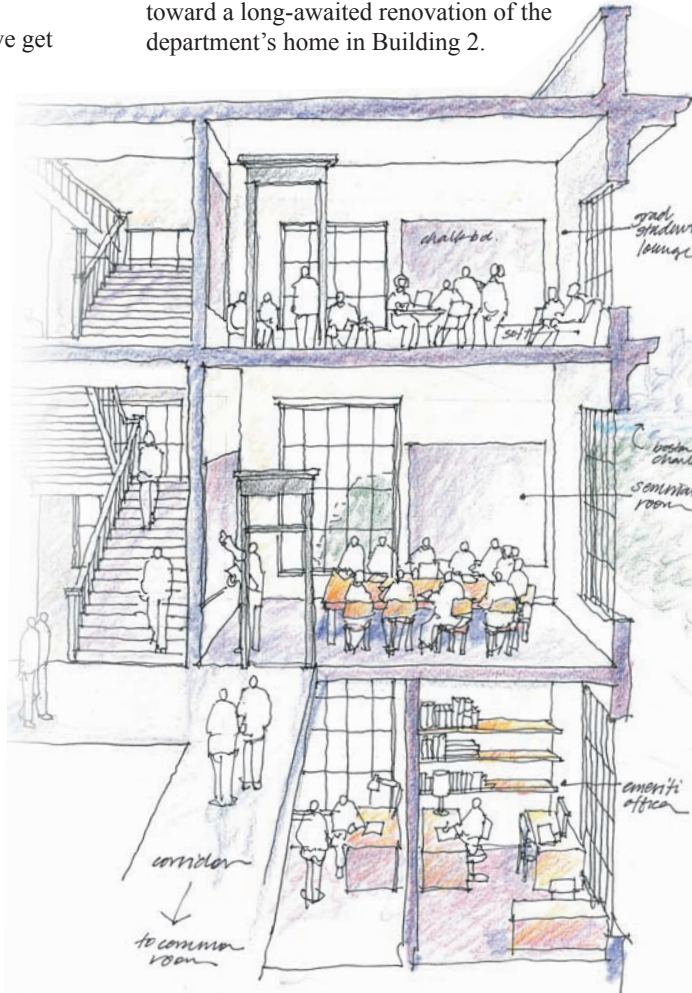




Gigliola Staffilani as Graduate Committee Chairs; and Ju-Lee Kim and John Bush, co-Chairs of the Undergraduate Advisors, with Stephen Johnson, who replaces Bush this year. Ruben Rosales is Chair of the department's newly-formed Diversity Committee, tasked with finding and implementing ways to reach a broader pool of potential mathematical talent.

Renovation plans

This past spring began the first formal steps toward a long-awaited renovation of the department's home in Building 2.



Dear Friends,

As the summer winds down and we get ready for the fall term, writing this letter gives me a chance to reflect on the past year and to anticipate the year ahead.

First, and most importantly, our recent recruiting efforts paid off splendidly with the addition of four outstanding new members to our faculty: Professor Igor Rodnianski (analysis and PDEs), and Assistant Professors Sug Woo Shin (Langlands program), Jared Speck (analysis and PDEs) and Gonalo Tabuada (non-commutative algebraic geometry).

Haynes Miller has been appointed Associate Head of Mathematics, a position which may have existed in the department long ago, but which had been unfilled since the 1970s at least. The Associate Head will oversee the department's educational activities. Haynes has served as Chair of the Undergraduate/Education Committee for seven years, and this new position raises the visibility of that role, both internally and externally, recognizing the increasing complexity of managing our teaching effort.

While on the topic of departmental governance, I take this opportunity to thank our colleagues for their committee service last year, and those on board for the coming year: David Jerison, who chaired our Pure Math Committee over the last two years, and Tom Mrowka, our new PMC Chair for 2011–12; Michel Goemans as Applied Math Chair; Bjorn Poonen, Peter Shor, and

MIT planners commissioned a study of our existing space to explore possibilities. With our enviable location on Memorial Drive and views of the Charles River, the result could be glorious. Images from the study, some shown here and inside, offer tantalizing ideas for community and office spaces.

Inside

- **New faculty 2**
- **Faculty news and awards 3**
- **Renovation update 4**
- **Fundraising 5**
- **Student activities 6–7**
- **Associate Head's report 7**
- **Outreach programs 8**

We inaugurated PRIMES, an academic-year program to give selected local high school students an opportunity to do supervised research. Professor Pavel Etingof and Lecturer Slava Gerovitch created and ran this new program, which was heavily over-subscribed, building on the success of the summer programs RSI (for high school students, selected internationally) and SPUR (for MIT undergraduates). For our majors planning to enter the work force after graduation, we presented a Career Panel last fall, hosting past majors to give talks about their professions. These covered quite a diversity of fields and careers in actuarial science, algorithmic trading, animation, energy markets, and consulting and venture capital. Our Simons Lecture series continues this spring, featuring László Lovász and Alexander Lubotzky.

