



### Dear Friends,

ANOTHER YEAR GONE BY and what a year it was. We're getting older, and younger, celebrating prizes and long careers, remembering our past and looking to the future. It is a remarkable time to be in Mathematics at MIT.

This year continues our drive to renew our faculty. Five superb mathematicians have recently accepted offers to join our faculty: Professors Alexei Borodin (representation theory and probability) and Peter Ozsváth (geometric topology), and Assistant Professors Clark Barwick (algebraic topology), Jacob Fox (combinatorics), and Sug Woo Shin (number theory). We are strengthening our ties outside the department with the joint appointments of Associate Professors Martin Bazant and Peko Hosoi, with ChemE and MechE respectively, and the appointment of Adjunct Professor Henry Cohn from Microsoft Research, New England.

Broadening our department's gender and racial diversity will have renewed emphasis in recruitment at all levels in coming years. Noted authority William Vélez will be a Martin Luther King Visiting Professor of Mathematics this spring, and we will aim to understand and emulate his striking success at bringing underrepresented minorities into mathematics at the University of Arizona.

Toby Colding and Paul Seidel received the 2010 Oswald Veblen Prize in Geometry, a major recognition. Of the 27 individuals who have been honored with this prize since it was established in 1964, four are now on the MIT faculty.

The retirement of seven of our illustrious colleagues this year—Mike Artin, David Benney, Dan Kleitman, Arthur Mattuck, Is Singer, Dan Stroock, and Alar Toomre—marks a shift to a new generation of faculty, from those who entered the field in the Sputnik era to those who never knew life without email and the Internet. The older generation built the department into the academic powerhouse it is today—indeed they *were* the core of the department, its leadership and most distinguished members, during my early years at MIT. Now, as they are in the process of retiring, I look around and see that *my* contemporaries are becoming the department's older group. Yikes!

Other big changes are in the works. Two of our dedicated long-term administrators—Joanne Jonsson and Linda Okun—have stepped down from their positions running the undergraduate and graduate offices. We've reorganized and combined those entities into a single office, *Mathematics Academic Services*, under the leadership of our new Academic Administrator, Jeffrey Kinnamon. He and our new Administrative Officer, Sarah Smith, will be modernizing departmental processes by moving record-keeping into electronic databases, among other things.

The Simons Lectures will continue in fine form again this year. Princeton's Manjul Bhargava and Cornell's Steven Strogatz will speak in the series in April.

The opportunity to teach fantastic students is one of the many blessings of being at MIT, and this year was exceptionally good. We awarded 23 PhDs, nearly all of whom are moving on to postdocs or other positions despite the tough job market. Our undergraduates claimed one-third of the top (Honorable Mention and higher) scores across all of North America in the 2009 Putnam Competition, and our team won 1<sup>st</sup> place.

Our RSI and SPUR summer research programs for high-school and undergraduate students continue to produce amazing results, winning major prizes at the Intel and Siemens Science Talent Searches. The department currently supports these important programs with scarce discretionary funds, so we are pleased to announce that Chi-Fu Huang and

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Marina Chen have taken the lead in raising an endowment for them. Together with those of Tim Lu '79 and Peiti Tung '79, their commitments thus far reach over \$1 million, a marvelous contribution whose income will cover nearly half the cost of both RSI and SPUR. We're grateful for their help.

As MIT prepares to celebrate its 150<sup>th</sup> anniversary this year, plans are forming for restoring the main group of Buildings 1 thru 10 over the next decade or so. We are conducting an architectural study of the department's home in Building 2 in preparation for its renovation, the timing of which will depend in part on fundraising success.

We want to thank the members of our Visiting Committee, which met with department members last spring and favorably reviewed our programs. John Reed, who served as Chair of the Mathematics Visiting Committee for the past decade, has moved on to be Chair of the MIT Corporation, wonderful news for the Institute. We hope that John's yet-to-be-announced replacement on our Visiting Committee will be as committed to the department as he has been.

Look inside for further details on these and other stories. Have a good year!

Michael Sipser

Department Head

## New faculty

**Alexei Borodin**, Professor of Mathematics, comes to MIT from Caltech, where he has been on the faculty since 2003. Borodin studies problems on the interface of representation theory and probability that link to combinatorics, random matrix theory, and integrable systems. In 2001 he received a long-term research fellowship from the Clay Mathematics Institute. He was awarded the Prize of the Moscow Mathematical Society in 2003 and the Prize of the European Mathematical Society in 2008. Borodin received his PhD from the University of Pennsylvania in 2001 under Alexandre Kirillov.



