MATHEMATICS + BERKELEY

Newsletter of the Department of Mathematics at the University of California, Berkeley

FALL 2015

MESSAGE FROM THE CHAIR

Greetings to the Friends of the UC Berkeley Math Department:

I have been serving as Interim Chair of the Mathematics Department since July 1 of last summer and have been immersed in lots of great departmental happenings over this past summer and fall. I am continually grateful during my caretaker regime to Mike Christ, Fraydoun Rezakhanlou and Jon Wilkening for serving as the respective vice chairs of faculty, undergraduate and graduate affairs, and to Tom Scanlon for serving as Equity Advisor. These jobs have become increasingly important over the years, as navigating the UC administrative environment becomes more and more complex.

Breakthrough Prize

A few weeks ago we were all thrilled when Ian Agol won a Breakthrough Prize in Mathematics, awarded at a gala ceremony in Silicon Valley that was followed by the Breakthrough Prize Symposium held the next day on the Berkeley campus.

Interim Chair Craig Evans

Many thanks to Maciej Zworski for acting as the departmental liaison to these festivities. Ian won a lot of money, but the really key question is whether he also gets a parking space: fevered negotiations continue at the highest campus levels.

Curriculum

This fall has seen as well the continued roll-out of the new "mathematics for the life sciences" courses Math 10AB, currently serving about 700 students and growing. This class, initiated by Lior Pachter, is an extremely ambitious introduction to calculus, combinatorics and probability/statistics methods for future biology majors. I am very proud that the Math Department, although experiencing budget cuts, has nonetheless been able to create this exciting new class.

And while the department has received varied media coverage this year, I also want to make it clear that our priority is to continue to provide high quality teaching of mathematics at all levels.

Thanks

I thank those of you who have supported the Berkeley Math Department in the past, and encourage those who may be considering donating to us in the future. Since both the State of California and the federal government continue cutting back their support of higher education, it is thanks to contributions from alumni and friends that we have been able to compete with private peers that are better-funded. We aspire to maintain our standing as the top mathematics department in a public institution in the world, and we will.

The new chair, Martin Olsson, begins his term next summer.

Best wishes,

Craig Evans, Interim Chair

Craig Evans (PhD UCLA 1975) has been a member of the UCB mathematics faculty since 1989. He is a member of the National Academy of Sciences, holds the Class of 1961 Chair in Undergraduate Education, and wrote the influential graduate textbook "Partial Differential Equations." Evans became Interim Chair on July 1, 2015 and will end his term on June 30, 2016.

Vice Chairs Mike Christ, Fraydoun Rezakhanlou, and Jon Wilkening

Martin Olsson

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IAN AGOL WINS 2016 BREAKTHROUGH PRIZE

Ian Agol speaking at the Breakthrough Symposium. (Photo: UC Berkeley / ETS)

The 2016 Breakthrough Prize in Mathematics was recently awarded to our colleague Ian Agol, for "spectacular contributions to low dimensional topology and geometric group theory, including work on the solutions of the tameness, virtual Haken and virtual fibering conjectures."

Endowed with a $3 million award, the Breakthrough Prizes are among the world's highest profile awards in fundamental sciences. The prizes were presented on November 8th, 2015 at a star-studded gala hosted by Seth MacFarlane; the award presenters included Russell Crowe and Hilary Swank.

Ian Agol's field, topology, is the branch of mathematics that studies the "shape" of spaces, treating as identical spaces that can be continuously deformed into each other, as opposed to geometry which studies concepts such as distance and curvature that are not preserved by such deformations. Agol's work is the culmination of a research program begun by William Thurston (who obtained his PhD in our department in 1972 and was a faculty member at Berkeley from 1991 to 1996). Thurston's seminal 1982 paper formulated key conjectures about the interaction between geometry and topology in 3 dimensions – specifically, how 3-dimensional manifolds are built from elementary pieces, and how these elementary pieces themselves behave. A major milestone in Thurston's program was reached in 2003, when Russian mathematician Grigory Perelman (who was a Miller Fellow at Berkeley in the 1990s) proved the geometrization conjecture, for which he was awarded (and declined) a Fields Medal and a Millennium Prize. The geometrization conjecture states that all 3-manifolds can be cut along spheres and tori into pieces which are quotients of one of eight model geometries by discrete group actions. The richest geometry is that of hyperbolic 3-manifolds (quotients of hyperbolic 3-space), i.e., those which carry a metric of constant negative curvature.

