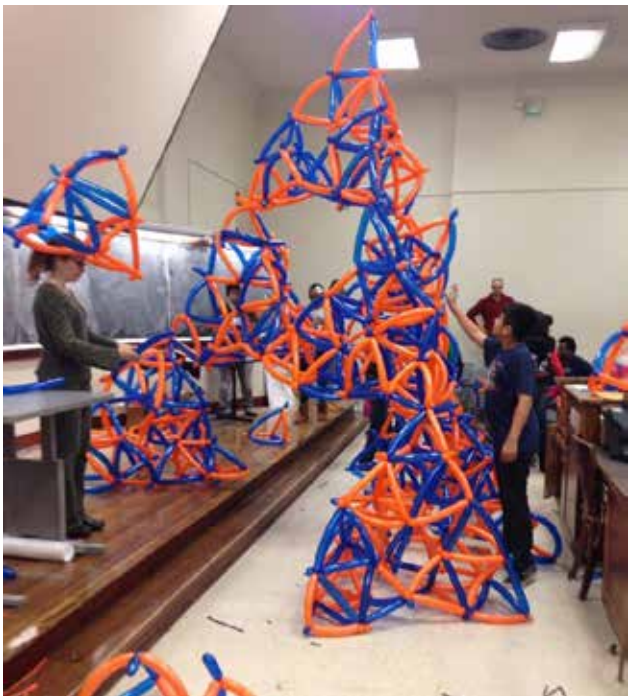
Math Times

Department of Mathematics — Spring/Summer 2015

MoSAIC festival connects mathematics, arts, and technologies

The weekend before Thanksgiving is usually a quiet one in Altgeld Hall, but in Fall 2014 the corridors were abuzz with activity. More than 350 people from all over the state packed our lecture halls and classrooms, as the department celebrated its tradition of mathematics, art, and public engagement by hosting the MoSAIC Festival on November 21-22, 2014 on the University of Illinois campus.



MoSAIC (Mathematics of Science, Art, Industry, Culture) are STEAM (Science, Technology, Art, and Mathematics) festivals to promote the connection between mathematics, arts, and technologies. The department was selected to host the festival in a competitive process. Earlier festivals were in New York City and Berkeley, CA, and subsequently the festival has visited Portland, OR, and Raleigh, NC.

The festival kicked off with a mathematical film festival on Friday evening, and had an ongoing exhibition featuring 45 works of mathematically inspired fine art: prints, sculpture, fiber arts, 3D prints, carved stone, clothing, and ceramics by some of the most renowned math-inspired artists in the world. On Saturday, there were talks and workshops by several famous mathematical artists and mathematicians.

The many activities of our undergraduate research community, the Illinois Geometry Lab (IGL), contributed greatly to the success of the festival. Students and alumni affiliated with the IGL contributed workshops on Saturday, doubling to six the number of workshops available to festival participants. This was a fine thing: we originally planned to run three workshops at a time, giving the workshop hosts a break between sessions. But the IGL has also been offering classes on Saturday to fifth and sixth graders in the Chicago Pre-College Science and Engineering Program (ChiS&E), and when three buses carrying more than 150 ChiS&E students and parents arrived on Saturday morning, it was all hands on deck.

Two of our PhD alumni, Judy Holdener (1994) and Anton Lukyanenko (2014), offered workshops as part of the festival. Judy gave a workshop on "Fun with iterative balloon-twisting," where attendees constructed an enormous Sierpinski Tetrahedron with balloons, almost filling up our largest lecture theater (top photo at left). Anton's workshop, "Parallel parking in hyperbolic space," explored hyperbolic space using modified remote control cars (bottom photo).

The MoSAIC Festival was supported by John Deere, the Mathematical Sciences Research Institute, The Bridges Organization, and the Office of Public Engagement, the Illinois Geometry Lab, and the Department of Mathematics at the University of Illinois at Urbana-Champaign.

In this issue:

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From the Chair

Alumni and Friends,

I always look forward to the spring issue of the Math Times, since it offers an opportunity to celebrate the accomplishments of our faculty, students, and staff.

What is really striking, in addition to the accomplishments of the individual award winners, is how many award winners we have, and the consistency with which Department members win awards.