Maintaining the momentum of our fundraising success, our friends have given generously once again. Notable gifts from MathWorks, the Robert Collins Trust, and others have put us well over the \$6 million mark, making this a banner year. We are most grateful to everyone who has supported us.

With that, I'll sign off for now. Have a good year!

Michael Sipser
Department Head

New faculty



Igor Rodnianski, Professor of Mathematics, comes to MIT from Princeton University, where he was on the faculty since 2000. Rodnianski is a world-renowned analyst, specializing in nonlinear hyperbolic PDEs, particularly Einstein's equations for space-time in general relativity. He has been developing a more precise understanding of singularities, their formation, and their connection with the geometry of space-time. Among various accomplishments, he has made great strides toward one of the main goals of the subject—to understand the conditions under which rotating black holes arise. Rodnianski was a Long-Term Prize Fellow of the Clay Mathematics Institute, and recently received the Distinguished Alumnus Award of Kansas State University.

He received his PhD from Kansas State in 1999 as a student of Lev Kapitanski, following a master's degree from St. Petersburg University.

Gonçalo Tabuada, Assistant Professor of Mathematics, comes to MIT from the New University of Lisbon, Portugal. Tabuada's research program covers a broad and deep area of algebraic geometry, linking modern homotopical algebra to non-commutative derived algebraic geometry and K -theory. In 2008, he received the Estímulo à Investigação Award of Portugal's Calouste Gulbenkian Foundation. He completed his PhD at the University of Paris 7 in 2007 under Bernhard Keller and had visiting appointments at the Paul Sabatier University, UCLA, University of Bonn, University of Göttingen, and MIT.



Jared Speck, Assistant Professor of Mathematics, comes to MIT from Princeton University. Speck is a leading analyst of the nonlinear PDEs of mathematical physics, linked to problems in relativistic fluid mechanics, nonlinear electrodynamics and general relativity. He received his PhD from Rutgers University in 2008 under Michael Kiessling and Shadi Tahvildar-Zadeh. He served as lecturer at

Princeton for a year before going to the University of Cambridge on a research appointment. He returned to Princeton last year as an NSF Fellow working with Igor Rodnianski and Sergiu Klainerman. (Shown in photo with wife Jessica Watkins.)



Sug Woo Shin arrives at MIT as Assistant Professor of Mathematics following a year at the Institute for Advanced Study. Shin has done exceptional work in the global Langlands program, which bridges number theory and representation theory. He received his PhD at Harvard University under Richard Taylor in 2007, and he was a Dickson Instructor at the University of Chicago. Shin was a

mentor of advanced high school students for the International Mathematical Olympiad while an undergraduate in Korea.

New Faculty Professorships



Mark Behrens has been appointed the Cecil and Ida B. Green Career Development Associate Professor of Mathematics. One of the top algebraic topologists of his generation, Mark works in homotopy theory, a branch of topology that aims to elucidate global properties of topological spaces through the study of continuous maps on spaces. Specifically, Mark investigates maps between spheres of differing dimensions—the building blocks for more general spaces. He uses vast computational resources and algebraic methods to classify these mappings, thereby revealing the structure of the associated homotopy groups. His program has yielded deep connections between homotopy theory, number theory, and algebraic geometry. He was recognized this past year with an NSF CAREER award.

Mark is a natural teacher, highly successful at all levels: giving summer talks to high school teachers, mentoring our SPUR students, running the department's microteaching workshop, designing undergraduate class tutorials, and giving graduate seminars. As Haynes Miller says, "he has an astute awareness of the particular feature of his audience." Passionate about increasing diversity in mathematics and science, Mark serves as the department's representative on the School of Science Underrepresented Minority Strategic group and serves as a mentor in MIT's summer MSRP program.



Gilbert Strang was appointed as the first holder of the department's new MathWorks Professorship, beginning July 1, 2011. The MathWorks Professorship was recently endowed through the generosity of MathWorks. (See related article on page 5.)

Gil is a leading numerical analyst, author, and educator. "Strang has been a great inspiration

and a good friend," says Alan Edelman. "He has a knack for asking those key critical questions that illuminate whole bodies of work. He has been an important figure in the analysis of finite elements, wavelets, and all aspects of linear algebra and matrix computations. His clear, concrete, and practical books and videos have been read and watched by millions of students worldwide. It is particularly appropriate that Strang be appointed the MathWorks Professor, given that he has introduced generations of students to the wonder of matrices."