**Peter Ozsváth**, Professor of Mathematics, joins the mathematics faculty this year. A professor at Columbia University since 2004, Ozsváth is a leading expert in low-dimensional geometric topology. In 2007, he received the AMS Oswald Veblen Prize in Geometry with Zoltán Szabó for their work on a new class of invariants. He was a Guggenheim Fellow in 2008 and appointed a Clay Research Scholar at MSRI in the spring of 2010. Ozsváth received his PhD from Princeton under John Morgan in 1994.

**Clark Barwick**, Assistant Professor of Mathematics, joins our faculty from Harvard University, where he served as a Benjamin Peirce Lecturer. Barwick is an algebraic topologist interested in the interactions between K-theory, homotopy theory, and algebraic geometry. He completed his PhD at the University of Pennsylvania in 2005 under Tony Pantev, and subsequently held postdoctoral appointments at the Mathematics Institute in Göttingen, the University of Oslo, and the IAS.



**Jacob Fox** joins MIT as a Simons Postdoctoral Fellow and Assistant Professor of Applied Mathematics. His interests span extremal combinatorics, combinatorial geometry, and probabilistic combinatorics. A graduate of MIT, Fox received both the department's Jon A. Bucsele prize and the AMS-MAA-SIAM Frank and

Brennie Morgan prize in 2006. He was recently awarded SIAM's Dénes König Prize for outstanding research in discrete mathematics. He completed his PhD at Princeton University under Benny Sudakov in 2010.

**Sug Woo Shin** will join us as Assistant Professor of Mathematics in September 2011. A number theorist, Sug Woo specializes in the Langlands program, connecting arithmetic geometry and representation theory. He completed his PhD at Harvard University under Richard Taylor in 2007, and subsequently held a Clay Liffoff Fellowship at the IAS. He is currently appointed as a Dickson Instructor at the University of Chicago and will return to the IAS in 2010–11.



## Awards



**Toby Colding** and **Paul Seidel** received the 2010 AMS Oswald Veblen Prize in Geometry, “awarded to Tobias H. Colding and William P. Minicozzi II for their profound work on minimal surfaces,” and for Paul Seidel’s “fundamental contributions to symplectic geometry and, in particular, for his development of advanced algebraic methods for computation of symplectic invariants.” **John Bush** was elected Fellow of the American Physical Society. **Michael Artin**, **Tom Leighton**, and **Gil Strang** were each named SIAM Fellows. **Tom Mrowka** received a Guggenheim Fellowship. **Katrin Wehrheim** received an NSF PECASE (Presidential Early Career Award for Scientists and Engineers). **Denis Auroux**, **Alexei Borodin**, **Kiran Kedlaya**, **Ivan Loseu**, **James McKernan**, and **Scott Sheffield** gave invited lectures at ICM 2010. **Richard Stanley** gave the AMS Colloquium Lectures and **Peter Shor** the AMS Josiah Willard Gibbs Lecture at the 2010 joint AMS-MAA-SIAM meeting. **Abhinav Kumar** received an NSF CAREER Award. **Jon Kelner** received a Sloan Research Fellowship.

**Katrin Wehrheim** was promoted to Associate Professor.

Two of our staff were recognized for outstanding service this year. Financial Administrator **Danforth Nicholas** received both the School of Science Infinite Kilometer Award and the MIT Excellence Award. Administrative Officer **Sarah Smith** received the School of Science Infinite Mile Award.

## Other recent faculty appointments



**Henry Cohn**, Adjunct Professor. A Principal Researcher at Microsoft Research, New England, Cohn works across several fields in discrete mathematics, including computational and analytic number theory, algebraic combinatorics, and theoretical computer science.



**Anette (Peko) Hosoi**, Associate Professor joint with Mechanical Engineering. Hosoi is interested in instabilities in viscous flows, low Reynolds number locomotion, and bioinspired design.



**Martin Bazant**, Associate Professor joint with Chemical Engineering. Bazant’s interests include nonlinear electrokinetics, microfluidics, and granular flow.

# Women in Math @ MIT

by Genevieve Wanucha



Women make up a quarter of the MIT math students, but the proportion of female math professors over the past thirty years has never risen above seven percent. That's why Professors Katrin Wehrheim and Gigliola Staffilani have built their 2008 "Women in Math" conference into a community network that supports the Institute's female mathematicians.