Agol's work proves two key conjectures of Thurston regarding the structure of hyperbolic 3-manifolds: the virtual Haken and virtual fibering conjectures. A 3-manifold is said to be Haken if it contains a properly embedded incompressible surface; this allows the manifold to be understood by iteratively cutting it along surfaces. Even better, a 3-manifold is said to be fibered if it can be expressed as a surface bundle over the circle, or equivalently, if it can be obtained by taking the product of a surface with an interval and gluing the surfaces at each end of the interval together. Not every hyperbolic 3-manifold is Haken or fibered. However, the virtual Haken and fibering conjectures, proved by Agol, state that every hyperbolic 3-manifold admits a finite cover (i.e., another manifold which wraps itself nicely around the given one) which has the requisite property. Agol's results complete the core part of Thurston's program for 3-manifolds, and have been rightfully acclaimed as the most important development in the field in the past decade.

Ian Agol obtained his PhD in 1998 from UC San Diego under Michael Freedman. He was a faculty member at the University of Illinois at Chicago from 2001 until 2007, when he became Associate Professor in our department; he was promoted to Professor in 2012. Agol's work has earned many accolades, including the 2012 Senior Berwick Prize and the 2013 Oswald Veblen Prize in Geometry; he was a plenary speaker at the 2014 ICM.

Breakthrough Prize Symposia

On November 9th, UC Berkeley hosted Breakthrough Prize Symposia on life sciences, fundamental physics, and mathematics, featuring the winners of the 2016 Breakthrough Prizes and other leading scientists. Besides Breakthrough Prize laureate Ian Agol, the Mathematics Symposium featured talks by our colleagues Lauren Williams, David Nadler and George Lakoff, as well as Sourav Chatterjee of Stanford, while our own Maciej Zworski represented mathematicians in a cross-disciplinary panel discussion.

DEPARTMENT NEWS

Distinguished Lectures

- The 2014-15 Serge Lang Undergraduate Lecture was given on October 16th, 2014 by Tony DeRose of Pixar Animation Studios, on "Math in the Movies." For 2015-16, Brian Conrad of Stanford University speaks on December 2nd, 2015 on "The ABC Conjecture."

- The 2015 DiPerna Lecture was given by Vladimir Sverak of the University of Minnesota on January 22nd, 2015, on "PDE Aspects of 2D Incompressible Flows."

- The 2015 Alfred Tarski Lectures were given by Julia Knight of the University of Notre Dame. The series of three lectures, given on March 30th and April 1st and 3rd, was on "Computability and Complexity of Mathematical Structures."

- The 2014-15 Chern Lectures were given by Fields Medalist and Shiing-Shen Chern Visiting Professor Ngô Báo Châu, of the University of Chicago, on November 12–14th, 2014. The talks were entitled "Endoscopy," "The Fundamental Lemma," and "Cohomology of the Hitchin fibration and more general fibrations."

- The Fall 2015 Bowen Lectures were given by Jacob Lurie, of Harvard University, on November 2nd, 3rd and 4th. The talks were entitled "Cohomology Theories, Rings, and Fields", "Representation Theory in Intermediate Characteristic", and "Roots of Unity in Intermediate Characteristic."

Faculty Honors

- Professor Ian Agol received the 2016 Breakthrough Prize in Mathematics.

- Professors Martin Olsson and Nicolai Reshetikhin received 2015 Simons Fellowships, while Professor Ian Agol became a Simons Investigator.

- Professors Richard Borcherds and Craig Evans were elected to the National Academy of Sciences.

- Professors Edward Frenkel and Daniel Tataru were elected to the American Academy of Arts and Sciences.