For example, Hal Schenck won the LAS Dean's Award for Undergraduate Teaching, the tenth time in 11 years that a Mathematics faculty member has won this award. One of the past winners is Rick Gorvett, who this year won the Campus Award for Excellence in Undergraduate Advising. The following pages list awards to faculty, staff, and undergraduate and graduate students, for research, teaching, and service.

It is a privilege to work with such exceptional people, particularly when that work involves helping students to access the many opportunities our department offers. This newsletter lists a substantial number of scholarship awards, many of which have come into existence in just the last few years. In addition to the scholarships to current students, this spring the department was able to offer generous scholarships to 35 prospective math majors. I am very grateful to the alumni and friends who have made such powerful investments in our students.

Enabling faculty and students to do great work involves more than resources to support research and scholarships to support access: we must also provide outstanding facilities. As the department has grown in response to increasing demand for mathematics, it has become ever more challenging to find space for everything we need and aspire to do. The conversations with the campus and with other stakeholders concerning the renovation of Altgeld and Illini Halls continue. I am very excited about the potential that these renovations will unleash in the outstanding people who work and study in this department.

Matthew Ando
Professor and Chair
Department of Mathematics

Illinois Math Reception

The 2016 Joint Mathematics Meetings will be held January 6-9, 2016, in Seattle, WA. The Illinois Department of Mathematics will host a reception at the meetings on January 8, 2016 at the Washington State Convention Center in Seattle. Everyone ever connected with the department is encouraged to get together for conversation and to hear about mathematics at the University of Illinois at Urbana-Champaign. More details will be posted on the department website www.math.illinois.edu.

Homecoming 2015

Mark your calendars for Homecoming 2015 to be held Saturday, October 24, 2015, when the Illini match up against Wisconsin. Our tent will be out in front of Altgeld Hall again this year. More information is posted at www.math.illinois.edu/homecoming/ or visit us on Facebook. We invite all mathematics alumni to join us for a complimentary buffet lunch.

Ted Chien

by Jim Dey

Ted Chien (BS Math&CS 1984), President and CEO, Sullivan, Cotter and Associates, Inc.

Ted Chien thought he would become an engineer like his father. But his plan to dabble in mathematics and computer science led to a permanent detour into those fields followed by a 30-plus year career in business.

"I enjoyed the education I received in the College of Liberal Arts and Sciences. It gave me a broader experience," said Chien, a 1984 University of Illinois graduate. "I think LAS probably prepared me better for a business career."

Now the President and CEO of the Chicago-based consulting firm of Sullivan, Cotter and Associates, Inc. the 52-year-old Chien said his fascination for those subjects caused him to deviate from the traditional path followed by the children of Chinese immigrants.

"I can't think of any (Chinese) friend I have who isn't a physician or engineer," he said, noting that his younger brother is a physician.

Chien's parents emigrated from the People's Republic of China in the 1950s, and Chien ended up enrolling at the UI for the simplest of reasons. His family lived in Urbana during part of his childhood while his grandfather and father, also UI students, worked for a Chinese University in Shanghai and the Illinois Environmental Protection Agency, respectively.

"Growing up in Urbana, I pretty much figured I'd end up at the UI. Being Chinese, you tend to look for schools that are great in the sciences," he said. "We were sports fans, so following the Fighting Illini also was a big thing."

Chien's family ultimately moved to Rockford, where he graduated from high school.

Chien's firm advises tax-exempt and not-for-profit organizations—primarily hospitals and health systems—on executive compensation and benefits packages. His latest job has taken him nearly full circle in the health care arena.

Chien began his career as an actuary and spent much of his career with Watson Wyatt (now Towers Watson) advising employers on employee health benefit packages, moved on to work for UnitedHealth Group, a diversified health care company with a strong focus in managing risk and information technology, and now advises health care providers.

"The only part of the health care field I have not worked in is government," he said.

Noting that "there aren't too many things that don't involve numbers," Chien compared what he does today to what he studied at the UI.

He was drawn to mathematics and computer science because "I just loved looking at formulas and solving problems."

"There is a process to everything. ...A lot of the problems we solve are all about probabilities," he said.

Take the issue of devising an executive compensation plan that is competitive in the marketplace. It involves using factors that are known as well as those that are not.

"You use the data you have to benchmark and forecast the market and then advise clients as to what the information is telling you and in what context," he explained.