Wehrheim and Staffilani want to make certain that young women have everything they need to keep riding the wave of mathematical success to career-level research mathematics. "Rather than discussing whether we still have an equal opportunity problem, let's do something," Wehrheim says. "I want to just ask what's going to actually help women make their way."

MIT women in math can benefit from the group in many ways, from sharing their

concerns at the biannual tea parties to using the resources on the new MIT Women in Mathematics website. And everyone, men and women, are encouraged to attend the Women in Math lecture series, featuring female mathematicians from universities around the globe.

These lectures are a critical part of the group's aim. Wehrheim notices a pervasive culture of math talks that champion highly specialized research, at the expense of students' ability to understand and ask meaningful questions. These talks can easily alienate junior mathematicians unsure whether they belong in the discipline. Wehrheim believes that talks by women foster more open communication, a valuable addition to the culture of any academic field.

The group also helps students find female friends. Rosalie Belanger-Rioux, a PhD student who studies partial differential equations, says, "I think the purpose of this is for women not to feel alone in this area where the large majority of faculty and students are male. I find it refreshing to be among women only, once in a while. It's just different!"

The students are living proof of Women in Math's importance. Sara Sheehan, a recent graduate with a degree in mathematics and computer science, had concerns about

career possibilities in math. "But the math community at MIT dispelled my fears," she says. "The most important thing for me was to see examples of successful female math majors and math professors — they helped me believe that I could do it too."

Judging by the opinions and attitudes of the MIT math department's young women, it seems the faculty can expect a growing female presence in the top levels of research mathematics. Maria Monks graduated this spring after winning a Hertz Foundation Fellowship and a Churchill Scholarship to study at Cambridge University in England. "I envision myself as a professor at a university down the road," she says. This attitude, the group's leaders believe, is exactly what makes an MIT graduate into a leading figure in mathematics.

**MIT WOMEN IN  
MATHEMATICS**  
[math.mit.edu/wim](http://math.mit.edu/wim)

See our new "MIT Women in Mathematics" website, featuring in-depth biographies, history, statistics, and recent events. We invite alumni to contribute ideas, biographies, or simply a quote on life at or beyond MIT math!

## New faculty professorships



**Toby Colding** is the newly appointed Norman Levinson Professor of Mathematics. Colding is a leading differential geometer, working on problems in geometric analysis, PDEs, and low-dimensional topology. With Bill Minicozzi, he received the 2010 Veblen Prize in Geometry from the AMS, "for their profound work on minimal surfaces."

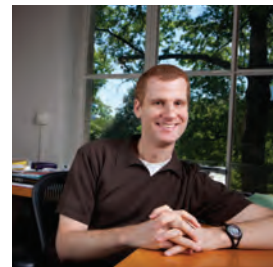
Colding joined the MIT mathematics faculty as Professor in 2005, coming

from the Courant Institute, where he had been on the faculty since 1995. He completed his PhD under Christopher Croke at the University of Pennsylvania in 1992, and did postdoctoral work at Courant and MSRI.

In addition to the recent Veblen Prize, Colding has received many honors, including an invited address at ICM98 and at the Congress of the German Mathematical Society 2003. More recently, he gave the 2008 Mordell Lecture at the University of Cambridge and the 2010 Cantrell Lectures at the University of Georgia. He is a foreign member of the Royal Danish Academy of Science and Letters and received an

honorary professorship at the University of Copenhagen in 2006. He was elected Fellow of the American Academy of Arts & Sciences in 2008.

**Benjamin Brubaker** has been appointed the Cecil and Ida Green Career Development Assistant Professor of Mathematics. Ben is a number theorist working in analytic number theory and the theory of automorphic forms; his research also draws on representation theory and combinatorics. Among his contributions are nonvanishing results for central values of L-functions of twists of automorphic representations, and the development of the theory of multiple Dirichlet series with Bump, Friedberg, and Hoffstein. The latter line of research has connections to many other areas within mathematics and physics, and in particular led recently to a link to crystal graphs. Ben is a gifted teacher who has inspired hundreds of students in subjects such as Fourier analysis, number theory and calculus. Ben received his PhD from Brown in 2003 and was appointed Szegő Assistant Professor at Stanford before coming to MIT in 2006.