- Professors Emeriti Alexander Chorin and the late David Blackwell were 2014 recipients of the National Medal of Science.

MATH 10 REACHES A MILESTONE

We are proud to report that the enrollment in Math 10 (Methods of Mathematics: Calculus, Statistics, and Combinatorics) has more than doubled year over year, to exceed 700 this Fall. Math 10 is a year-long sequence offering a fresh perspective on twenty-first century mathematics to students who intend to major in the life sciences. Unlike "Calculus for Biology" classes at other institutions, Math 10 does not merely add examples from biology to an existing course. Instead, it combines in a unique manner elements of calculus, statistics and discrete mathematics, to cover a wide range of ideas from the mathematical sciences that are relevant for modern biology and medicine. The course has gone a long way since it was launched by Professor Lior Pachter in 2011-12 as a pilot with 50 students. It is now required by all biology majors, and with a total enrollment in excess of 700 in the lectures taught this Fall by Profs. Craig Evans and Richard Bamler, Math 10 nearly matches the scale of our calculus sequences Math 1 and 16.
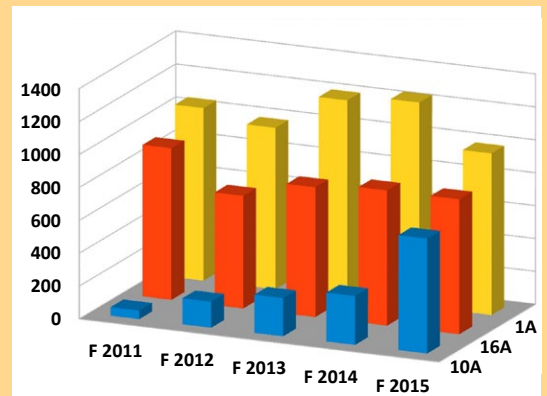
Math 10A, 16A and 1A Fall semester enrollments, 2011-2015

Prof. Craig Evans teaches Math 10A. (Photo: Keegan Houser)

- Assistant Professors Richard Bamler, Lin Lin and Vivek Shende received 2015 Sloan Research Fellowships.

- Professor Olga Holtz became a Fellow of the American Mathematical Society.

- Professor John Steel received the Hausdorff Medal of the European Set Theory Society.

- Associate Professor Lauren Williams won the 2016 AWM-Microsoft Research Prize in Algebra and Number Theory.

- Professor James Demmel received the 2014 Paris Kanellakis Theory and Practice Award of the ACM.

- Professor Alan Schoenfeld received the 2014 Mary P. Dolciani Award.

- Professor Maciej Zworski received a 2014 Distinguished Faculty Mentor Award.

- Professor Bernd Sturmfels received a honorary doctorate from the University of Frankfurt, while Professor Dan-Virgil Voiculescu received one from the University of Waterloo.

- Professor Denis Auroux was awarded the 2014 Noyce Prize for excellence in undergraduate teaching.

- Professor Joseph Wolf was elected to Argentina's Academia Nacional de Ciencias.

- Professor Arthur Ogus was honored with a conference at IHES on the occasion of his 70th birthday.

- Morrey Visiting Assistant Professor Yan Zhang received the department's 2014-15 Distinguished Undergraduate Teaching award.

GRADUATE PROGRAM NEWS

Prof. Jon Wilkening, Vice Chair for Graduate Affairs

Our graduate program remains one of the top rated graduate programs worldwide (in the most recent US News ranking of math graduate programs we tied for third place), and *the* top graduate program among public universities in the United States. The excellence, energy, and creativity of our graduate students continue to be key drivers of the success of the department in research and teaching.

This past year we welcomed 33 new students to our PhD program, nine of whom were international students. The entering cohort was selected from an extraordinarily talented group of applicants, and includes some of the most promising young mathematicians in the country and worldwide.

Last year we awarded 33 PhDs and 4 Masters degrees. Many of these degree recipients went on to academic postdoctoral positions in mathematics, including prestigious positions at many of the top institutions around the world. We also saw several of our graduate students take their mathematical skills into industry positions.

Our graduate students have won numerous awards and fellowships; several of them were also honored with departmental prizes at last year's commencement ceremony.

