work in the first place. Because travel restrictions are gradually lifting in Europe, I've been able to spend a week at the Complutense University of Madrid working on a problem with collaborators. This was a great trip, especially after so many months working alone!

During my time at QMATH, I will research quantum lattice systems. Lately I have been particularly interested in a concrete class of quantum ground states of valence bond solid models. They've been well-studied since the 1980s but still surprise me with how versatile and relevant they are for understanding ground state phase diagrams. I will also teach and mentor students. Teaching has always been a great part of the job and can only become more enjoyable as instruction resumes on campus.

On a personal note, I am getting married to my wonderful partner this year, and we're looking forward to catching up with our loved ones when we can.

Alumni Update

Kevin Todd Christian

B.S. — 1987

Kevin Christian is Director of Pricing for several tech companies in Silicon Valley, including Infoblox in Santa Clara. As part of the job, he watches marketplace trends, tracking prices, to try to identify places where prices could be adjusted to the benefit of the company.

He also designs weekday crossword puzzles for the New York Times. Kevin's first word search was published in a local newsletter at the young age of 13. His first crossword was published by the Los Angeles times in 2010, getting feedback from Merl Reagle (a 30 year veteran of crossword creation), eventually switching to New York Times in 2013. He finds it a fun, creative outlet for his weekend in the early mornings.

He currently resides in Burlingame, California.

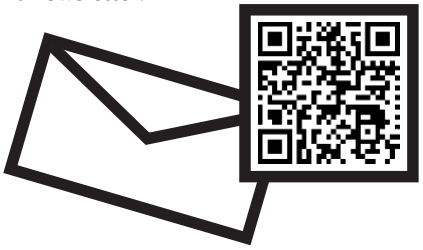
Are you a Graduate?

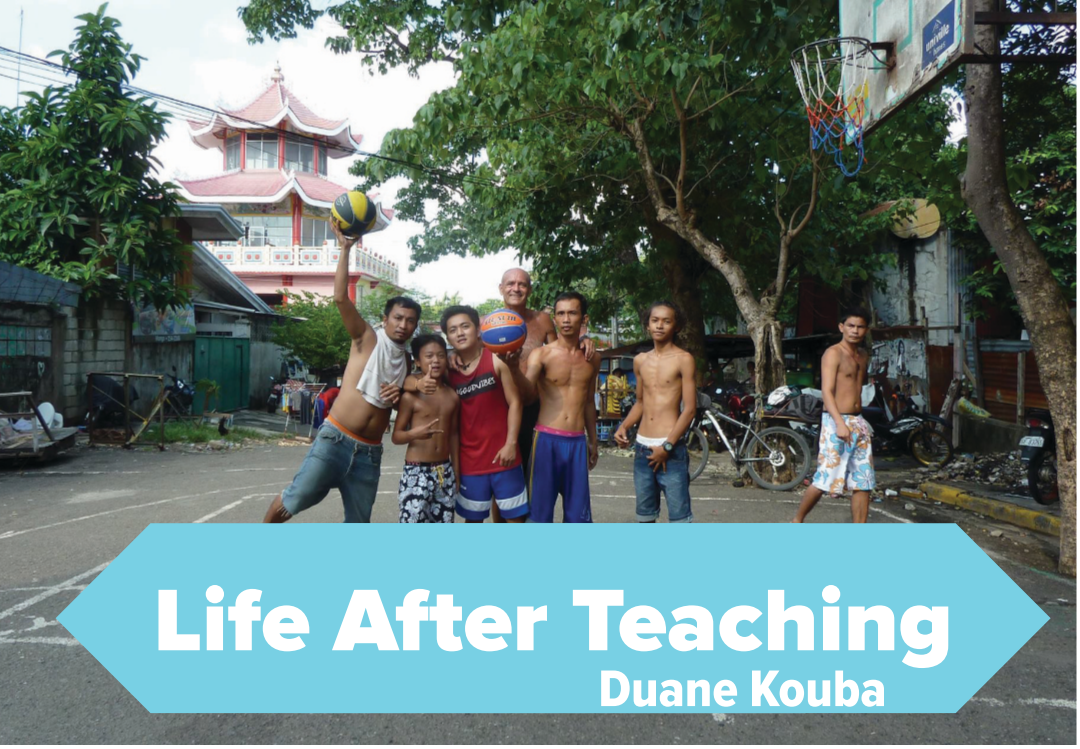
We want to hear from you! Please send us information about yourself so that we can stay in touch and share in your experiences outside of UC Davis.