## A minority perspective



**William Vélez**, Distinguished Professor of Mathematics at the University of Arizona, wants to take the National Science Foundation seriously when it comes to underrepresented minorities. “The NSF does have this strategic plan,” he says. “They recognize that the workforce of the United States is aging, and that in order to meet the demand, we need to bring in women and minorities and persons with disabilities into STEM careers. If we in the university accept money from the National Science Foundation, shouldn’t we also be supporting their strategic plan?”

Vélez raised this question in a talk entitled, “The Mathematical Enterprise: A Minority Perspective,” hosted by the MIT mathematics department on April 5, 2010. The event was attended by about 85 students, faculty, and administrators, and was presented as part of the department’s ongoing effort to increase underrepresented minorities at all levels.

A former president of the Society for Advancing Hispanics/Chicanos and Native Americans in Science (SACNAS), Vélez made an important distinction: foreign-born students are not underserved minorities, even if they are members of underrepresented groups. “I happen to think we should *always* have large numbers of international students in our graduate programs. But 50 percent” — roughly the current proportion of math PhDs granted to foreign-born students by U.S. universities — “I think represents a system that is out of balance.”

Vélez believes that efforts by mathematics departments to recruit underserved minori-

ties need to shift. “Focusing on recruiting faculty into faculty lines — that’s *way* too long-range,” he said. Instead, “We really have to start paying attention to recruiting domestic students into our graduate programs.”

Vélez has been very active along these lines at the University of Arizona. “I send out probably 5,000 messages a semester, telling students that I think they should be adding the math major; here’s the schedule of courses; here’s some opportunities that would come your way by adding more mathematics to your undergraduate schedule.”

Of course, he allowed, top mathematics departments want the best students. But what, he asked, does *best* mean? “Could it mean that *best* actually means what’s best for this country? Should we bring in the best students that would serve to motivate future generations of mathematicians and scientists so that we have a more diverse culture in our mathematics departments?”

## 2010 Doctorates

**Jeffrey Aristoff**, “On Falling Spheres: the Dynamics of Water Entry, and Descent along a Flexible Beam,” under John Bush. Jeff is now a postdoc at Princeton.

**Michael Baym**, “Large, Noisy, and Incomplete: Mathematics for Modern Biology,” under Bonnie Berger. Michael is now an NSF mathematical science postdoc at Harvard Medical School.

**Damian Burch**, “Intercalation Dynamics in Lithium-Ion Batteries,” under Martin Bazant. Damien is now an engineer at Exxon Mobil.

**L. Christopher Evans**, “A Strong Maximum Principle for Reaction-Diffusion Systems and a Weak Convergence Scheme for Reflected Stochastic Differential Equations,” under Dan Stroock. Chris is now a postdoc at the University of Missouri.

**Martin Frankland**, “Quillen Cohomology of Pi-Algebras and Application to Their Realization,” under Haynes Miller. Martin is now a postdoc at UIUC.

**Jennifer French**, “Derived Mapping Spaces as Models for Localizations,” under Mark Behrens. Jennifer works freelance for Shmoop, an educational non-profit based in California.

**Matthew Gelvin**, “Fusion Action Systems,” under Haynes Miller. Matt is now a postdoc at the University of Copenhagen.

**Zhenqi He**, “Odd Dimensional Symplectic Manifold,” under Victor Guillemin. Zhenqi

is now working at Bank of America/Merrill Lynch in NYC.

**Xia (Carol) Hua**, “Testing Regression Models with Residuals as Data,” under Richard Dudley. Xia is now working for Oracle in California.

**Christopher Kottke**, “Index Theorems and Magnetic Monopoles on Asymptotically Conic Manifolds,” under Richard Melrose. Chris is now a postdoc at Brown.

**Brian Lehmann**, “Numerical Properties of Pseudo-Effective Divisors,” under James McKernan. Brian is now an NSF postdoc at the University of Michigan.

**Qian Lin**, “Modules for Affine Lie Algebras at the Critical Level and Quantum Groups,” under Roman Bezrukavnikov. Qian is now working for Oracle in California.

**Ricky Liu**, “Specht Modules and Schubert Varieties for General Diagrams,” under Alex Postnikov. Ricky is at the University of Minnesota for the first year of his NSF postdoc, and will then transfer the remainder of his postdoc to the University of Michigan.

**William Lopes**, “The Seiberg-Witten Equations on a Surface Times a Circle,” under Tom Mrowka. William is now at the University of Chicago.

**Kevin Matulef**, “Testing and Learning Boolean Functions,” under Ronitt Rubinfeld (EECS). Kevin is now a postdoc at the Institute for Theoretical Computer Science at Tsinghua

University, China.