STUDENT AWARDS

Graduate Student Honors

- **Shamil Shakirov** received the 2014-15 Herb Alexander Prize, awarded for an outstanding dissertation in pure mathematics.
- The 2014-15 Bernard Friedman Memorial Prize in Applied Mathematics was awarded to **Benjamin Preskill.**
  - **Piotr Achinger** and **Ralph Morrison** received the Kenneth Ribet & Lisa Goldberg Award in Algebra.
  - **Benjamin Harrop-Griffiths** was awarded the 2014-15 Nikki Kose Memorial Teaching Prize.
  - **Thunwa Teerakarn** received a 2014 Teaching Effectiveness Award.
  - **Brian Cruz, Kevin Donoghue, Benjamin Harrop-Griffiths, Donggyu Lim, Dominique Maldague, Saad Qadeer, Kyle Russ-Navarro, Moor Xu, Alexander Youcis** and **Qiaochu Yuan** were 2014-2015 recipients of Outstanding Graduate Student Instructor Awards.
  - Recent PhDs **Ellen Chih, Jeffrey Galkowski** and **Harold Williams** were awarded NSF Postdoctoral Research Fellowships..

Undergraduate Honors

- The 2014-2015 Departmental Citation was awarded to Class of 2015 Valedictorian **Indraneel Kasmalkar.**
- **Donghao Wang** received an award for distinguished performance in the 2014 Putnam Competition.
- **Robert Chatham, Alexandra Fahey, Yuval Gannot, Weiqiao Han, Indraneel Kasmalkar, Seunghwan Lim, Kiho Park** and **Theodore Zhu** were awarded the Dorothea Klumpke Roberts Prize in Mathematics in recognition of their truly exceptional scholarship.
- **Boyi Chen, Jason Hu, Yangfan Lu, Alex Mennen, Benjamin Siskind** and **Yilin Wei** were awarded the Percy Lionel Davis Award for Excellence in Scholarship in Mathematics.

Congratulations to our students who received their PhDs this past academic year!

Piotr Achinger, "K(π,1) Spaces in Algebraic Geometry," under Arthur Ogus. Piotr is now a European Postdoctoral Institute Fellow at the Institute of Mathematics of the Polish Academic of Sciences.

Khalilah Beal, "Viscosity Solution Methods in Risk Analysis," under Craig Evans.

Natth Bejraburnin, "A Study on Correlations between Gene Functions and Gene Evolutions," under Lior Pachter. Natth now works at Facebook.

Emily Berger, "Probabilistic Methods for Single Individual Haplotype Reconstruction," under Lior Pachter.

Ellen Chih, "Indivisible Characteristics of Recursively Enumerable Sets," under Theodore Slaman and Leo Harrington. Ellen is now an NSF Postdoctoral Fellow at the University of Wisconsin Madison.

Jeffrey Galkowski, "Distribution of Resonances in Scattering by Thin Barriers," under Maciej Zworski. Jeffrey is now an NSF Postdoctoral Fellow at Stanford University.

Boaz Haberman, "Inverse Problems with Rough Data," under Daniel Tataru. Boaz is a Dickson Instructor at University of Chicago.

Kelley Harris, "Inference of Population History and Mutation Biology from Human Genetic Variation," under Steve Evans and Rasmus Nielsen. Kelley is now a Postdoctoral Research Fellow in Genetics at Stanford.

Benjamin Harrop-Griffiths, "Quasilinear Dynamics of KdV-Type Equations," under Daniel Tataru. Benjamin is now a Simons Junior Fellow at the Courant Institute of Mathematical Sciences, NYU.

Christian Hilaire, "The Ricci Flow on Riemannian Groupoids," under John Lott.

Katrina Honigs, "Derived Equivalent Varieties and Their Zeta Functions," under Martin Olsson. Katrina is a Postdoctoral Research Assistant Professor at University of Utah.

Long Jin, "Scattering Resonances for Convex Obstacles," under Maciej Zworski. Long is now a Postdoc at Harvard University.