Providing that kind of insight and information to major firms keeps Chien busy. He travels so often that it's not as much fun anymore.

"It gets old. It's not as glamorous as some people think it is," he said. "In January and February, I was in Minneapolis the equivalent of about 10 days. Sometimes I think I've spent more time living on a Delta plane than in my own home."

Still, Chien loves his work and enjoys Minneapolis, calling the quality of life "tremendous. ... the only drawback is the length of the winter."

A father of three adult children, Chien keeps fit through golf, tennis and physical exercise. He calls walking, running and biking "the things I enjoy."

Although a huge fan of the UI, Chien said he did not have much contact with the University while busy with his career and raising a family. But he said he became re-involved with the UI's math department after the Alumni Association reached out to touch base and he separately attended a memorial service that brought him back to the campus. The individual visits led to an invitation to join the Department of Mathematics's Development Advisory Board.

"(Board members) hear what the department is doing and provide insight from the private sector," he said. "I always wanted to get involved with the University other than to follow the athletic program. Here, I get to meet some really accomplished alumni, interact, learn and hopefully make a contribution to furthering the development of the Math program. I think of it as an easy way to get reacquainted and see where it takes me."

It's not just the UI, the math department or even meeting students that have been a plus. Returning to campus-area landmarks helped renew his appetite for the old days.

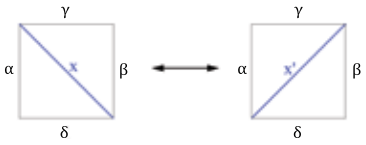
"The best part was going back to Papa Del's," said Chien, referring to a campus restaurant renowned for its delicious thick and thin pizzas.

Jim Dey is a columnist and editorial writer for The News-Gazette *in Champaign-Urbana.*

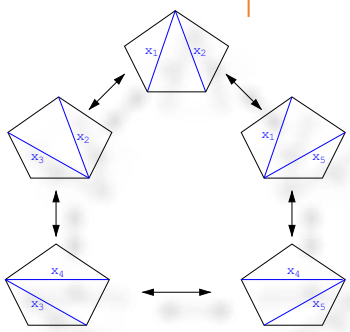
DISCRETE INTEGRABLE SYSTEMS

by Rinat Kedem

In statistical mechanics and quantum field theories, integrability can manifest itself in several different ways. Usually integrable systems have a continuous spectral parameter, and are related to integrable differential equations. Discrete integrable systems appear in the solution of some of the same systems, but are a lesser studied phenomenon.



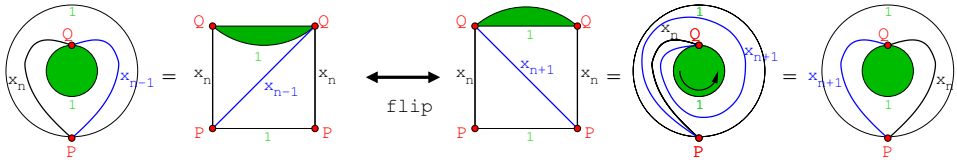
Consider the triangulations of an n-gon in hyperbolic space. We assign a number called a λ-length to each edge and to the two diagonals of each 4-gon in hyperbolic space:



The arc lengths of the two diagonals are related by a "flip", the Ptolemy relation: $x\,x' = \alpha\beta + \gamma\delta$. With each external edge having length 1, and diagonals of an initial triangulation having lengths $x_1, x_2, \ldots$, we proceed by performing "flips" for each rectangle until we cycle through all possible triangulations, of which there is a finite number. The collection of arc lengths is thus a finite set. If n=5, there are two diagonals in any triangulation. Start with arc lengths x_1, x_2; then there are exactly five arc lengths in the set of all triangulations. To read this picture (image at left), we write $x_{n+1}\,x_{n-1} = x_n + 1$, and note that this sequence is 5-periodic in n.

These arc lengths are cluster variables of a finite-type cluster algebra, and the "flip" relation is called a mutation in the cluster algebra. Fomin and Zelevinsky showed that finite cluster algebras are classified by the finite type Dynkin diagrams.

