



From the Chair

Another fruitful academic year in the Princeton University Mathematics Department is behind us, and we have many successes to celebrate. I would like to start off by congratulating the class of 2023, as well as the graduate students who have recently completed their PhDs, for their outstanding academic accomplishments, and wish them luck in their pursuit of future goals. I look forward to seeing all you will achieve in your future educational and professional endeavors.

During the 2022-2023 academic year, we were fortunate to welcome Bhargav Bhatt who assumed the inaugural Fernholz Professorship, joint between the Institute for Advanced Studies and Princeton University. The department also saw the addition of two new assistant professors, five new instructors, and nine new researchers, who have made valuable contributions towards our research, teaching, and mentoring goals. As we start the 2023-2024 academic year, we are excited to be joined by another five new instructors and five new researchers, in addition to a new senior faculty member, Will Sawin, who will join the department in January 2024. I would also like to take this opportunity to welcome Ali Zaidi, who joined our staff as a Systems Assistant in March, and Kristen Hubbard, who assumed the role of Business & Grants Manager role in May. I wish all the new and incoming members of our department the very best during your time here at Princeton.

In addition to our many new faces, we also saw the departure of Professor Weinan E, who retired from his position in the Fall of 2022. Professor E received his PhD in mathematics in 1989, and joined the Princeton Mathematics Department and Program in Applied and Computational Mathematics in 1999. After nearly twenty-five years at Princeton and over thirty years in the field of mathematics, he has transferred to emeritus status. His contributions to Princeton, and to the mathematical community as a whole, are immeasurable.

Continued on next page

Announcing a New Course in Math

This Fall, we are piloting a new course, MAT210, One Variable Calculus with Proofs. It aims to bridge the gap between high school style mathematics—which stresses following rules instead of deeper understanding—and advanced mathematical exploration followed by rigorous proofs.

While MAT210 is primarily aimed at prospective math majors, it is also suitable for students who want an introduction to rigorous mathematical thinking. Thus, it may interest prospective philosophy, physics, or math-track economics majors.

The prerequisite for MAT210 is MAT103 (or equivalent). MAT210 covers roughly the same material as MAT104, surveying the main ideas of calculus in a single variable incorporating an introduction to formal mathematical proofs. The course will place equal emphasis on theory (how to construct formal mathematical definitions and rigorous, logical proofs) and on practice (concrete computational examples involving integration and infinite sequences and series). The course will begin with integrals and computing areas using the technique of mathematical induction. We will continue with basic set theory, functions and properties of the real number system.

Senior Lecturer Mark McConnell, who has taught similar courses at a range of schools, is looking forward to teaching the new MAT210.



Aleksa Milojevic, Valedictorian. Read more on page 6.

From the Chair

Chair continued from page 1

As always, our events calendar was quite full over the course of the last year, and attracted a high level of interest from members of the department. In addition to the many diverse seminars conducted throughout the year, we welcomed Bo'az Klartag as our Minerva Distinguished Visitor in the fall, and Mohammed Abouzaid gave a Minerva Lecture series on "Floer homotopy: theory and practice," in the spring. We were also joined by Melody Chan for our Horizons Seminar in April, and we hosted the Elias M. Stein Memorial Conference on campus in June.

I would like to take a moment to highlight a few of the honors bestowed upon our distinguished faculty over the last year. In the fall of 2022, Noga Alon received the Knuth Prize, Bhargav Bhatt was awarded the Nemmers Prize, and Nicholas Katz received the Steele Prize, while June Huh was named a MacArthur Fellow. In the spring, Paul Minter was awarded a Clay Research Fellowship, and Zoltán Szabó received the Phi Beta Kappa Teaching Award. While it is no surprise that the Princeton Math Department is comprised of a stellar group of mathematicians, I nonetheless continue to be impressed by their many achievements.

Each year in the Princeton Math Department brings new and unprecedented challenges and accomplishments, and I am happy to see the continued success of our faculty, students, staff, and alumni. It was lovely to see many of you at our Alumni Reception in May, and I hope you will continue to attend events in the future. Thank you for continuing to maintain relationships with the department, and I look forward to seeing you all soon.

Igor Rodn

Igor Rodnianski, Department Chair

Department Administration

Igor Rodnianski, Chair

János Kollár, Associate Chair

Chenyang Xu, Director of Graduate Studies

Lue Pan, Assistant Director of Graduate Studies

János Kollár, Director of Undergraduate Studies

Jennifer M. Johnson, Associate Director of Undergraduate Studies

Ana Menezes, Undergraduate Placement Officer

Alexandru Ionescu, Senior Advisor

Mark McConnell, Junior Advisor

Kathleen Applegate, Department Manager

Jill LeClair, Graduate Administrator

Michelle Matel, Undergraduate Administrator

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Princeton University, Office of Communications, Daniel A. Day (2018)

New Junior Faculty and Researchers

2023-2024 Faculty Appointments



Fraser Binns
Postdoctoral Research Associate
Manifolds and Cell Complexes
Ph.D. 2023, Boston College