**Peter McNamara**, “Whittaker Functions on Metaplectic Groups,” under Ben Brubaker. Peter is now a postdoc at Stanford.

**Karola Mészáros**, “Root Polytopes, Triangulations, and Subdivision Algebras,” under Richard Stanley. Karola will be a postdoc at the University of Michigan next year.

**Oaz Nir**, “Single-cell Morphological Data Reveals Signaling Network Architecture” (in the field of Mathematics and Health Sciences and Technology), under Bonnie Berger. Oaz is now at Hudson River Trading in NYC.

**Angelica Osorno**, “An Infinite Loop Space Structure for K-theory of Bimonoidal Categories,” under Mark Behrens. Angelica is now a postdoc at the University of Chicago.

**Ana Rita Pissarra Pires**, “Origami Manifolds,” under Victor Guillemin. Ana Rita is a Lecturer in the MIT Math Department.

**Amanda Redlich**, “Unbalanced Allocations,” under Peter Shor. Amanda is an NSF postdoc at Rutgers.

**Fang Wang**, “Radiation Field for Einstein Vacuum Equations,” under Richard Melrose. Fang is a postdoc at Princeton.

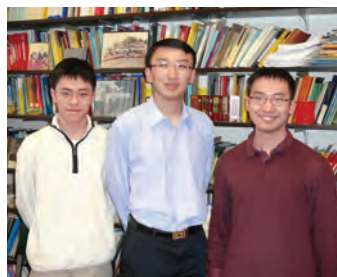
**Ting Xue**, “Nilpotent Orbits in Characteristic 2 and the Springer Correspondence,” under George Lusztig. Ting is a postdoc at Northwestern.

## Student awards

**Craig Desjardins** and **David Jordan** received the Charles and Holly Housman Award for Excellence in undergraduate teaching. **Roman Travkin** received the Charles W. and Jennifer C. Johnson Prize for his outstanding paper accepted for publication. Roman was also selected for an Albert Memorial Fellowship by the Dean of Graduate Education. **Yufei Zhao** '10 received the Jon A. Bucsela Prize in Mathematics for distinguished scholastic achievement, professional promise, and enthusiasm for mathematics. Yufei was also awarded the Gates Cambridge Scholarship for an outstanding student outside the UK to study at the University of Cambridge. **Charmaine Sia** '10 was a co-winner of the AWM Alice T. Schafer Prize for excellence in mathematics by an undergraduate woman. Charmaine also received the AMITA Senior Academic Award. **Maria Monks** '10 received a Hertz Fellowship, and **Vinayak Muralidhar** '10 a Marshall Scholarship for graduate study in the UK. **David Greenberg** '11 won the 2010 Laya and Jerome B. Wiesner Awards in the Arts at MIT.

For their MIT RSI projects, high-schoolers **Akhil Mathew** and **Lynnelle Ye** won third (\$50,000) and fourth (\$40,000) place respectively in the Intel Science Talent Search. Lynnelle Ye also placed second (\$50,000) in the 2009 Siemens Competition for her RSI project, and tied for second in the first Math Prize for Girls contest (co-organized by Ravi Boppana, MIT PhD '86).

## 2009 Putnam triumphs



MIT's winning team

The MIT team placed first in the 2009 William Lowell Putnam Mathematical Competition, the third time the team has placed first since 2000! The winning team, seniors **Qingchun Ren**, **Bohuan Zhan**, and **Yufei Zhao**, were mentored by Professor Richard Stanley.

Once again, MIT undergraduate students dominated the competition overall, with a record one-third (28 out of 76) of the top scorers (honorable mention and higher). Here are the juicy details:

■ **Putnam Fellows: 2/5** Qingchun Ren, Yufei Zhao

■ **Next twenty: 6/20**

Sergei Bernstein, Whan Ghang, Panupong Pasupat, Colin Sandon, Jacob Steinhardt, and Bohua Zhan

■ **Honorable Mentions: 20/56**

Arkipov, Berman, Borsenco, Bujokas, Christiano, Deng, Gupta, Hoch, Kishore, Lee, Liu, Luo, Oliveira Pinto, Rolnick, Rush, Sankar, Schneider, Shi, Smith, and Yuan

## Making a Difference

Inspired by the experience of their son (Matt Huang '10) as a math major at MIT—and how important mathematics has been in their own lives—MIT parents **Chi-Fu Huang** and **Marina Chen** have spearheaded an initiative to endow the summer programs RSI and SPUR, pledging a major gift and soliciting friends and colleagues for additional support.