Xin Jin, "Symplectic Approaches in Geometric Representation Theory," under David Nadler. Xin is now a Boas Assistant Professor at Northwestern University.

Adam Kalman, "Newton Polytopes of Cluster Variables," under Lauren Williams. Adam is now a Data Scientist / NLP Engineer at Kanjoya Inc.

Andre Kornell, "Operator Algebras in Solovay's Model," under Marc Rieffel. Andre is now a Krener Assistant Professor at UC Davis.

Kim Laine, "Security of Genus 3 Curves in Cryptography," under Ken Ribet. Kim is now a Postdoc at Microsoft Research.

Daniel Lanoue, "The Metric Coalescent," under David Aldous. Daniel is now a Researcher at Typical Set LLC.

Heather Lee, "Homological Mirror Symmetry for Open Riemann Surfaces from Pair-of-Pants Decompositions," under Denis Auroux. Heather is now a Golomb Visiting Assistant Professor at Purdue University.

Christopher Melgaard, "Randomized Pivoting Strategies and Spectrum-Revealing Bounds in Numerical Linear Algebra," under Ming Gu. Christopher now works at Morgan Stanley.

Adam Merberg, "Noncommutative Generalized Brownian Motions with Multiple Processes," under Dan-Virgil Voiculescu.

Ralph Morrison, "Tropical and non-Archimedean Curves," under Bernd Sturmfels. Ralph is now a Postdoc at KTH Stockholm.

Michael Pejic, "Quantum Bayesian Networks with Applications to Games Displaying Parrondo's Paradox," under Alberto Grünbaum.

Eric Peterson, "Cotangent Spectra and the Determinantal Sphere," under Constantin Teleman. Eric is now a Benjamin Peirce Fellow at Harvard University.

Benjamin Preskill, "The Jump Splice Method for Elliptic Interface Problems and the Incompressible Navier-Stokes Equations," under James Sethian. Benjamin now works for PDT Partners.

Zvi Rosen, "Algebraic Matroids in Applications," under Bernd Sturmfels. Zvi is now a Postdoc at Penn State University.

Mohammad Safdari, "Variational Inequalities with Gradient Constraints," under Nicolai Reshetikhin and Craig Evans. Mohammad now works at the Institute for Research in Fundamental Sciences (IPM), Tehran, Iran.

Shamil Shakirov, "Applications of Macdonald Ensembles," under Nicolai Reshetikhin. Shamil is now a Harvard Junior Fellow at Harvard University.

Zachary Sylvan, "On Partially Wrapped Fukaya Categories," under Denis Auroux. Zachary is now a Postdoc at ETH Zurich.

Arthur Tilley, "N Angry Men," under Thomas Scanlon. Arthur now works at the Center for New Music and Audio Technologies.

Lawrence Valby, "Some Case Studies in Algebra Motivated by Abstract Problems of Language," under Thomas Scanlon. Lawrence is now a Visiting Assistant Professor at Indiana University.

Luming Wang, "Discontinuous Galerkin Methods on Moving Domains with Large Deformations," under Per-Olof Persson. Luming is a Quantitative Researcher at Citadel LLC.

Eric Wayman, "A Skew-Product Decomposition of Diffusions on a Manifold Equipped with a Group Action, A Lorentz Model with Variable Density in a Conservative Force Field, and Reconstruction of a Manifold from the Intrinsic Metric of an Associated Markov Chain," under Steve Evans. Eric now works at Startup.ML.

Te Zhang, "Weak Convergence and Rapidly Oscillating Pendula," under Craig Evans.

2015 Commencement

Jordan Ellenberg   *(Photo: MAA)*

The Department of Mathematics' 2015 Commencement Ceremony took place on May 22nd in Zellerbach Auditorium. This year's commencement speaker was Professor **Jordan Ellenberg** of University of Wisconsin. The ceremony saw just over 300 mathematics and applied mathematics majors receive undergraduate degrees, while 35 graduate students received Masters and PhDs; a number of departmental prizes (both graduate and undergraduate) were also awarded during the ceremony.