Gil has received numerous prestigious awards during his long career at MIT, including the Chauvenet Prize in 1977, the John von Neumann Medal and the Lester R. Ford Prize in 2005, and the Su Buchin Prize in 2007. He came to MIT as a CLE Moore Instructor in 1959, joining the faculty in 1962, and was recognized with MIT's Graduate Student Council Teaching Award in 1986 and 2003. He served as President of SIAM during 1999 and 2000. Gil is a Fellow of the American Academy of Arts and Sciences, a SIAM Fellow, and a Member of the National Academy of Sciences.

Faculty Recognitions

Scott Sheffield received the Line and Michel Loeve International Prize in Probability, awarded by U.C. Berkeley every two years "to recognize outstanding contributions by researchers in probability who are under 45 years old." **James McKernan** was elected Fellow of the Royal Society, "for his work in algebraic geometry, especially for his contributions to proving the existence of minimal models of complex algebraic varieties in all dimensions." **Jonathan Kellner** received the Harold E. Edgerton Faculty Achievement Award, given to a junior member of the MIT faculty for exceptional distinction in teaching, research, and scholarship. **Tom Mrowka** received

the AMS Joseph Doob Prize (with Peter Kronheimer) for their book *Monopoles and Three Manifolds* (Cambridge University Press, 2007). **Bjorn Poonen** received the MAA Chauvenet Prize for his article "Undecidability in number theory," *Notices of the AMS*, 55 (2008). Bjorn also received a Guggenheim Fellowship. **Peter Shor** was elected Fellow of the American Academy of Arts and Sciences. **David Vogan** received the AMS Levi L. Conant Prize for his article "The character table for E_8 " in *Notices of the AMS*, 54 (2007). **Bonnie Berger** was selected to give the Margaret Pittman Lecture, sponsored by the National Institutes of Health. **Alan Edelman** was selected to

be a SIAM Fellow "for his contributions in bringing together mathematics and industry in the areas of numerical linear algebra, random matrix theory, and parallel computing." **Laurent Demanet** received a Sloan Research Fellowship.

Steven Johnson received tenure.

Mark Behrens and **Ben Brubaker** were promoted to Associate Professor.

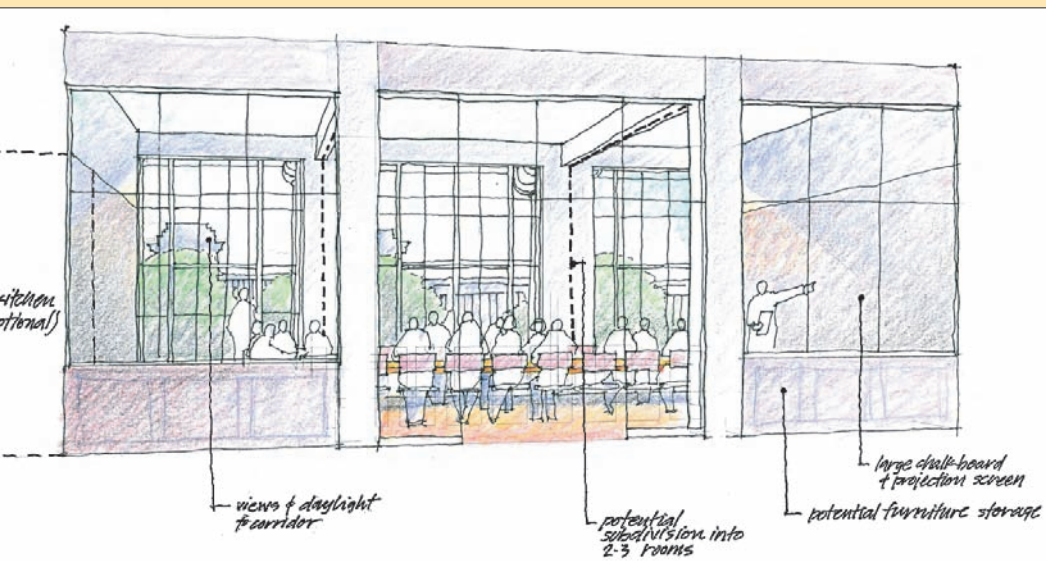
Staff Awards

Galina Lastovkina and **Dennis Porche** received the School of Science Infinite Mile Award.

The Building 2 Renovation Project

Building 2, home of the Mathematics Department, has been identified as a candidate for major near-term renovation under MIT 2030, a comprehensive process to envision the MIT of the future. This long-anticipated renovation would enliven our departmental quarters in multiple ways. It would provide attractive conference, seminar, and casual community spaces to enable small-group interaction. Offices

Poland [now Lviv in the Ukraine], during the 1930s and 1940s. To facilitate collaboration, the planning study presents a vision that creates spaces that encourage people to leave their offices, talk to one another, and work together, with blackboards and coffee strategically placed to stimulate conversation.”