Chi-Fu Huang and Marina Chen

To date, their campaign has raised more than \$1 million, out of a \$2.5 million goal. **Peiti Tung** '79 (VI-3), SM '80 (VI), and **Tim Lu** PhD '92 (XVIII) were two of the first alumni and parents who have since joined this campaign.

Chen said she and Huang were inspired to support the department after a meeting with department head Michael Sipser. "Mike articulated the need for supporting the summer research programs and made us realize how important it was to continue nurturing these young talents."

"Mathematics," Huang says, "permeates both my academic and business careers." While pursuing his PhD at Stanford, he grew puzzled by a particular problem in financial economics. Realizing he lacked the mathematical knowledge to solve the problem, he spent the next year taking graduate level math courses. He later made significant contributions to financial market research deploying stochastic processes. He was an MIT Sloan faculty member for over ten years, and now serves as non-executive chairman for the firm he co-founded, Platinum Grove Asset Management.



Tim Lu with David Benney

Raised during China's Cultural Revolution, Tim Lu spent his formative years working in a rural farm and factory. Lu came to MIT after studying at Technical University of Nova Scotia, where math department head Surain Sarwal recognized Lu's ability and called his former advisor, David Benney. Benney, then head of the Applied Mathematics Group, became Lu's thesis advisor. Lu now serves as a Managing Director and head of the Liability Management Group at Credit Suisse. When Chi-Fu Huang and Michael Sipser explained that the recession and cuts to the MIT operating budgets had placed the summer programs in jeopardy, Lu says, "I knew then that I had to do something." The support is from the Lu Maokang and Sun Rendu Memorial Fund to honor his late parents, who were his very first educators, yet did not see his MIT graduation.

"Mathematics is the mother of all sciences. We, and many of our friends, directly or indirectly, benefited in our careers from our education in math."

—Chi-Fu Huang

Peiti Tung had already established an MIT scholarship honoring her father and had intended to continue supporting MIT through that fund. When Chen and Huang approached her about joining them in the campaign to support the math summer programs, they told her that while "Asians are well represented as students, they have not been as visible as donors supporting higher education." By joining them, Chen and

Huang argued, Tung would draw greater awareness from their community and attract further support. Tung spent two weeks praying for guidance before deciding that "God loves math too!"

## Changing of the guard: Seven faculty members retire

“When seven members of any department retire in the same year,” said Department Head Michael Sipser, “it’s got to be an event of major significance. But when *these particular* seven colleagues of ours retire from *this particular* department in the same year, I would say it’s truly a whopper of an occasion.” Sipser’s remarks introduced a retirement luncheon at the MIT Faculty Club on May 14<sup>th</sup>, attended by friends, colleagues, and family members of retiring professors Mike Artin, David Benney, Dan Kleitman, Arthur Mattuck, Is Singer, Dan Stroock, and Alar Toomre. The gathering recognized a generational shift that was, Sipser guessed, “unprecedented.”

The longest-serving retirees had trod the halls of Building 2 for over half a century. They came from near and far: Brooklyn, Detroit, Germany, Estonia, and New Zealand. Four are pure mathematicians, three are applied.

Most were hired in the 1950s and ’60s, back when Ted Martin and Norman Levinson—soon joined by the sage counsel and talent-spotting instincts of Is

Singer—had been busily engaged in advancing the department from a service role to the topmost tier of research and teaching departments in the country.

Their combined contributions to mathematics and to MIT would take pages to describe.

They had held the department’s most prestigious professorships, chairs named for Norbert Wiener, John D. MacArthur, and Jim Simons. They included Guggenheim, MacArthur, Fairchild, and American Academy of Arts & Sciences fellows and National Academy of Sciences members. Among their long list of honors were the Abel prize, the National Medal of Science, the Eugene Wigner medal, and the American Mathematical Society’s Steele and Bôcher Prizes. They included an Institute Professor and winners of the MacVicar and the Killian and sundry other MIT honors. They had served as department heads, chairs of the pure and applied committees, president of the AMS, and members of numerous other com-

mittees and councils. They had edited prominent journals, written influential textbooks, and transformed the teaching of mathematics.