NEW FACULTY

Richard Bamler

Assistant Professor Richard Bamler comes to our department from Stanford University. Bamler's research lies at the interface of differential geometry and geometric analysis. His work investigates the behavior of Ricci flow on Riemannian manifolds. Bamler obtained his PhD from Princeton University in 2011 as a student of Gang Tian, then became a Simons Postdoctoral Fellow at Stanford before joining our faculty in 2014. He was awarded a Sloan Research Fellowship in 2015.

Alan Hammond

Associate Professor Alan Hammond, who was appointed in 2014 jointly to our department and the Department of Statistics, comes to Berkeley from the University of Oxford. Hammond's research uses probability theory to obtain rigorous mathematical results in statistical mechanics. Hammond obtained his PhD at UC Berkeley in 2005 as a student of Yuval Peres and Fraydoun Rezakhanlou. He then occupied postdoctoral positions at the University of British Columbia and the Courant Institute of Mathematical Sciences at NYU. In 2009 he joined the Department of Statistics at the University of Oxford, where he was a University Lecturer and was awarded an EPSRC Career Acceleration Fellowship.

Lin Lin

Assistant Professor Lin Lin was appointed to our department in 2014. Lin's work is in applied and computational mathematics, with a particular focus on problems in computational chemistry and materials science such as electronic structure theory for quantum systems. Lin obtained his PhD from Princeton University in 2011 under the supervision of Weinan E and Roberto Car, then became a Luis Alvarez Postdoctoral Fellow at the Lawrence Berkeley National Laboratory. In 2015 he was awarded a Sloan Research Fellowship.
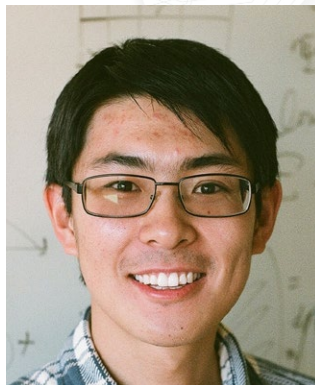
Sug Woo Shin

Associate Professor Sug Woo Shin came to Berkeley in 2014 from MIT, where he had been a faculty member since 2011. Shin is an expert in number theory. His work concerns Shimura varieties, automorphic forms, and the Langlands correspondence. Shin obtained his PhD in 2007 from Harvard University, where he was a student of Richard Taylor. He then became a member of the Institute for Advanced Study and a Dickson Instructor at University of Chicago, before taking a tenure-track position at MIT. In 2013 he received a Sloan Research Fellowship.

Nikhil Srivastava

Assistant Professor Nikhil Srivastava comes to Berkeley from Microsoft Research. Srivastava's work studies structural and algorithmic questions in linear algebra and graph theory. With collaborators, he has obtained striking results on graph sparsification and solved the Kadison-Singer problem in operator algebras. Srivastava obtained his PhD from Yale University in 2010 under the supervision of Daniel Spielman. After spending time at IAS, Princeton and MSRI, in 2012 he became a Researcher in the Algorithms group at Microsoft Research in Bangalore, India. In 2014 he was an invited speaker at the International Congress of Mathematicians in Seoul.

FAREWELLS AND WELCOMES

Ladder Faculty

Even as last year we welcomed five new members of the ladder faculty, Associate Professors Alan Hammond and Sug Woo Shin and Assistant Professors Richard Bamler, Lin Lin and Nikhil Srivastava (see their profiles on page 6), we must also bid farewell to some of our esteemed colleagues:

Professors Alberto Grünbaum and Leo Harrington retired in June 2014, and Professor Hugh Woodin retired in January 2015. These colleagues have made many remarkable contributions to mathematics and to the Department, and we wish them well.

We are very saddened by the deaths of two of our colleagues. Professor Robert Coleman, who had joined our faculty in 1983, passed away in March 2014, just a few months after his retirement. He is remembered for his groundbreaking work in number theory and p-adic geometry. Professor Ichiro Satake, who joined our faculty in 1968 and retired in 1983, passed away in October 2014. He is best known for his work on algebraic groups and automorphic forms.