Dominique Kemp
Postdoctoral Research Associate
Harmonic Analysis
Ph.D. 2021, Indiana University,
Bloomington



Giorgio Cipolloni
Associate Research Scholar
**Probability Theory & Stochastic
Processes**
Ph.D. 2021, Institute of Science and
Technology, Austria



Dmitrii Krachun
Instructor
**Probability Theory & Stochastic
Processes**
Ph.D. 2023, University of Geneva



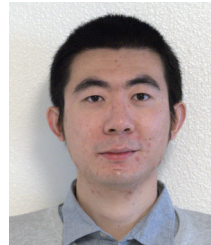
Louis Esser
Instructor
Algebraic Geometry
Ph.D. 2023, University of California,
Los Angeles



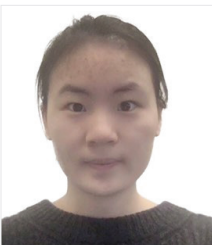
Justin Lacini
Postdoctoral Research Associate
Algebraic Geometry
Ph.D. 2020, University of California,
San Diego



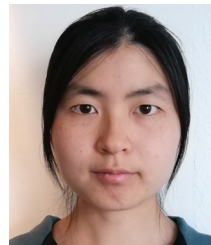
Federico Glaudo
Postdoctoral Research Associate
Partial Differential Equations
Ph.D. 2022, ETH Zürich



Hongyi Liu
Instructor
Differential Geometry
Ph.D. 2023, University of California,
Berkeley



Lili He
Instructor
Partial Differential Equations
Ph.D. 2023, Johns Hopkins University



Mingjia Zhang
Veblen Research Instructor
Number Theory
Ph.D. 2023, University of Bonn

PROMOTIONS



Matija Bucic
Assistant Professor
Discrete Math
Ph.D. 2021, ETH Zürich

Honors and Awards

Faculty and Instructors



Noga Alon

Professor Noga Alon has been awarded the 2022 Knuth Prize, awarded by the ACM Special Interest Group on Algorithms and Computation Theory (SIGACT) and the IEEE Technical Committee on the Mathematical Foundations of Computing (TCMF) "for major research accomplishments and contributions to the foundations of computer science over an extended period of time."



Elliott Lieb

Professor Emeritus Elliott Lieb received the 2023 Kyoto Prize in the mathematical sciences category. Lieb shares this year's prize with Professor Emeritus Ryuzo Yanagimachi, University of Hawai'i at M'noa, and video artist Nalini Malani.



Bhargav Bhatt

Professor Bhargav Bhatt has been named the 2022 Frederic Esser Nemmers Mathematics Prize Recipient "for his revolutionary contributions to algebraic geometry in mixed characteristics through a new synthesis of ideas in topology, algebra, and arithmetic."



Paul Minter

Veblen Research Instructor Paul Minter has been named a 2023 Clay Research Fellow. Minter works in Geometric Measure Theory, tackling regularity and compactness questions for minimal hypersurfaces in Riemannian manifolds.



June Huh

Professor June Huh has been named one of the twenty-five 2022 MacArthur Fellows for "Discovering underlying connections between disparate areas of mathematics and proving long-standing mathematical conjectures."



Igor Rodnianski

Professor and Department Chair Igor Rodnianski shares the American Mathematical Society's 2023 Bôcher Memorial Prize with Frank Merle, Pierre Raphaël, and Jérémie Szeftel. Rodnianski has also received the 2023 Clay Research Award, joint with Frank Merle (IHES, Paris), Pierre Raphaël (University of Cambridge), and Jérémie Szeftel (Sorbonne Université, Paris) in recognition of their profound contributions to the theory of nonlinear partial differential equations.



Nicholas Katz

Professor Nicholas Katz received the 2023 Steele Prize for Lifetime Achievement "for his landmark contributions to number theory and arithmetic geometry." "Katz's fundamental articles and monographs have benefited the mathematical community by opening up new directions of research and illuminating large areas of mathematics."



Zoltán Szabó

The Princeton University chapter of Phi Beta Kappa awarded Professor Zoltán Szabó the Phi Beta Kappa Teaching Award for excellence in undergraduate teaching. Professor Szabó shares this year's award with Agustín Fuentes, Professor of Anthropology.



Ana Caraiani '07

Veblen Research Instructor and NSF Postdoctoral Fellow from 2013 to 2016, received one of the Breakthrough Prize Foundation's New Horizons in Mathematics Prizes for "diverse transformative contributions to the Langlands program, and in particular for work with Peter Scholze on the Hodge-Tate period map for Shimura varieties and its applications."



Joshua Greene *09

Ph.D. graduate, has been selected to receive the 2023 Levi L. Conant Prize. The prize, awarded by the American Mathematical Society, recognizes the best expository paper published in either the Notices of the AMS or the Bulletin of the AMS in the preceding five years.



Maggie Miller *20

Ph.D. graduate, received a Maryam Mirzakhani New Frontiers Prize, which is awarded to women mathematicians who have recently completed their doctorate degrees and produced important results, for her "work on fibered ribbon knots and surfaces in 4-dimensional manifolds."