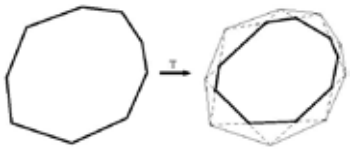
More interesting are evolutions which are not periodic, but integrable. The simplest example related to triangulations of the annulus, is with one marked point on the inner and outer edges



The resulting cluster algebra is not of finite type: There are an infinite number of triangulations and arc lengths. If we call the two initial arc lengths x_1, x_2 then we have the relation $x_{n+1}\,x_{n-1} = x_n^{\,2} + 1$ for $n \in \mathbb{Z}$. It is an evolution related to the Cartan matrix of the affine algebra $\hat{\mathfrak{sl}}_2$, which we call the A_1 Q-system.

Considered as a discrete evolution in the "time" variable n, there is a conserved quantity: the Laurent polynomial $C = x_{k+1}x_k^{-1} + x_{k+1}^{-1}x_k^{-1} + x_{k+1}^{-1}x_k$ is independent of k. Therefore this equation is integrable and the variables x_n satisfy a 3-term linear recursion relation with constant coefficients, one of which is the conserved quantity. This system is related to the quantum Toda equation.

Another geometric example of an integrable discrete evolution is the pentagram map (image at right), the map T acting in projective 2-space.



The map T is periodic for $N = 5, 6$ and is otherwise integrable. In the continuum limit, it is related to the KdV equation. This discrete evolution and its generalizations can also be described as a cluster algebra.

Given any algebraic system, a good question to ask is: What is its non-commutative analogue? For example, the A_1 Q-system has the following non-commuting analogue, introduced by Kontsevich: $X_{n+1}\,K\,X_{n-1} = X_n^{\,2} + 1$. Here $K = X_{n+1}^{-1}\,X_n\,X_{n+1}\,X_n^{-1}$ is an additional invariant, and the X_ns are invertible non-commuting variables. The system is integrable with the same conserved quantity C as above, with the x_i's changed to X_i's and written in the same order. It can be solved using partition functions of paths with non-commutative weights. In the special case where K is central, this system is a quantum cluster algebra.

The quantum versions of the Q-systems of higher rank are related to the quantum difference Toda hierarchy. Their conserved quantities, acting on the space of special Whittaker functions, act as the Toda Hamiltonians. These functions can be interpreted as partition functions of graded conformal blocks of Wess-Zumino-Witten conformal field theories at level-1, or characters of Demazure modules.

Rinat Kedem came to Illinois in 2001. She received her PhD in physics at the Institute for Theoretical Physics in Stony Brook with Barry McCoy, specializing in integrable models in statistical mechanics. She subsequently did her postdoctoral work with M. Jimbo and T. Miwa at the Kyoto School of integrable systems. Professor Kedem's specialty is in the intersection of character theory and mathematical physics, in particular, fermionic formulas for modular functions. She is the 2014-2016 Lois M. Lackner Faculty Scholar and she gave an invited lecture at the 2014 International Congress of Mathematicians in Seoul. Visit her website at www.math.illinois.edu/~rinat/.

CAMPUS AND COLLEGE OF LAS AWARDS

Campus Award for Excellence in Undergraduate Advising

Rick Gorvett is the Director of the department's actuarial science program and academic advisor to students in the program. In 2005, Gorvett was named State Farm Companies Foundation Scholar in Actuarial Science, and in 2008 he received the LAS Dean's Award for Excellence in Undergraduate Teaching. Students praise the deep passion and endless enthusiasm that he displays when advising students, the personal attention he devotes to each student, and the wealth of knowledge and career advice he can offer based on his many years of experience in both industry and academia. Gorvett's lasting impact is evident in the reputation the program enjoys as a prime recruiting ground for companies, and the extraordinary level of alumni loyalty and support it receives. Under Gorvett's leadership, the Actuarial Science program at Illinois has seen tremendous growth. The number of actuarial science graduates per year has nearly tripled, and internship and research opportunities for its students have multiplied. In 2010, the program was named a Center of Actuarial Excellence by the Society of Actuaries.