Staff

There were six departures among our department staff in the last year. Rebecca Pauling, our Director of Student Services, accepted a position with Industrial Engineering Operations Research and left in October 2014. Mark Jenkinson, her successor, accepted a position in Biosciences and left on September 1, 2015. Celene Reyes left the Math Diagnostic Testing Project in January 2015. Deb Haaxman, our Academic Human Resources Analyst, retired June 2015, after 33 years of UC service. Veasina Thang's and Brandon Eltiste's positions ended on July 31, 2015.

On the other hand, we are very happy to report that Jennifer Pinney agreed to serve as Interim Director of Student Services. In addition, Dexter Stewart from Astronomy agreed to help with Math's undergraduate advising for the fall semester; Risa Wolfson was hired as a temporary undergraduate advisor for the fall semester; Monica Warde was hired as an Academic Human Resources Analyst to replace Deb Haaxman; Kristin Mendoza-Fabiani was hired as a Research Administrator for our department; and Jacqueline Frias was hired as the Program Assistant for the Math Diagnostic Testing Project.

Prof. Robert Coleman (1954-2014)

Prof. Ishiro Satake (1927-2014)

Postdocs and Visitors

The department is welcoming a number of new postdoctoral fellows this fall:

Alexis Bouthier (Representation Theory and Langlands Program), PhD Université Paris-Sud 2014, Morrey Visiting Assistant Professor.

Ved Datar (Differential Geometry), PhD Rutgers University 2014, RTG Visiting Assistant Professor.

David Dynerman (Geometry of Datasets and Mathematical Biology), PhD University of Wisconsin Madison 2015, Morrey Visiting Assistant Professor.

Max Fathi (Optimal Transport, Analysis and PDEs), PhD Université Pierre et Marie Curie (Paris 6) 2014, FRG Visiting Assistant Professor.

Martin Helmer (Computational Algebraic Geometry), PhD University of Western Ontario 2015, NSERC Postdoctoral Fellow.

Tyler Helmuth (Probability Theory, Statistical Mechanics), PhD University of British Columbia 2015, NSERC Postdoctoral Fellow.

Peter Hintz (Linear and Nonlinear PDEs), PhD Stanford University 2015, Miller Research Fellow.

Takayuki Kihara (Mathematical Logic), PhD Tohoku University 2011, JSPS Postdoctoral Fellow.

Brent Nelson (Mathematical Analysis and Operator Algebras), PhD UCLA 2015, NSF Postdoctoral Fellow.

Khoa Nguyen (Symplectic Geometry), PhD Stanford University 2015, RTG Visiting Assistant Professor.

Silvain Rideau (Model Theory), PhD Université Paris-Sud 2014, Morrey Visiting Assistant Professor.

Khrystyna Serhiyenko (Cluster Algebras), PhD University of Connecticut 2015, NSF Postdoctoral Fellow.

We are also hosting a number of distinguished Visiting Scholars including Samuel Bengmark, Harry Crane, Martin Davis, C. Ward Henson, Wei Li, Ibrahim Ly, Reza Pakzad, Nikolai Saveliev, Alexandru Scorpan, Dana Scott, Zeng-Qi Wang, Keita Yokoyama, Shaowen Yu, Yonghua Zhao, and Fuhai Zhu. Pierre Raphaël is this year's Chancellor's Visiting Professor.

Monica Warde

Alexis Bouthier

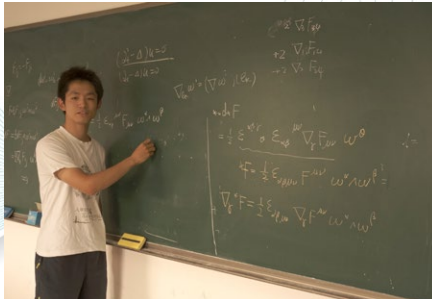*Peter Hintz*

Khrystyna Serhiyenko

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FALL 2015 NEWSLETTER

Graduate student Shenghan Zhang

Prof. Evans' Math 10 lecture (photo: Keegan Houser)

Graduate students discuss mathematics in 1015 Evans

ALSO IN THE NEWS

Rankings

The UC Berkeley math department occupies the fourth place worldwide in the 2015 Academic Ranking of World Universities in Mathematics published by Shanghai Jiao Tong University.