Melanie Matchett Wood *09

Ph.D. graduate, has been named one of the twenty-five 2022 MacArthur Fellows for her work in combining a breadth of mathematical approaches to reveal new ways to see fundamental properties of numbers.

Freshman Seminars: The First Year

The commencement of the Freshman Seminar Program dates back to 1985. Freshman Seminars are solely available to the first-year class, giving way to the opportunity to enroll in one seminar per term. The opportunities and benefits of seminar-style teaching—the small class size, the close contact between and among students and the instructor, the depth of focus enabled through sustained engagement and conversation—had long been recognized and appreciated at the University (and in higher education more generally). Freshman Seminars are not mandatory but encouraged. Besides providing an in-depth dive into a fascinating topic, students get to know a faculty member well, develop close relationships with a group of students, and gain useful experience with the sorts of reading, discussion, exercises, and writing that Princeton courses require. For the second consecutive year, Assistant Professor Casey Kelleher will teach FRS 140 *Cirque des Mathématiques*. The ultimate goal is to develop both new theories and notations surrounding circus acts including aerial acrobatics, juggling, balancing acts, and magic. The

course will consist of many open-ended research projects as participants build mathematical language as a team.



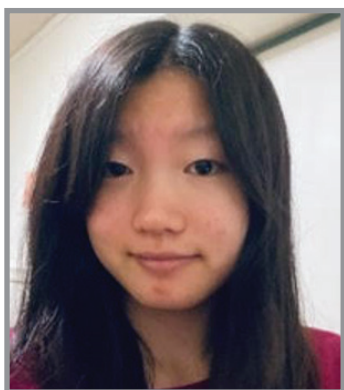
Students in "Cirque des Mathématiques" (FRS 140) analyze circus acts as a way to explore creative applications of mathematics.

Photo by the Office of the Dean of the College

Undergraduate Program

Undergraduate Student Updates

Math Major Joye Chen received Schafer Prize Honorable Mention



Joye Chen, '23

Joye Chen, '23, received an honorable mention from the 2023 Alice T. Schafer Prize, awarded by the Association for Women and Mathematics and named for Alice T. Schafer (1915–2009), one of the founders of AWM and its second president, who contributed greatly to women in

mathematics throughout her career.

The award cites Joye's participation "in the SMALL REU during the summer of 2022 where she worked on hyperbolic knot theory and co-authored three publications (two already on ArXiv and one in preparation). Joye contributed significantly in proving several key results on hyperbolic knotoids and generalized knotoids, in particular giving a complete classification of hyperbolic alternating links in thickened surfaces-with-boundary."

Math Major Aleksa Milojević named Princeton Class of 2023 Valedictorian



Aleksa Milojević '23

Princeton University's valedictorian for the Class of 2023 is Aleksa Milojević, a mathematics major from Belgrade, Serbia. "Aleksa's undergraduate research efforts in the mathematical field of combinatorics contain solutions to some

open problems that leading researchers would be proud to have produced," said Peter Sarnak, Princeton's Eugene Higgins Professor of Mathematics and a professor at the Institute for Advanced Study.

Milojević has won several of Princeton's most prestigious awards, including the Class of 1939 Scholar Prize, awarded to the junior with the highest academic standing for all preceding coursework; the Andrew H. Brown Prize, awarded to outstanding juniors in mathematics; the Shapiro Prize for Academic Excellence (twice); and the Freshman First Honor Prize, awarded to two students in recognition of exceptional achievement.

He has written three papers, including one that "essentially settled" a recent problem Noga Alon and two other mathematicians had posed, said Alon, a professor in Princeton's Department of Mathematics and the Program in Applied and Computational Mathematics. Alon also oversaw Milojević's junior papers, which he said "demonstrated impressive originality, independence and technical ability."

While some scholars might take umbrage at having a question tackled — successfully — by an undergraduate, Milojević and Alon continue to have a warm working relationship.

"I don't think there is much 'ill will' in math, at least the people I interact with," Milojević said. "They usually ask



View of Fine Hall from Jadwin Hall

Continued on the next page

Recap: Undergraduate Studies

John Sheridan and David Villalobos Paz were appointed as part of the new Lecturer Corps program of ODOC. The program works across all departments and focuses on giving structured support and mentoring for all aspects of learning and teaching. This includes both working with undergraduates to succeed in the Princeton learning environment and also with graduate students and junior faculty to develop improved teaching methods.

Villalobos Paz shared, "Last year, we started holding weekly drop-in office hours in the NCW and Forbes dining halls, with the aim of helping all undergraduate students enrolled in any of our math classes. I have also worked extensively with the Emma Bloomberg Center in order to support our growing population of first-generation, low-income students. In Fall 2022 and Spring 2023, this took the shape of a weekly Math Table geared towards SIFP students enrolled in any of our math classes. For Summer 2023, I developed and taught MAT/APC 152, a brand new basic applied math class with the aim of helping incoming FSI students to strengthen their problem-solving and mathematical writing skills, in preparation for our Calculus sequence in the Fall."