Several retirees spoke at the occasion. Alar Toomre recalled his first days as an assistant professor at the department in 1963. “Toomre here impresses me,” he remembered Department Head Ted Martin saying, “because he’s the first one whose nominal retirement date—if he makes it through tenure—would be in the 21<sup>st</sup> century.” He praised Norman Levinson and others who “had the foresight to actually construe applied mathematics broadly enough to include the fluid dynamics of galaxies.”

Danny Kleitman summed up his life as “kind of a miracle,” as if “the world was set up to make me fortunate.” Others seemed to view their impending retirement with a mixture of relief and

alarm. “This is a nice event,” said Dan Stroock cheerfully, “and part of the curse of it is taken off by sharing it with so many others.”

Arthur Mattuck characterized his five-plus decades on the faculty as “in some sense a cautionary tale,” including “a few things

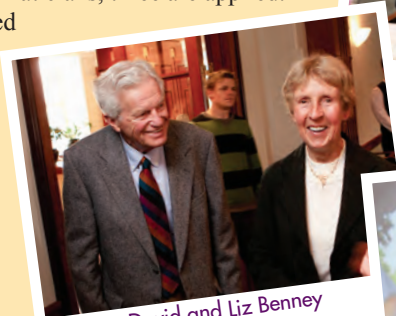
maybe that I got right, but a lot of things I got wrong.” He spoke of changing fashions in research and teaching and his own continued efforts to adapt the department’s teaching to the mathematics that MIT students needed

and were developmentally ready for. “In view of rapidly changing fashions, and uncertainty as to what will be good,” Mattuck urged that “the math department continue to experiment, but that they do it eclectically ... allowing for different options.”

Mattuck’s thoughtful comments brought the event to a close. Though no two-hour celebration could do justice to the enormous contributions that these seven have made, “the main point,” as David Vogan wrote to them afterwards, “is to say ‘Thank you,’ and to clap.”



Mike Artin and Carolyn Artin



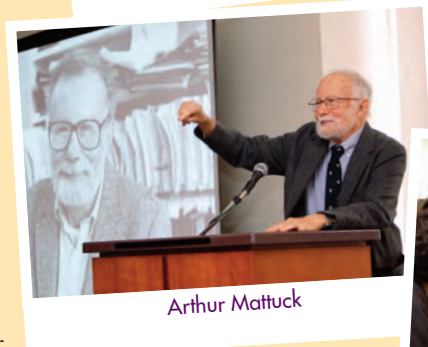
David and Liz Benney



Danny Kleitman



Dan and Lucy Stroock, Victor Kac



Arthur Mattuck



Roman Bezrukavnikov, Pavel Etingof, Is Singer, Richard Melrose



Joyce and Alar Toomre



Herman Chernoff and Lou Howard (Emeriti)



Danny Kleitman



Sig Helgason, Carla Kirmani,  
Phyllis Ruby Block, Linda Okun



David Jerison, Hartley Rogers, John Bush

## More scenes from the retirement luncheon



Avisha Lalla and Lika Yurkovetsky



Alar Toomre



Richard Stanley, Joanne Jonsson,  
David Vogan



Ulla and Willem Malkus (Emeriti),  
Ruben Rosales (center)

## Farewell Joanne and Linda

Dozens of friends, faculty, and fellow administrators gathered twice in May to celebrate the careers of our beloved administrators, Joanne Jonsson and Linda Okun.

Joanne served the department for 32 years, most of them as Academic Administrator. Hired by Jim Munkres to run the Undergraduate Math Office, she quickly became indispensable to faculty and students alike. With her dedication, inspired leadership, and creativity, she developed helpful tools still used today, such as the math major check sheets, which clearly and elegantly summarize student progress for busy advisors. Always ready to answer a question about department policies and Institute rules, Joanne kept track of every student



and their progress or lack thereof. MIT can be confusing, but Joanne knew everyone in key committee roles and all the tricks for getting things done. It is difficult to imagine how we will manage without her. She could be tough, appropriately so, with students—and faculty—who weren't doing what they ought to be doing. Joanne will be remembered in the department as a warm, caring colleague and friend to whom one could always go for helpful, sensible advice or a sympathetic ear, over a cup of coffee.

Graduate Administrator Linda Okun left her position after fourteen years with the department. Linda ran the graduate office after her predecessor, Phyllis

Ruby Block, retired. Linda helped graduate students throughout their time at MIT, from coordinating admissions and arranging visits by prospective students to graduation and job searches. Among her numerous contributions to the department and its students over the years have been the graduate program brochure and the “Dinners with Faculty” program for first-year graduate students. “Linda cares,” said Michael Sipser in his speech at her farewell party. “I cannot tell you how many students have expressed to me their sadness that Linda will be leaving the department.”