Conference Room

would be laid out thoughtfully for the way mathematicians work today. There would be suites of graduate student offices and/or instructor offices opening onto shared meeting areas so that discussions and office hours wouldn't interfere with quiet concentration. The overall design would provide a unity to our space, with entrances and stylistic elements identifying our department. Finally, the renovation would restore the antiquated infrastructure of the building. Built in the early 1900s, the other "Main Group" buildings have similar infrastructure problems. A successful renovation of our departmental home would confirm the possibilities such restoration holds for these other areas.

About a year ago, we received approval to undertake a planning/feasibility study for the renovation. The purpose of the study was to evaluate the existing condition of the building, document current space needs, assess the capacity of the building to accommodate future growth/change, and explore potential design concepts that would improve the function and aesthetics of the space. We interviewed several firms and hired Imai Keller Moore Architects to complete the study. The mathematics department faculty was enthusiastic about IKM's approach to the project and their experience on other projects at MIT.

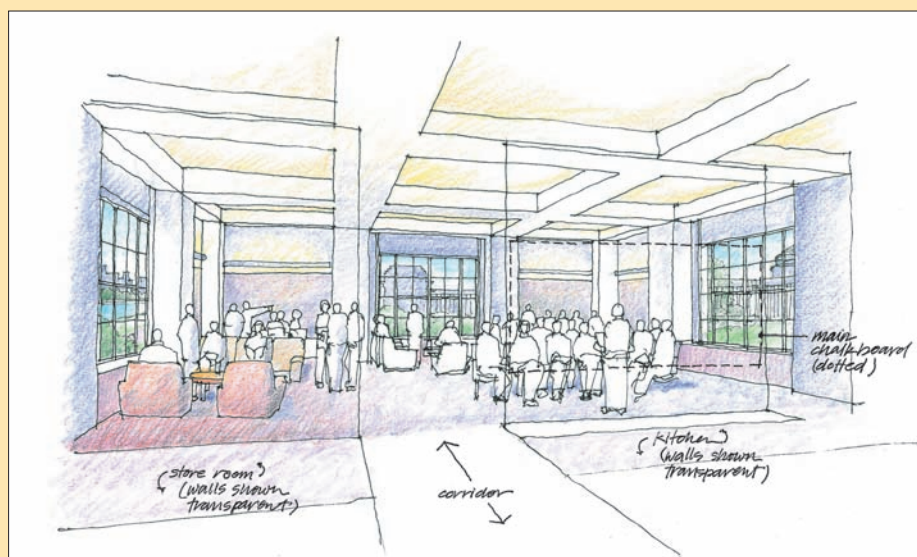
Mathematics Department Head Mike Sipser noted that "the Planning Study was a unique and exciting opportunity for faculty in our department to work collaboratively and create a vision for the future. The consulting team was invaluable in helping to facilitate the conversations among all the constituent groups in the department: faculty, graduate students, instructors, and staff. They guided a process that provided us with many ideas and possibilities for the renovation of Building 2."

Mike describes one idea that emerged from these meetings: "Mathematicians share a tradition of meeting in pairs or small groups, gravitating to inviting spaces like the famous Scottish Café in Lwów,

"The proposed Common Room illustration, for example, gives us a sense of how the current common room and department library could be transformed into a beautiful space, with windows on three sides overlooking the river and Killian court. Another sketch generated during the planning study describes a vision for a new departmental Conference Room on the second floor that will overlook Lowell Court. This new space would be a stunning addition to the department and an ideal location for hosting seminars and other department presentations."

Other ideas include transforming spaces near the stairway on the southeast corner of the building into common gathering areas, including a graduate student lounge and small seminar room. Moving these types of spaces to this strategic location would enhance their attraction and promote connection between the first, second, and third floors.

Faculty viewed these and other sketches at a lunch meeting in April. The meeting ended with a spontaneous round of applause, an encouraging response to the conceptual stage of our renovation project. We are now moving into the next stage: reaching out to our donor community to raise funds for construction. Once a funding plan has been approved by the MIT Corporation, we'll begin the process of developing architectural and engineering design



Common Room

documents, ultimately leading to construction of a new home for the department.

"We want a department home that is exciting and stimulating both to us, who work and study here, and to the people we want to attract as students and colleagues," Mike summarizes. "A great department deserves great space."

The New MathWorks Chair



Michael Sipser, Cleve Moler, Gilbert Strang, Jack Little, Marc Kastner

On February 7, 1985, the MIT Mathematics Department purchased ten copies of a software program called MATLAB, short for Matrix Laboratory. It thus became the first customer of a young Boston-area startup called MathWorks, founded a year earlier by Jack Little ('78 EECS) and Cleve Moler. These days, the company's products—MATLAB and Simulink—are used by engineers and scientists around the world. A few months ago, we were delighted to learn that Jack and Cleve planned to create the MathWorks endowed Professorship through a major gift to the MIT Mathematics Department.