Sheridan added, "Through expanded opportunities for engagement, we continue learning our undergraduate students' evolving mathematical needs delivering more targeted solutions. We notice benefits in providing informal occasions (esp. lunch office hours) for students to self-report their concerns to faculty, to build confidence and skill in mathematical communication, and to develop an exploratory mindset for problem-solving -- this will be complemented

Aleksa continued from previous page

questions that they care about, and they like to see them solved."

Milojević recalled an incident his junior year when he posed a question after a combinatorics seminar that the speaker couldn't answer. Late that night, he got an email with the answer from Alon, who'd been at the seminar with him. Milojević was touched by the gesture: "The question wasn't addressed to him, but he thought about it and wanted to reach out to tell me the answer. It was

Undergraduate Student Profile



Matthew Kendall

I am interested in topology and differential geometry. One of my favorite stories is Morse theory and its repercussions which followed in geometric topology and symplectic geometry. I have learned these stories,

and many more, from Professor Ozsváth, Professor Szabó, Professor Hofer, and Professor Zemke. For them, and for all of the faculty who have taught me, I am very thankful. When I came to Princeton, I did not expect to see a vibrant community surrounding the Fine Common Room. Since my freshman year, I have found my closest friends there and perhaps spent too many of my waking hours there. I also enjoy playing the cello and listening to Romantic Era music.

in the coming year with a mathematics study hall focused initially on (but not limited to) MAT201. A key driving goal will remain that of helping students better assess the efficacy of their own learning/preparation and encouraging good study habits."

very unexpected, and it just showcased how interested he is in both teaching students and also in the questions themselves."

For his senior thesis, Milojević used a different branch of mathematics, arithmetic algebraic geometry, to write his own exposition of elementary proofs of the Riemann Hypothesis for curves over finite fields. "This is a very demanding topic for an undergraduate, and I have been very impressed by his mathematical talent, insights and

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Graduate Program

Graduate Student Profile



Sameera Vemulapalli, *23

I recently graduated from Princeton with my Ph.D. and am now a postdoc at Stanford University. My work focuses mainly on number theory and algebraic geometry; nowadays, I think mostly about low-degree number

fields and covers of the projective line.

Princeton was a lovely place to be as a graduate student, both inside and outside the department — I miss it! At first, I was hesitant to attend Princeton because the town is small and quiet, and being from California, I had never experienced a real winter; however, I ended up really enjoying the camaraderie and coziness of the department, the company of the friends I made in Princeton, and I even learned to enjoy the winters (by getting interested in various winter sports).

I'd recommend to any graduate student in the Princeton Math Department to attend the many varied activities in the department (the numerous seminars and seminar dinners, tea, wine and cheese, frisbee, the faculty-student soccer games), but also spend an equal amount of time outside of the department. There's a surprising amount of activity in the area (go to Porchfest, Reunions, explore the little town of New Hope, check out the Catskills, etc.)! To any avid rock climber, I recommend Haycock Mountain, where I spent too much time as a graduate student. In short — I really benefitted from how much there was to do and learn at Princeton, and I hope to make many visits back.

A Message from the Director of Graduate Studies



Chenyang Xu

A distinguishing hallmark of the Princeton Math Department is its exceptional graduate program. Each year, a select cohort of students is carefully chosen from a vast pool of applicants hailing from premier institutions across the globe. This intricate

selection process unfolds in three steps. A committee of professors conducts the initial two rounds of evaluation—this year comprising eight members—while the final list is meticulously crafted during a full faculty meeting. In this academic cycle, we are excited to welcome twelve incoming students, a remarkable feat as half of our top ten candidates chose to join our ranks. Considering the fierce global competition among graduate programs, I, as the Director of Graduate Studies (DGS), am positive about this outcome.

While the recruitment of graduate scholars undoubtedly constitutes a pivotal aspect of my fulfilling role as the DGS, the scope of my responsibilities extends far beyond. Our team consists of the excellent co-DGS Lue Pan and the graduate program administrator Jill LeClair. Jill held the job back when I was a graduate student at Princeton in 2004. Our biweekly meetings are platforms to discuss emerging matters; moreover, Lue and I frequently interact with diverse student groups to ensure that all aspects remain on course. The assistance of the graduate student committee, with representatives from each academic level, is also invaluable. Notably, this committee plays an instrumental role in coordinating the Open House—a two-day event aimed at acquainting prospective graduate students with the multifaceted facets of our department.

Concluding on a pleasant note, on behalf of our team, I extend heartfelt congratulations to our graduating cohort of graduate students. To each of you, I convey my earnest wishes for a brilliant future, and I hope that the cherished memories forged during your time at Princeton continue to serve as a wellspring of inspiration, much as they have for many of us. Fine Hall will forever stand as your academic home.