Good luck Joanne and Linda! We'll miss you.

## Alumni corner

*We recently received this story from Seymour Haber of Temple University (retired).*

My doctoral oral examination was truly peculiar. At MIT, in those days, the hopeful student picked his own exam committee—three professors, in three mathematical subjects, each to ask questions about his subject. My choices were:

Norbert Wiener	harmonic analysis
John Nash	mathematical logic
Warren Ambrose	measure theory

When I got to the exam room, I found two additional professors: George Thomas, who was the department's executive officer and sat in on all doctoral orals, and Norman Levinson. I had no idea why Levinson was there. Years later, I heard that Ted Martin, the department head, saw the list of people on my committee and exclaimed "There's no one sane on that committee!" So he sent Levinson, who was eminently sane.

It certainly was a strange committee. I had taken just a single semester course with Wiener, a reading course at that. It hadn't

involved much contact with Wiener. And he gave me a B, which was a low grade for a graduate student. (The system was: A = Alright, B = Bad, C = Catastrophically bad, D = "Please leave the math program.") Wiener was disappointed with my work: he had thought I was Armand Siegel, a physicist who was supposed to be doing research with Wiener, and I wasn't advancing the research. (I was about the same size and shape as Siegel, and Wiener's eyesight was poor. Eventually Wiener's secretary figured out what was going on and told him.) So Wiener was a strange choice, but I wanted to do research in harmonic analysis, and that was his field. Also, he was the best mathematician America had ever produced, at that time.

Nash was another problem. He was still sane then, but strange. And he had it in for me. (I hadn't treated him with the respect he thought was his due. He was not much older than me, and was in the same social group of grad students that I was in. He was a much better mathematician than I was and perhaps deserved respect, but I thought him arrogant, and respect wasn't one of my strengths.) He informed me that he disagreed with MIT's "three subjects" strategy and would ask me questions "from the whole range of mathematics"! Well, logic was my second-favorite branch of math, and Nash had taught my logic course.

I had never taken a course with Ambrose, but he taught measure theory, and I needed a third subject. I figured I could quickly read up on measure theory in Halmos's book.

I hadn't intended to take the oral just then—it was April or May (1953), and I'd planned to cram for it over the summer. But Thomas, who had it in for me even worse than Nash, had pressured me into taking it then.

So the exam began. Levinson acted as "master of ceremonies" and called on Nash first. Nash asked me a few routine questions, then

came up with a blockbuster: "Can you describe Post's proof of the unsolvability of the Word Problem for semigroups?" This was a totally unfair question. Nash had come nowhere near the theorem in the course he taught: it was pretty recent work. But I answered it without hesitation, and correctly. Two days earlier I had wearied of cramming for the exam and had decided to relax—by reading Post's proof of the unsolvability of the Word Problem for semigroups! I can't explain the coincidence. Such reading was not normal relaxation for me.

Nash continued. "I'll now ask you ..." But Levinson stopped him, saying "Let's first have another member of the committee ask some questions. Professor Wiener?"

"Uh, speaking of semigroups," Wiener began, "could you, uh, tell us the connection between, uh, semigroups and relativity theory?"

I had never heard of any such thing. I spent a few seconds searching my memory to see whether I *had* ever heard of any such thing and then said, "I don't know that." Silence followed. Finally Levinson turned to Wiener and said, "What *is* the connection between semigroups and relativity theory?" Wiener got up, went to the blackboard, and lectured for twenty minutes about an idea he'd had the previous week connecting semigroups and relativity theory! After that, the exam was a farce. Wiener asked me a few easy questions about Fourier series, and Ambrose asked some easy questions about measure theory, and they passed me. I had the summer free.

*Haber received his PhD under Norman Levinson in 1954.*

### Remembering Fagi Levinson



Zipporah "Fagi" Levinson, wife of the late Institute Professor Norman Levinson and "den mother" to the mathematics department for decades, died on Dec. 11, 2009, at the age of 93. During her husband's influential tenure and for decades after his death in 1975, Fagi looked after the department's social fabric, welcoming new faculty, presiding over social gatherings, solving problems, and serving as general confidante. Family and faculty throughout MIT paid tribute to Fagi at a remembrance tea, arranged by the department and Fagi's daughter Joan Zorza, on March 1.

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