Cleve was a professor of mathematics and computer science for almost 20 years at the

University of Michigan, Stanford, and the University of New Mexico. He wrote MATLAB to enable students to use the LINPACK and EISPACK math libraries without writing FORTRAN programs. MATLAB soon came to the attention of Jack, who recognized it as a powerful software solution that could enable engineering, scientific, and technical applications on the personal computer.



We are all delighted that Gil Strang has been selected to hold the first MathWorks Chair (see page 3 for more on Gil), and we're most grateful to Jack, Cleve, and MathWorks for making this extraordinary gift possible.

A gift arrives ... 20 years later

Robert Collins passed away in 1991, leaving part of his estate to the Department of Mathematics at MIT. This generous gift was made even more remarkable in ways that bear telling now.

Collins, in the words of his good friend Peter Holmstrom, was a "whiz kid who became a very successful investor." He was not a mathematician: he never attended any college or university and had no formal connection to MIT. But he had a lifelong interest in mathematics and a deep respect for MIT.

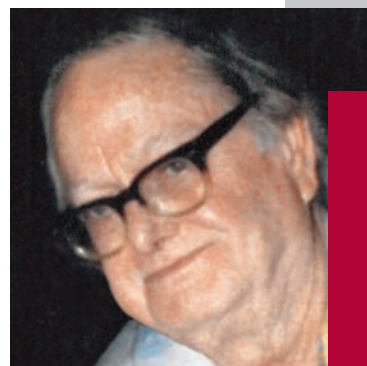
The gift was made at the time when David Benney was department head, but it did not come to MIT immediately. Collins stipulated that Peter Holmstrom would manage a trust holding the funds, releasing only a portion of the income to the Mathematics Department. This proved to be a fortuitous move: Holmstrom's investments have since multiplied the fund's value several times over. In the meanwhile, the Mathematics Department used the income to establish a rotating "Collins Scholarship," which provides one faculty member

with a discretionary account to support his or her research for a five-year period. Currently David Vogan holds this honor.

Mike Sipser visited Peter Holmstrom a couple of years ago at his home north of San Francisco. "As far as I know," Mike says, "none

of our faculty ever knew Robert Collins. So I wanted to meet his friend Peter, who was managing these important resources for us, and give Peter a chance to learn a bit about our department and how these funds are helping us."

This past fall, Peter decided to turn the funds over to MIT. The total value of the fund exceeds \$3,000,000. We are deeply grateful to Robert Collins and to Peter Holmstrom for this wonderful gift.



Robert Collins

For more information on making a gift to the Mathematics Department, please contact
Director of Development
Erin McGrath
at emcgrath@mit.edu,
617-452-2807.

Putnam Triumphs

Continuing our successes of recent years, MIT undergraduates dominated the 2010 William Lowell Putnam Mathematical Competition, with the most participants receiving high recognition (23/84).

Putnam Fellows: 2/5

Yu Deng, Colin Sandon

Next nineteen: 5/19

Sergei Bernstein, Vlad Firoiu, Whan Ghang, Jacob Steinhardt, Alexandr Zamorzaev

Honorable Mentions: 16/60

John Berman, Yu Cheng, Paul Christiano, Brian Hamrick, Travis Hance, Daniel Li,

Ofir Nachum, David Rolnick, David Rush, Krishanu Sankar, Jonathan Schneider, Minseon Shin, Anthony Wang, Yinghui Wang, Chiu Wai Wong, George Xing. Among these, Yinghui Wang was awarded the Elizabeth Lowell Putnam Prize, for outstanding performance by a woman participant.

The MIT Team placed second in the competition. The students on our team, sophomores Sergei Bernstein and Whan Ghang and junior Jacob Steinhardt, were mentored by Professors Richard Stanley and Abhinav Kumar.



Ricardo Joel Abrantes Andrade, “*From Manifolds to Invariants of En-Algebras*,” under Haynes Miller. Ricardo is now an Assistant Professor at Stanford.

Junkyu An, “*Combinatorial Enumeration of Weighted Catalan Numbers*,” under Alexander Postnikov. Junkyu is now a Senior Analyst at KIS Pricing, Inc.

Jennifer Shyamala Sayaka Balakrishnan, “*Coleman Integration for Hyperelliptic Curves: Algorithms and Applications*,” under Kiran Kedlaya. Jen is now a postdoc at Harvard.

Hoda Bidkhorji, “*Classification and Enumeration of Special Classes of Posets and Polytopes*,” under Richard Stanley. Hoda is now a postdoc at North Carolina State.

Tova Helen Fell Brown, “*Bordered Heegaard Floer Homology and Four-Manifolds with Corners*,” under Denis Auroux. Tova is now a postdoc at UCLA.

Peter M. Buchak, “*Flow-Induced Oscillation of Flexible Bodies*,” under John Bush. Peter is now a postdoc at the University of Massachusetts, Amherst.

Linan Chen, “*Applications of Probability to Partial Differential Equations and Infinite Dimensional Analysis*,” under Daniel Stroock. Linan is now a postdoc at McGill.