Recent Ph.D.'s

NAME	ADVISER	THESIS TITLE	ORIGINAL PLACEMENT/POSITION
Alonso Rodríguez, Raúl	Skinner	Construction of anticyclotomic Euler systems using diagonal cycles	UC San Diego; Postdoctoral Research Associate
Alweiss, Ryan	Alon	Challenges and results in extremal combinatorics	Trinity College, Cambridge; Junior Research Fellow
Ballinger, William	Szabó	Knot concordance and matrix factorizations	Harvard University; Benjamin Peirce Fellow, Research Scientist
Chen, Eric Y.	Venkatesh (IAS)	Derived structures in the duality of automorphic periods	EPFL, Lausanne, Switzerland; Postdoctoral Researcher
Deng, Calvin	Bhargava	Elliptic curves ordered by Faltings height	unknown
Elboim, Dor	Sly	Challenges in probability and mathematical physics	IAS Member ('23-'24)/Stanford University; Postdoctoral Scholar
Giri, Vikram	De Lellis (IAS)	Dissipative intermittent Euler flows satisfying the local energy inequality	ETH Zürich; Postdoctoral Researcher
Hamann, Linus	Hansen (Natl Univ of Singapore)/Skinner	Geometrization of the local Langlands and the cohomology of Shimura varieties	Stanford University; NSF Postdoctoral Research Fellow ('23-'24)/Harvard University; Benjamin Peirce Fellow
Lee, Sanghoon	Chang	Some elliptic PDE problems in conformal geometry	Korean Institute of Advanced Study (KIAS); Research Fellow
Lyu, Shiji	Kollár	Splinter-type singularities via ultra-power	University of Illinois Chicago (UIC); Research Assistant Professor
Ma, Xiao	Ionescu	The wave kinetic theory of three wave and four wave models	University of Michigan; Donald J. Lewis Research Assistant Professor
Prasad, Rohil	Hofer (IAS)	Symplectic dynamics: Invariant measures, closing lemmas and equidistribution	UC Berkeley; Miller Research Fellow
Ryoo, Seung-Yeon	Naor	On the sharpness of the Assouad embedding theorem for finitely generated groups of polynomial growth and nilpotent Lie groups	Caltech; Postdoctoral Scholar Teaching Fellow
Vemulapalli, Sameera	Bhargava	Successive minima of orders in number fields	Stanford University; NSF Postdoctoral Research Fellow ('23-'24)/Harvard University; Benjamin Peirce Fellow
Wang, Zhihan	Marques	Singular structures and generic regularity for minimal hypersurfaces	University of Chicago; L.E. Dickson Instructor

Events

2022-2023



Minerva Lectures

The department hosted the Minerva Lectures series in the spring of 2023. Mohammed Abouzaid, Professor at Stanford University, delivered a talk on "Floer homotopy: theory and practice." His primary research interest is in structures arising from studying Floer theory on symplectic manifolds and their applications. Abouzaid has received awards such as the Invited ICM Lecture (2014) and New Horizons Prize (2017).



Minerva Distinguished Visitor

Professor Bo'az Klartag, Weizmann Institute of Science, Israel, spent the fall semester of 2022 as our Minerva Distinguished Visitor at Princeton. This position allows a leading mathematician to spend several months in the department interacting with our faculty and students. While here, Klartag gave a five-part Minerva Minicourse on Convexity in High Dimensions, which can be found at <https://www.youtube.com/user/princetonmathematics>.

Photo by Andrea Kane



Women and Mathematics

The conference, "Patterns in Integers: dynamical and number theoretic approaches," took place at Princeton University and the Institute for Advanced Study, May 21-26, 2023. The Department of Mathematics hosted Women and Math Princeton Day on May 24 at Fine Hall. The event featured a full day of incisive lectures and an engaging panel discussion, "A Day in the Life," followed by a well-received walking tour of historical information, fun facts, and dinner in downtown Princeton. The exchange of ideas and insights from the distinguished speakers, panelists, and attendees aided in making this event a success.

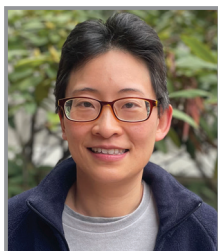
SPEAKERS:

Maria Chudnovsky, Princeton
Catherine Hsu, Swarthmore College
Casey Kelleher, Princeton
Jennifer Li, Princeton
Leila Sloman, Freelance Writer
Maranda Tomlinson, IDA CCR-P

Sameera Vemulapalli, Princeton
Katy Woo, Princeton

ORGANIZERS:

Wei Ho, Princeton
Maria Chudnovsky, Princeton
Casey Kelleher, Princeton
Sarah Peluse, Princeton



Melody Chan



Mike Hill



Juliette Bruce

Noetherian Ring Lecture Series

This past year, the Noetherian Ring has continued the Noetherian Ring lecture series, which features Princeton and IAS faculty presenting their research areas in an accessible way to undergraduate and graduate students. Additionally, the Noetherian Ring joined forces with the IAS to celebrate mathematics on May 12 with a showing of the film "Olga Ladyzhenskaya."

Horizons Lectures

The department's Climate and Inclusion Committee organizes the Horizons Lectures Series. The series consists of two events—a research colloquium and a seminar discussion on the societal impacts of the mathematics profession with the following goals:

- To discuss issues of diversity and inclusion in STEM fields.
- To provide career advice to graduate students and junior faculty.
- To promote the work of mathematicians from underrepresented groups.