Please complete our Alumni Questionnaire:
www.math.ucdavis.edu/news/alumni_quest

or send e-mail to:
mso@math.ucdavis.edu

We will do our best to include it in the next newsletter.





Life After Teaching

Duane Kouba

I started my Lectureship in the Department of Mathematics at UC Davis in 1982 and reluctantly retired in the spring 2021. During that time I also spent 18 years as a member of the UC Davis Men's Basketball coaching staff, highlighted by a Division II National Championship in 1998, an exciting four-year transition from Division II to Division I, and becoming a member of the Big West Athletic Conference. It was a long, busy, and rewarding journey with many ups and downs. But without a doubt this was a dream job for me to work in a world-class Department surrounded by award winning researchers, and to be able to teach some of the best and brightest California, U.S., and international students. I was also able to coach some highly talented student-athletes, many of whom have become highly successful professionals and coaches.

I would be remiss if I didn't sincerely thank every Chair who enthusiastically and generously supported my employment and merit reviews over the years: Borges, Mangel, Krener, Alder, Tracy, Hunter, Mulase, Nachtergaele, Hass, Romik, Thompson, and Schilling. There were certainly many other generous faculty members who also befriended, mentored, and advised me. Thank you to all of you for enriching all of my experiences at UC Davis.

Even though I won't be teaching for a while I do have a few academic projects planned. I have two completed rough drafts of calculus papers which I would like to edit and submit for publication. For the past 20 years I have collected survey data from students from all of my classes regarding majors, GPAs, SAT scores, AP courses, and study habits - hours spent studying alone or with groups, use of the Calculus Room, use of technology, use of my course websites, etc. I hope to organize this data, look for trends, and write a report about these trends. I certainly will continue to work on my Calculus.org website, which has given me a great deal of personal and professional satisfaction over the years, adding more problem and solution sets to this widely used website.

Since retirement I have continued to stay in good physical condition with more frequent basketball workouts and mountain biking. I am also spending a bit more time now on Sudoku puzzles and online card games (cribbage and high-low poker) while sipping on coffee at Starbucks. Long neglected organization, painting projects, and repairs have been made to my house since retiring. After travel restrictions are lifted in the Philippines, I want to continue my traveling, teaching, and basketball charity work in Cebu City, where I have spent extended time living for the past ten years pre-COVID.

I deeply miss the daily excitement and energy of interacting with students, staff, and faculty, but I also look forward to the chance to again teach a class at UC Davis from time to time as an Emeritus Lecturer.

Staff Update

by Gladis Lopez, Chief Administrative Officer

It has been so nice and energizing to see so many of you back on campus! We are seeing less students in person in the advising office as our remote advising seems to be their preferred way to meet with student advisors.

We are very proud of Tina Denena who won a well deserved L&S Advising Administrator Award. Matt Silver was promoted from an Administrative Assistant III to an Administrative Assistant IV. Congratulations to both of you!

Cydney Matteson is our Wellness Ambassador as well as an Advisor Mentor in the Academic Advising Mentor Program. Stephanie Zarate finished her 1st year of graduate school and has started her 2nd and final year.

This year we welcomed Vanessa Bravo as our graduate staff advisor. We are very fortunate to have her on board and to have a fully staffed administrative office. As you know, Victoria Whistler, our former graduate staff advisor, retired early this year after working for many years at UC Davis.

We have had several Department events and are now in the full swing of things. We are looking forward to staff events in person such as the Staff Holiday luncheon and our staff BBQ's.

Working remotely during the pandemic has shown that staff can be as productive working remotely as when working in the office. Our staff continues to provide excellent customer service and provide Department administrative support in a very efficient way. Currently we have a hybrid schedule: all staff members are working from home two days a week (with some exceptions). This has worked very well so far and we are waiting for guidance from campus administration to decide the work schedule for Winter and Spring 2022. The staff work schedule can be found on our Department web page.

We continue with our internal Staff Recognition Program. Staff's good performance is recognized with a small token of appreciation — a $30 Trader Joe's gift card. Please send me an email

gylopez@ucdavis.edu

if you would like to nominate staff members for this award. We give 2-3 awards per employee a year.

We are excited about the opportunities that this academic year may bring and look forward to a very productive and successful year.

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