Leonid Chindelevitch, “*Extracting Information from Biological Networks*,” under Bonnie Berger. Leonid is now an Applied Mathematician at Pfizer Inc.

Dorian Croitoru, “*Mixed Volumes of Hypersimplices, Root Systems and Shifted Young Tableaux*,” under Alexander Postnikov. Dorian is now a Portfolio Manager at WorldQuant, LLC.

Craig Jeffrey Desjardins, “*Monomization of Power Ideals and Parking Functions*,” under Alexander Postnikov. Craig is now a Trader/Technologist at Virtu Financial LLC.

Christopher Stephen Dodd, “*Equivariant Coherent Sheaves, Soergel Bimodules, and Categorification of Affine Hecke Algebras*,” under Roman Bezrukavnikov. Chris is now a postdoc at the University of Toronto.

Benjamin London Harris, “*Fourier Transforms of Nilpotent Orbits, Limit Formulas for Reductive Lie Groups, and Wave Front Cycles of Tempered Representations*,” under David Vogan. Ben is now a postdoc at Louisiana State University.

David Andrew Jordan, “*Quantized Multiplicative Quiver Varieties*,” under Pavel Etingof. David is now a postdoc at the University of Texas at Austin.

Catherine Ann Lennon, “*Arithmetic and Analytic Properties of Finite Field Hypergeometric Functions*,” under Ben Brubaker. Cathy is now a software developer at RJMetrics.

2011 Doctorates

Wenxuan Lu, “*Instanton Correction, Wall Crossing and Mirror Symmetry of Hitchin’s Moduli Spaces*,” under Shing-Tung Yau (Harvard). Wenxuan is now a Lecturer at the University of Pennsylvania.

Xiaoguang Ma, “*On Trigonometric and Elliptic Cherednik Algebras*,” under Pavel Etingof. Xiaoguang is now a postdoc at the University of Alberta.

Michael Lim Manapat, “*Critical Phenomena in Evolutionary Dynamics*,” under Martin Nowak (Harvard Medical School). Michael is now a Lecturer in Applied Mathematics at Harvard.

Bernard Allen Mares, “*Some Analytic Aspects of Vafa-Witten Twisted $N=4$ Supersymmetric Yang-Mills Theory*,” under Tom Mrowka. Ben is now a postdoc at McMaster.

Ronen Eliahu Mukamel, “*Orbifold Points on Teichmüller Curves and Jacobians with Complex Multiplication*,” under Curtis McMullen (Harvard). Ronen is now an Assistant Professor at Stanford.

Timothy Nguyen, “*The Seiberg-Witten Equations on Manifolds with Boundary*,” under Katrin Wehrheim and Tom Mrowka. Tim is now a Research Assistant Professor at the Simons Center at SUNY–Stony Brook.

James Thomas Pascaleff, “*Floer Cohomology in the Mirror of the Projective Plane and a Binodal Cubic Curve*,” under Denis Auroux. James is now an Instructor at the University of Texas at Austin.

Nikita Rozenblyum, “*Connections on Conformal Blocks*,” under Jacob Lurie (Harvard). Nick is now a Simons postdoc at Northwestern.

Michael Benjamin Schnall-Levin, “*RNA: Algorithms, Evolution and Design*,” under Bonnie

Berger. Michael is now a postdoc at the Broad Institute.

Jin Woo Shin, “*Efficient Distributed Medium Access Algorithm*,” under Devavrat Shah (EECS). Jin Woo is now a postdoc at the Georgia Institute of Technology.

Steven W. Sivek, “*Bordered Legendrian Knots and Sutured Legendrian Invariants*,” under Tom Mrowka. Steven is now a postdoc at Harvard.

Kaloyan Stefanov Slavov, “*The Moduli Space of Hypersurfaces Whose Singular Locus has High Dimension*,” under Bjorn Poonen. Kaloyan is now a postdoc in Bulgaria.

Vedran Sohinger, “*Bounds on the Growth of High Sobolev Norms of Solutions to Nonlinear Schrödinger Equations*,” under Gigliola Staffilani. Vedran is now a postdoc at the University of Pennsylvania.

Jose A. Soto, “*Contributions on Secretary Problems, Independent Sets of Rectangles and Related Problems*,” under Michel Goemans. Jose is now an Assistant Professor at the University of Chile, Santiago.

Emanuel I. Stoica, “*Unitary Representations of Rational Cherednik Algebras and Hecke Algebras*,” under Pavel Etingof. Emanuel is now a postdoc at the University of Geneva.

Sawyer James Tabony, “*Deformations of Characters, Metaplectic Whittaker Functions, and the Yang-Baxter Equation*,” under Ben Brubaker. Sawyer is now a Visiting Professor at Boston College.