The Spring 2023 Horizons Lectures Series took place throughout the week of April 24 with Horizons Lecturer Melody Chan and panelists Mike Hill and Juliette Bruce. Associate Professor Melody Chan of Brown University provided a Department Colloquium talk on moduli spaces in tropical geometry. Mike Hill, UCLA, delivered an algebraic topology talk on Equivariant approaches to chromatic homotopy. Juliette Bruce, Brown University, provided an algebraic geometry talk on the top-weight cohomology of A_g . Together, they shared a candid discussion of queer perspectives in mathematics, highlighting the stories and journeys of three LGBTQ+ mathematicians. All events were well attended by students, faculty, staff, and the math community.



Noetherian Ring Movie Night, May 12

Photo by Mira Gordin

"The Spooky Quantum Phenomenon You've Never Heard Of"

This article includes work by **Professor Emeritus, Simon Kochen**.
<https://www.quantamagazine.org/the-spooky-quantum-phenomenon-youve-never-heard-of-20220622/>

Visit our website for detailed and updated information on all upcoming events at

math.princeton.edu

Events

2022-2023 Continued

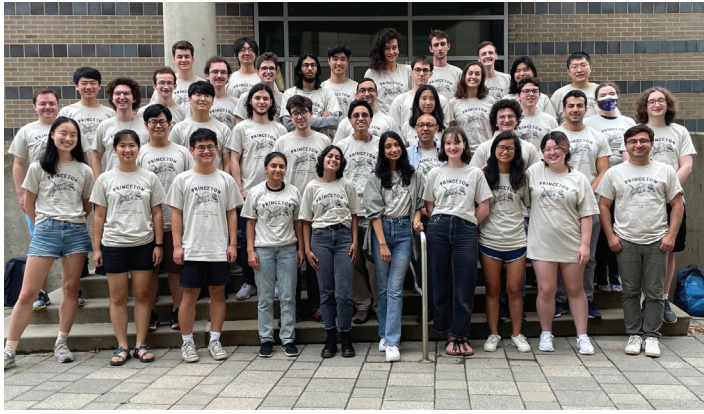


Photo by Jill LeClair

NSF-RTG Summer School in Geometry and Topology

The NSF-RTG Summer School in Geometry and Topology took place from July 2-21, 2023. It was a three-week intensive program for 40 advanced undergraduates and early-stage graduate students from across the country as well as from Princeton. The program included geometry and topology courses, emphasizing invariants relevant to 3- and 4-dimensional manifolds and knots within them. In addition, the second and third weeks included a three-day mini conference covering recent research in areas related to the courses.

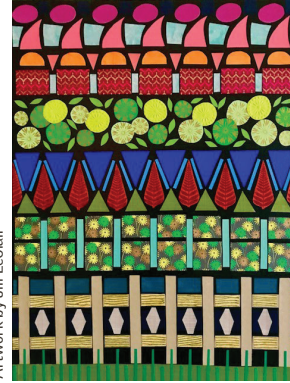
Instructors:

- David Gabai
- Jonathan Hanselman
- Peter Ozsváth
- John Pardon
- Zoltán Szabó
- Shira Tanny
- Andrew Yarmola
- Ian Zemke

Conference Organizers:

- David Gabai
- Jonathan Hanselman
- Anubhav Mukherjee
- Patrick Naylor
- Peter Ozsváth
- Zoltán Szabó
- Shira Tanny
- Ian Zemke

Department Spring Recital April 19, 2023



Artwork by Jill LeClair

This marks the first in person production since 2019. We extend our appreciation to Jill LeClair, Graduate Administrator, for the exceptional efforts in organizing the music recital at Taplin Auditorium. The program included nine classical, folk and pop songs, performed by undergraduates Jack Gallahan, Joye Chen, Matthew Kendall, and Owen Yang; graduate students M. Alper Gunes, Myeonhu Kim, Kevin Ren; postdocs Dallas Albritton, Agustin Moreno (IAS), Instructor Alan Chang; Senior Lecturer Mark McConnell, Professor Peter Ozsváth, and Visiting Graduate Student Anthony Coniglio.



Photo by Jill LeClair



Photo by Jill LeClair



Aleksa continued from page 7

mature approach to this project," said Sarnak, his adviser. "He is well on his way to writing what I am sure will be an outstanding thesis, one that will be used in future expositions and graduate courses around the world."

Milojević's love of mathematics reaches back to his childhood. His grandfather was a math teacher, and his parents are engineers. He excelled in math competitions as a student in Serbia, winning multiple medals in the International Mathematics Olympiad and in the International Physics Olympiad, and he has participated in many outreach efforts at Princeton, including directing the Princeton University Mathematics Competition (PUMaC), a day-long math contest for more than 500 participating high-school students.

He loves sharing his joy in math. A member of Mathey College, Milojević remembers a moment when a neighbor was struggling with an intro math class and asked for a peer tutor. Milojević offered to help. That student is now a math major and tutoring younger students. "It was very fulfilling to see how they transformed from someone that wasn't sure they could do math to someone who not only wants to do math but wants to foster it in younger people," Milojević said.