Campus Award for Excellence in Undergraduate Teaching by Graduate Teaching Assistants and LAS Lynn Martin Award for Distingished Women Teachers

Elyse Yeager will receive her PhD in May 2015 under the direction of Alexandr Kostochka, as well as her MS in the teaching of mathematics. She received her BS in Mathematics in 2006 from the University of Alaska, Fairbanks, then spent two years as a Peace Corps volunteer, teaching middle school math and science and serving as a teacher trainer in a remote village in the West African state of Gambia. Following her return to the U.S., she completed her MS at West Virginia University in 2010. While there, she worked with the Louis Stokes Alliance for Minority Participation to help underrepresented minority students excel in STEM fields. Here at Illinois, Yeager has taught Calculus I, Calculus II, Matrix Theory, and Preparation for Calculus in a variety of formats, from standalone classes and traditional recitation sections, to active learning style Merit discussion sections targeted at underserved populations, to blended online/in-class formats. In 2012 she received the department's Brahana TA Instructional Award. In addition to her teaching at Illinois, Yeager served as volunteer instructor at the Danville Correctional Facility under the Education Justice Project, a pioneering program aimed at bringing college level education to prison populations. Yeager has served on the Grievance Committee of the Graduate Employees' Organization for the past three years and she is also currently serving on SAGE, the Students Advising on Graduate Education committee in the Graduate College. This fall she will be a tenure-track instructor at the University of British Columbia.

LAS Dean's Award for Excellence in Undergraduate Teaching

Professor **Hal Schenck** is currently the Associate Chair for Faculty in the department. "Dynamic, innovative, exciting, humorous, conscientious, and passionate" are some of the terms that students use to describe Schenck and his classes. His unique and engaging teaching style is captured in the following quote from one of the student letters of recommendation: "He would walk around the lecture hall and look for discarded odds and ends, mostly pencils, and offer them as prizes for the students who could correctly answer his problems first." Professor Schenck conducts research over an exceptionally wide variety of areas in both pure and applied mathematics. His current NSF grant (joint with Rich Sowers) is on "systematic risk and topology," and uses topology to study the dynamics of trading networks. Schenck earned his doctorate at Cornell University in 1997. He was an NSF postdoctoral research fellow at Harvard University. In 2001, he was appointed to the faculty at Texas A&M University, before coming to the University of Illinois in 2007.

LAS Award for Excellence in Undergraduate Teaching by Graduate Teaching Assistants

As an undergraduate, **Thomas Mahoney** studied mathematics and saxophone performance at Hastings College in Nebraska. He is now a fifth-year graduate student here at Illinois and is studying combinatorics under Professor Douglas West. He has taught calculus in several styles and enjoys employing active learning elements and technology in his classrooms. Mahoney has been included in the List of Teachers Ranked as Excellent every semester that he has taught. Mahoney also received the department's Brahana TA Instructional Award this year.

LAS Academic Professional Award

Tony Mullen is a member of the department's IT staff with a wide range of duties across all our platforms: Linux, Macintosh and Windows. He has totally revamped the printing infrastructure for the Mathematics Department, was instrumental in switching the department's instructional labs from a Macintosh to Windows operating system which is saving the department time and money, and he was also involved in simplifying email accounts attached to departmental administrative positions. Mullen has been very helpful during the department's IT staffing transition and has diligently handled the extra work in spite of health issues.

LAS Academic Staff Award

Kay Daly is the Office Manager in department's Undergraduate Office where she has been working for 22 years. She is in charge of the department's spring Commencement ceremony, manages the department's homegrown online gradebook, and serves as Unit Director of the department's charitable drive. Daly instills a calm but supportive atmosphere for undergraduate students visiting the office and she builds positive morale among our collection of permanent and faculty advisors.

FACULTY AND STAFF DEPARTMENT AWARDS

N. Tenney Peck Teaching Award in Mathematics

Philipp Hieronymi received his DPhil from the University of Oxford in 2008 under the supervision of Alex Wilkie. He was a DAAD fellow at the Fields Institute and McMaster University before joining the University of Illinois in 2010, first as J. L. Doob Research Assistant Professor, and since 2012 as tenure-track Assistant Professor. His research in logic focuses on ordered structures and their potential applications in analysis and geometry.

Hieronymi is a popular instructor who has earned consistently outstanding student evaluations across classes of all levels and sizes. He has appeared nine times on the List of Teachers Ranked Excellent, with several of these appearances being for large lecture service classes. He has been instrumental in the department's successful transition to a large lecture format for Math 415, our main undergraduate Linear Algebra class. Hieronymi has also been active on the outreach front, organizing the annual "Gathering for Gardner" events that celebrate the legacy of the popular mathematics writer Martin Gardner.