Mayank Harshad Varia, “*Studies in Program Obfuscation*,” under Ran Canetti (CSAIL). Mayank is now a technical staff member at Lincoln Laboratory, MIT.

Lu Wang, “*Self-Shrinkers of Mean Curvature Flow and Harmonic Map Heat Flow with Rough Boundary Data*,” under Toby Colding. Lu is now a postdoc at Johns Hopkins.

Yee Lok Wong, “*High-Performance Computing with PetaBricks and Julia*,” under Alan Edelman. Yee Lok is now at Goldman Sachs.

HwanChul Yoo, “*Combinatorics in Schubert Varieties and Specht Modules*,” under Alexander Postnikov. HwanChul is now a postdoc at the Korea Institute for Advanced Study.

Letter from Haynes Miller

Associate Head of the Mathematics Department

Dear Friends,

Here's a challenge we encountered in our recent efforts to further improve the Mathematics Department's educational program. We offer thirteen different "Communications Intensive" subjects in the department. Some are fairly standard lecture subjects, but most are Undergraduate Seminars, with no fixed syllabus and different leaders each year. Then there is the unique Project Laboratory in Mathematics. Despite their diversity, however, faculty teaching Mathematics CI subjects confront many of the same problems, from teaching the skills of good presentation and good writing in mathematics to evaluating student performance. The challenge is to create a virtual community of CI subject leaders and to capture resulting good practice.

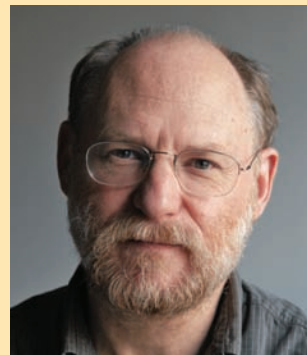
Enter Susan Ruff, a Lecturer in the Program in Writing and Humanistic Studies with a bachelor's degree in Mathematics from Swarthmore College. Susan has worked with Mathematics Department faculty members on our Communication Intensive subjects almost since the start of the Communication Requirement. Together with former Instructors Sami Assaf and Mia Minnes, Susan came up with a brilliant solution to the CI challenge. The three sketched a design for a website that would encourage discussion among subject leaders, preserve good practice, and archive teaching material. Violeta Ivanova of the MIT Office of Educational Innovation and Technology built a prototype and helped us secure a small

OEIT grant to pay for the services of a programmer, and by the fall of 2009 we had an operational WordPress web tool, The Mathematics CI Space. This site now houses an extensive archive of material about teaching mathematical communication, discussing topics that include how to teach good writing, using peer critique to help students improve their presentations, and handling students with varying backgrounds and ability.

Last year we won an NSF grant to merge the extensive archive of material about teaching mathematical communication we have assembled with the Mathematical Association of America's Mathematical Digital Library <http://mathdl.maa.org>. With this initiative, MIT moves into a leadership role in the national discussion about teaching the communication of mathematics.

In a separate development, we have expanded the Math CI Space into a general platform for all sorts of collaboration among educators: the Educational Collaboration Space, freely available at <http://ecs.mit.edu>. This work has been the focus of articles published by the MIT News Office and *Inside Higher Ed*.

— Haynes Miller



Bjorn Poonen presenting to Vedran Sohinger



Linan Chen and Joel Lewis

Student awards

Graduate students **Linan Chen** and **Joel Lewis** received the Charles and Holly Housman Award for excellence in undergraduate teaching. **Steven Sivek** and **Vedran Sohinger** each received the Charles W. and Jennifer C. Johnson Prize for an outstanding paper accepted for publication.

Undergraduate **Alexandr Zamorzaev '11** received the Jon A. Bucsela Prize in Mathematics for distinguished scholastic achievement, professional promise, and enthusiasm for mathematics. **Yinghui Wang '11** and **Fan Wei '12** each received Honorable Mention in the Alice T. Schafer Prize for excellence in mathematics by an undergraduate woman in mathematics, given by the Association for Women in Mathematics. Yinghui also received the Elizabeth Lowell Putnam Prize, for outstanding performance by a woman in the Putnam Competition. **Melissa Gymrek '11**, a double major with EECS,

received the Association of MIT Alumnae (AMITA) Senior Academic Award. **Raghu Mahajan '11**, a double major with Physics, received a Gates Cambridge Scholarship to study at the University of Cambridge. **Paul Christiano '12** received the Anna Pogogyants Award for his UROP project in CSAIL under the supervision of Jonathan Kelner. **Shaunak Kishore '12** received a Barry M. Goldwater Scholarship, given to students who exhibit outstanding potential and who intend to pursue careers in mathematics, the natural sciences, or engineering disciplines. Former undergraduate **Maria Monks '10** was awarded the 2011 Frank and Brennie Morgan Prize, given jointly by the three Math Societies, for outstanding research in mathematics while an undergraduate. **Yupei Zhao '10** received Honorable Mention for this prize.