In addition to fond memories of the department — especially the daily Math Tea in the Fine Hall Common

Room — one vivid memory came from spring 2021, when he and his friends were newly back on campus after the COVID-19 shutdown. The dining halls were still closed, but his friends were determined to celebrate his birthday. "They bought a cake, and we ate it outside, at separate tables," Milojević recalled. "We were probably freezing — it was mid-March, and I remember it was quite cold — but it's a very warm memory for me."

At Princeton, Milojević also took courses on Russian literature and the history of Eastern Europe. "Serbia is not far from Russia," he said. "Some parts of our culture are similar, and the religion is the same as well, so it was very interesting for me to learn about Eastern Europe from the U.S. perspective."

He admits the prospect of speaking before his fellow graduates at Commencement is a bit daunting. "Given how diverse the class is, it's very hard to encapsulate all the perspectives that the students have," he said.

After graduation, Milojević will head to ETH Zürich, which has one of the foremost math programs in the world, to pursue a Ph.D. in combinatorics.

"He is clearly on track to become a world-leading mathematician, teacher and mentor," Sarnak said.

[Liz Fuller-Wright, Office of Communications](#)
[Jamie Saxon, Office of Communications](#)

Math Club

The Princeton Math Club has been back in full swing over the last year with faculty colloquia, advising events, and monthly game nights. This year, they hosted seven colloquia from faculty on topics including Universal Graphs, Noether's Theorem, and Algebraic Varieties. They began a tradition of Senior Symposia that allowed graduating seniors to present their theses. Math Club members and many others gathered once a month for Friday board game nights in the Fine Common Room to enjoy plenty of pizza, bubble tea,

and intense games ranging from anagrams to Scythe to our favorite of all, penguins. PUMaC problem writers worked throughout the year to develop and test-solve questions for their competition, which was a smashing success this past April, with over 50 high school teams traveling to compete. The Math Club revived the end-of-year math club banquet for the first time since before the pandemic, and they look forward to continuing many activities this fall.

Events

Upcoming Events

Group Theory and Number Theory: Interactions

October 16–20, 2023

A Conference in Honor of
Tiep's 60th Birthday

**McDonnell Hall A02
Princeton University**

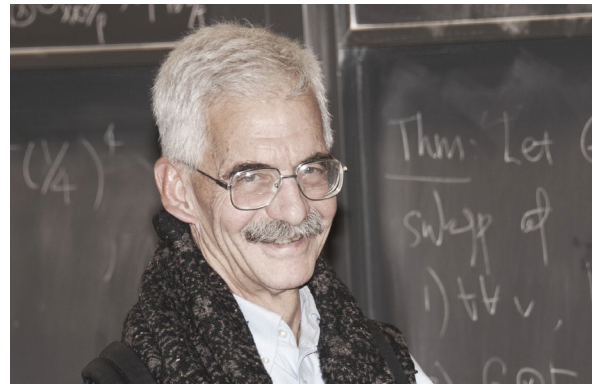
Please find more information,
at <https://sites.google.com/view/tiep60conference>.

Speakers:

Manjul Bhargava, Princeton
Tim Burness U. Bristol
Persi Diaconis, Stanford
Florian Herzig, U. Toronto
Nguyen Hung, U. Akron
Radha Kessar, U. Manchester
Alexander Kleshchev, U. Oregon
Michael Larsen, Indiana U.
Martin Liebeck, Imperial College
Alex Lubotzky, Hebrew U.
George Lusztig, MIT
Gunter Malle, Technische U.
Peter Sarnak, Princeton
Aner Shalev, Hewbrew U.
Britta Späth, Bergische U.
Jack Thorne, U. Cambridge
Geordie Williamson, U. Sydney
Zhi Wei Yun, MIT

Organizers:

Bob Guralnick, USC.
Nick Katz, Princeton
Gabriel Navarro, U. de València
Mandi A. Schaeffer Fry, U. Denver



Conference on the Occasion of
Nicholas Katz' 80th Birthday

Monodromy and Its Applications

**McDonnell Hall A02
Princeton University**

December 7–9, 2023

This International Conference discusses the general topic of monodromy. The main theme of the conference will be the key role of monodromy in all its incarnations: classical and l -adic, local and global, arithmetic and geometric, applications of it in number theory and algebraic geometry, and its connections to group theory and representation theory. In recent years there have been a number of exciting developments in this area. These include the complete classification of the finite (almost quasi) simple groups that occur as monodromy groups of hypergeometric sheaves by Katz, Rojas-León and Tiep, the proof of many cases of the Putman-Wieland conjecture by Landesmann and Litt, the calculation of Tannakian monodromy groups in new settings by many mathematicians and their applications to generalizations of Shafarevich's conjecture by Lawrence and Sawin, the proof of a relative analogue of Grothendieck's period conjecture for a family of varieties by Bakker and Tsimerman, and the proof of the unbounded denominators conjecture by Calegari, Dimitrov, and Tang. The conference will discuss developments related to these and other manifestations of monodromy in mathematics. Please find

Katz continued on the next page

Upcoming Events

more information at:
<https://www.math.princeton.edu/katz80>.