This award is named for Professor N. Tenney Peck who was a pioneer in the field of functional analysis, specializing in non-locally convex spaces, and was also a dedicated teacher with an open door for students.

Distinguished Teaching Award in Mathematics for Tenured Faculty

Lee DeVille received his PhD from Boston University in 2001. He joined the department in 2007 following postdoctoral positions at Rensselaer Polytechnic Institute and New York University's Courant Institute. His research is in stochastic analysis, dynamical systems, and applications, particularly in the life sciences. He is affiliated with the Carl R. Woese Institute for Genomic Biology.

A recipient of the N. Tenney Peck Teaching Award in Mathematics in 2010, DeVille has distinguished himself through his consistently high student ratings as well as his key role in several major curricular projects. Along with Professor Zoi Rapti, he has been instrumental in the creation of the Illinois Biomathematics Program, a one year program of special courses, seminars, and research experiences for undergraduates in mathematics and biology. He is currently working with Rapti and faculty in biology on designing a special calculus course for biology majors. Deville is also one of the directors of the PI4 program, which provides interdisciplinary training and internship opportunities for graduate students.

Distinguished Teaching Award in Mathematics for Non-Tenure-Track Faculty

Rebekah Gilbert, a visiting instructor since the fall of 2012, has been chiefly responsible for managing the Calculus & Mathematica program and developing new methods of incorporating technology into the calculus sequence. She has taught several Mathematica-based courses and redesigned such courses for the first two semesters of calculus and for differential equations. This year, Rebekah has worked with Professor Randy McCarthy in a project to pilot the use of technology in discussion sections for large lecture courses, through the pairing of interactive demonstrations and group work sheets that she created. Her student evaluations gave Rebekah extremely high ratings. Rebekah received her BS in mathematics from Grove City College in Pennsylvania and an MS from the Pennsylvania State University under the supervision of George Andrews. Her Master's degree involved original research leading to an article, "A Fine Rediscovery" which will appear this year in the *American Mathematical Monthly*.

Armin Straub is a J.L. Doob Research Assistant Professor. In the spring and fall of 2014, Armin received exceptionally high student ratings for the courses that he taught in differential equations and in linear algebra, which in the fall of 2014, for the first time, was taught only in large sections. The letter of nomination for Armin stressed his remarkably strong student feedback—extremely rare for those who teach service courses such as differential equations and linear algebra. Armin Straub received his Diplom from the Technical University in Darmstadt (Germany), and his PhD at Tulane University under the joint direction of Victor Moll at Tulane and Jonathan Borwein at the University of Newcastle (Australia). In 2013, he was a year-long visitor at the Max-Planck-Institute for Mathematics in Bonn. His research is at the interface of number theory, combinatorics, and special functions, with, at times, a strong influence from modular forms. He has published or had accepted a total of 29 refereed research publications.

Exceptional Merit Award in Mathematics for Non-Instructional Staff

Broderick Williamson, a Human Resource Associate, has been with the department for almost three years. Broderick is the first person that a new hire to this department has the opportunity to meet. It is vital that the hiring process go smoothly and Broderick is the one to make that happen. And he does—every day. He shows initiative with the HR process by continuously taking training to stay up-to-date with policy and rules that are ever-changing and by continuing to improve the hiring procedures in the department. This past year Broderick has really stepped up to the challenge of the department's hiring work load while our HR Director was on leave. Broderick made it possible to continue providing excellent HR service to our employees.

GRADUATE DEPARTMENT AWARDS

Bateman Prize in Number Theory

Arindam Roy, a sixth-year PhD student working with Professor Alexandru Zaharescu, will receive his PhD this summer. His main area of research is analytic number theory, specifically the famous Riemann zeta function. Arindam has published five papers, and has six others submitted for publication. He was one of the main organizers of the Graduate Student Number Theory Seminar held this past year and was also a recipient of the Bateman Fellowship in Number Theory this year. He will be a G.C. Evans Instructor at Rice University this fall.