MIT PRIMES

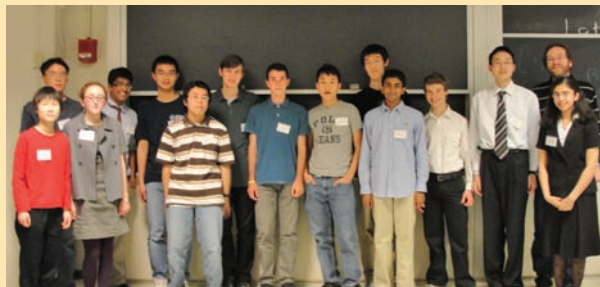
Priming Talented Teens

In October 2010 the Department of Mathematics launched a new high school research program called PRIMES (Program for Research in Mathematics, Engineering, and Science). PRIMES selects exceptional students from Greater Boston to work on research projects formulated by faculty and mentored by graduate students. Meeting during the academic year, PRIMES complements the RSI summer program, allowing students more time to pursue their projects. The goal of the program, PRIMES Chief Research Advisor Professor Pavel Etingof explains, is to "let mathematically talented high school students discover how it feels to be a research mathematician."

Research topics range from combinatorics, number theory, and convex geometry to graph theory/dynamical systems, arithmetic of finite fields, commutative algebra and algebraic geometry over finite fields, and representation theory. Graduate students serve as mentors and thereby have an opportunity to acquire teaching experience and to learn new fields. "I wanted to learn some representation theory," says mentor Steven Sam, "and the best way is to teach someone."

On May 21, 2011, PRIMES held its first annual conference at MIT, where 21 students presented their projects. The widely attended event showed the tremendous success of the program. Several projects will likely lead to publications in professional journals and will be strong contenders at national science competitions for high school students. Comments by students' parents demonstrated their enthusiasm:

"The program provides a truly transformative experience for bright kids—they got



Left to right: Christina Chen, Dong-Gil Shin, Caroline Ellison, Saarik Kalia, Xiaoyu He, Carl Lian, Ziv Scully, Aaron Klein, Mike Zhang, David Ding, Surya Bhupatiraju, Bill Kuszmaul, Jason Li, Sheela Devadas, Pavel Etingof

to learn what real research is like by actually doing real research."

"The program is unparalleled! There is no comparable opportunity for highly motivated teens to immerse themselves in the world of higher mathematics."

"It also gives some talented young students a great chance to know MIT so they can feel and breathe the true MIT culture."

Several PRIMES students are entering MIT as undergraduates in the fall and will continue their research under the UROP program.

PRIMES is directed by Dr. Slava Gerovitch; Dr. Tanya Khovanova is the head mentor. The program is funded through 2012 by generous support from the Mathematics Department, the Department of Electrical Engineering and Computer Science, the Clay Mathematics Institute, the NSF, the NIH, and MathWorks. The program is looking for support in subsequent years. For more information about the program, the abstracts of conference talks, and the slides of student presentations, see: <http://web.mit.edu/primes>

MIT Hosts National Mathematics Contest for Girls

At the invitation of the Mathematics Department, MIT hosted the third annual Advantage Testing Foundation Math Prize for Girls in September, 2011. The contest is the only national mathematics contest for middle school and high school girls. It was founded by Arun Alagappan, president of the Advantage Testing Foundation, which sponsors the contest, and by Advantage Testing co-director Ravi Boppana ('86 PhD EECS), to promote gender equality at the highest levels of achievement in math and science. The ceremony was held in Kresge Auditorium, where Alagappan, Boppana, Professor Tom Leighton, and MIT President Susan Hockfield welcomed the 277 participants and their families and guests. Sophomore Victoria Xia of Vienna, Virginia, took home the \$25,000 first-place prize.



Victoria Xia

Upcoming Event

A dinner honoring Sig Helgason's wonderful career and 85th birthday will take place Saturday, January 7, 2012 at the MIT Faculty Club.

RSI & SPUR — Fundraising Update

We've raised \$1,475,000 of our \$2.5M dollar goal to endow the RSI and SPUR summer research programs for high school and MIT undergraduates, now in their 18th and 14th year respectively. The new donors who have joined this campaign with a major gift are Jake Xia ('92 EE) and Jen Lu ('90 EE, '91 EECS), Tom Chang ('76 EE) and Jeanette Eng, and Laurie and Andy Okun.

Last July 18th many of our donors heard an overview of the programs from Professor and RSI & SPUR Director David Jerison, together with presentations on RSI and SPUR projects by students and their graduate student mentors. The donors met with

the students participating in the programs and math faculty. We're grateful to Chi-Fu Huang and Marina Chen, who are leading this fundraising effort, and to all donors for their generous support.

MIT DEPARTMENT OF MATHEMATICS

Department of Mathematics



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