Meanwhile, Berkeley ranks second in the 2016 list of "Best Global Universities for Mathematics" just published by U.S. News.

Research Initiatives

The Department of Energy recently announced support for the Center for Advanced Mathematics for Energy Research Applications (CAMERA), directed by Professor James Sethian.

The Simons Foundation launched the Simons Collaboration in Homological Mirror Symmetry, in which Prof. Denis Auroux is a Principal Investigator.

Facilities Update

Our priority this past year has been to renovate the department's spaces. During the summer of 2014, seventy-five graduate offices were upgraded including paint, new furniture and chalkboards. During the spring of 2015, the Evans 9th floor men's and women's restrooms were renovated. This included new plumbing, flooring and wall tiles, toilets, sinks, fix-tures, ceiling tiles, paint, mirrors, shelves and signage. During the summer of 2015, twenty-three faculty offices were renovated, including new flooring, furniture, paint, window blinds and glass boards.

A Note on Strategic Priorities

The Department of Mathematics is working hard to maintain its excellence in all aspects of research and education and to bridge the resource gap that separates us from our better-funded peers. For this we continue to rely crucially on donations from alumni and friends of the Department. Here are some of the department's current top priorities:

• **Graduate Student Fellowships** are vitally needed to enable the department to make competitive, attractive offers to the very strongest applicants to our graduate program, who are otherwise often lured by our private peers with offers of higher stipends and lower teaching loads.

• **Endowed Faculty Chairs** are needed in order to improve the department's ability to make competitive offers for the recruitment and retention of world-class faculty.

• **Research Visitor Funds** make it easier to invite high-profile visitors to visit Berkeley to deliver lectures in our department or collaborate with our faculty. These intellectual exchanges are of tremendous value to our research and education.

Besides these specific goals, we welcome gifts to the department's discretionary fund, which give the Chair of the Department much-needed flexibility in funding graduate student recruitment, parts of the faculty recruitment process, research travel for graduate students, and many other initiatives that make our program competitive and rewarding.

We invite you to join us in keeping UC Berkeley Mathematics strong through your gifts to the department. All donations, large or small, are greatly valued You may choose whether to direct your gift toward a specific goal of your choice or to have your donation used for our most pressing needs at the department's discretion.

For further information, please contact Nicholas Cole, e-mail: ncole@berkeley.edu, Maria Hjelm, e-mail: mhjelm@berkeley.edu, or Prof. Craig Evans, e-mail: chair@math.berkeley.edu

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

You may return this form to:

Heather Read, Donor Relations
University of California
Department of Mathematics
979 Evans Hall, #3840
Berkeley, CA 94720-3840

Your Gift Is Welcome!

❑ Enclosed is my gift of $_____

Please make your tax deductible gift for the Department of Mathematics payable to "UC Berkeley Foundation."

❑ $5000　　❑ $1000　　❑ $500　　❑ $250　　❑ $100　　❑ Other $_____

In addition, (company name) _____ will match my gift.

The company matching gift form　　❑ is enclosed　　❑ will be mailed

❑ Please direct my gift to the Department of Mathematics Annual Fund, to be used for the Department's greatest need at the Chair's discretion.

❑ I prefer to designate my gift for undergraduate scholarships.

❑ I prefer to designate my gift for graduate student fellowships.

❑ I prefer to designate my gift for (other) _____

❑ Send me information on charitable estate and gift planning or on establishing an endowment.

Print Name _____　Signature _____　Date _____

Address _____

E-mail* _____

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You can also donate to the Department of Mathematics online at:

https://math.berkeley.edu/donate

The information you provide will be used for University business and will not be released unless required by law. A portion of all gifts is used to defray the costs of administering the funds. All gifts are tax-deductible, as prescribed by law.

Thank You
For Your Gifts!

Photos by: Keegan Houser, Piotr Achinger, Helen Hu

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