Speakers:

Ana Caraiani, U. Bonn
Hélène Esnault, FU Berlin
Ofar Gabber, IHES
Robert Guralnick, University of Southern California
Mark Kisin, Harvard
Emmanuel Kowalski, ETH Zürich
Aaron Landesman, MIT
Michael Larsen, Indiana Univ. Bloomington
Gérard Laumon, Paris Sud
Wanlin Li, Washington University in St. Louis
Lillian Pierce, Duke
Will Sawin, Columbia
Mark Shusterman, Weizmann Institute
Yunqing Tang, Berkeley
Jacob Tsimerman, Toronto

Organizers:

Lillian Pierce, Duke
Peter Sarnak, Princeton
Will Sawin, Columbia
Pham Huu Tiep, Rutgers

Evening Public Lecture

Cynthia Dwork, Harvard

**McCosh Hall | Room 50 | 5:30 pm
December 7, 2023**

Minerva Distinguished Visitors

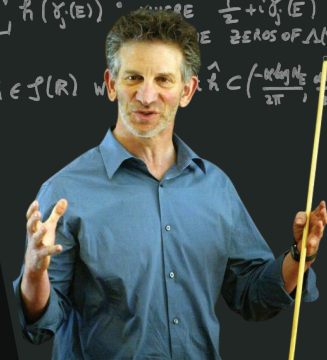
The Distinguished Visitor is department appointment allowing top mathematicians to pursue and share ongoing projects with colleagues at Princeton.

Fall Semester 2023:

Tarek Elgindi, Duke University
Alexander Lubotzky, Weizmann Institute and
The Hebrew University
Felix Otto, Max Planck Institute for Mathematics
Pierre Raphael, University of Cambridge

Visions in Arithmetic and Beyond

$$\sum_j \hat{h}(\gamma_j(E)) \cdot \text{where } \frac{1}{E} + i\gamma_j(E) \\ \text{ZEROS OF } \Lambda(s, E) \\ \hat{h} \in \mathcal{F}(\mathbb{R}) \text{ with } \hat{h} \in C\left(\frac{-\log N_E}{2\pi}, \frac{\log N_E}{2\pi}\right)$$



**CELEBRATING
PETER SARNAK'S
WORK AND IMPACT**

JUNE 3-7, 2024

Co-hosted by the
Institute for Advanced Study
and Princeton University

INVITED SPEAKERS

Manjul Bhargava, Princeton University
Frank Calegari, University of Chicago
Simion Filip, University of Chicago
Larry Guth, MIT
Elon Lindenstrauss, Hebrew University
Michael Magee, Durham University
Melanie Matchett Wood, Harvard University
James Maynard, University of Oxford
Curtis McMullen, Harvard University
Paul Nelson, Aarhus University
Sarah Peluse, University of Michigan
Will Sawin, Columbia University
Daniel Spielman, Yale University
Terence Tao, UCLA
Jacob Tsimerman, University of Toronto
Maryna Viazovska, EPFL
Horng-Tzer Yau, Harvard University
Tamar Ziegler, Hebrew University

ORGANIZERS

Alex Gamburd, The Graduate Center, CUNY
Nick Katz, Princeton University
Hee Oh, Yale University
Kannan Soundararajan, Stanford University
Akshay Venkatesh, Institute for Advanced Study

For more information and registration visit:
ias.edu/math/events/visions-in-arithmetic-and-beyond

Organized in partnership with the Clay Mathematics Institute. We also thank the American Institute of Mathematics for their financial support.



Minerva Lecture Series

Benson Farb, University of Chicago

**McDonnell Hall A02 | 4:30 PM – 5:30 PM
February 5 – 9, 2024**

Women and Mathematics

— Princeton Day

**Fine Hall 314 | 10:00 AM – 5:30 PM
May 22, 2024**

Alumni Open House

Friday, May 24, 2024 | 2:00PM
Fine Hall | 3rd Floor Common Room

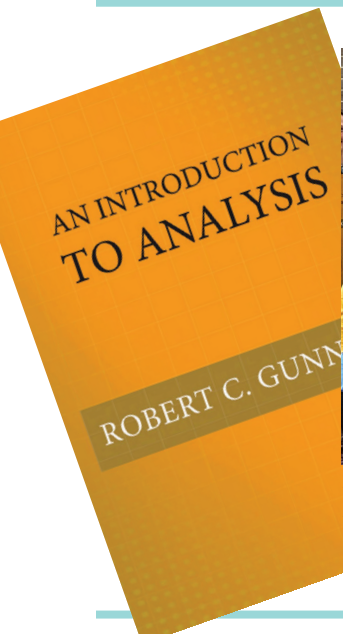


Photo by Adele Peng

Math Club 2022–2023

Pictured is the math club at their end-of-the-year banquet. They creatively designed their custom t-shirt based on the textbook cover of An Introduction to Analysis by Professor Emeritus Robert C. Gunning.



MAT 218 last day of class conducted outdoors on a beautiful spring day

Photo by Alan Chiang