Kuo-Tsai Chen Prize

Brian Collier is a fifth-year PhD student working with Professor Steven Bradlow. His work involves harmonic maps, Lie theory and complex differential geometry. In his thesis project, and subsequent related work, Brian has investigated various aspects of Higgs bundles. These complicated objects were introduced by Nigel Hitchin in a landmark 1987 paper. In physics, Higgs fields describe particles like the recently-discovered Higgs boson. In mathematics, Higgs bundles play a role in algebraic geometry, hyperkähler geometry, and integrable systems. Brian's research accomplishments have earned him invitations to speak in research seminars and workshops in the US, Singapore, and Europe.

Wolfgang Haken Prize in Geometry and Topology

Caglar Uyanik is a joint PhD student of Chris Leininger and Ilya Kapovich, working in geometric group theory. Caglar's work includes important results about dynamics on the space of geodesic currents on a free group. article "Generalized north-south dynamics on the space of geodesic currents" blends together for the first time Bonahon's theory about geodesic currents on hyperbolic surfaces and the theory of geodesic currents on free groups. In the process Caglar obtained useful and novel applications regarding the dynamics and geometry of subgroups of $Out(F_n)$.

The Wolfgang Haken Prize in Geometry and Topology, funded by private contributions and given for the first time this year, is awarded to a mathematics PhD student for outstanding research in geometry and topology. The prize is named after Professor Emeritus Wolfgang Haken, who was a member of the University of Illinois Mathematics Department from 1965 until his retirement in 1998. Professor Haken is a renowned topologist, particularly famous for his contributions to the 3-manifold topology and for the proof in 1976, together with Ken Appel, of the "Four Color Map" theorem.

Irving Reiner Memorial Award

Oliver Pechenik graduated from Oberlin College and came to Illinois as an NSF graduate fellow. His thesis work in algebraic combinatorics (under the supervision of Alexander Yong) investigates the Schubert calculus. His published and forthcoming contributions (with a variety of co-authors) include a new cyclic sieving phenomenon, a resolution of a conjecture of Propp and Roby, a simple proof of well-definedness of the Belkale-Kumar product and the first proved combinatorial rule for equivariant K-theory of Grassmannians.

The Irving Reiner Memorial Award, given for outstanding scholastic achievement in the field of algebra, is named in honor of Professor Reiner, a long-time member of our department who was a leader in the field of integral representation theory.

Brahana TA Instructional Award

Thomas Mahoney, a fifth-year PhD student studying combinatorics under Professor Douglas West, will receive his PhD this summer. He has taught Calculus in several styles and enjoys employing active learning elements and technology in his classrooms. Thomas has been included in the List of Teachers Ranked as Excellent for every single semester that he has taught. This fall he will be an Assistant Professor at Emporia State University, Kansas.

Dominic Searles is a PhD student in algebraic combinatorics working with Professor Alexander Yong. He obtained his Master's degree from the University of Auckland in New Zealand (Go Kiwis!) before coming to Illinois as a Fulbright grantee. He will receive his PhD this sumer. He has taught both traditional discussion sections and Merit sections, and he especially enjoys teaching in the collaborative environment of the Merit program. Dominic was the 2014 recipient of the Irving Reiner Memorial Award. This fall, Dominic will take a postdoctoral position at the University of Southern California.

Department TA Instructional Award

Nickolas Andersen is a fourth-year PhD student in number theory working with Professor Scott Ahlgren. Nick grew up in Southern California and received a BS in Mathematics from Brigham Young University in 2011. He has appeared on the List of Teachers Ranked as Excellent by their Students for every semester in which he has taught. When teaching calculus, he likes to use the Fundamental Theorem of Calculus as an excuse to share Leibniz cookies with his class.

Nathan Fieldsteel is a fifth-year PhD student, studying under Hal Schenck. His research focuses on hyperplane arrangements, and falls under the umbrella of computational algebraic geometry. He has been teaching since his junior year at Wesleyan University and is known for his energy and enthusiasm. Nathan can be launched into a 15-minute diatribe by simply asking the question "When are we ever going to use Taylor series?"

Bateman Fellowship in Number Theory

Nickolas Andersen and Amita Malik are the recipients of the Bateman Fellowship in Number Theory for the forthcoming 2015-2016 academic year.

Nickolas Andersen's research involves various sorts of modular forms and their applications to number theory. The Fourier coefficients of modular forms are concentrated sources of information. These sequences and their generalizations contain much of what we know, or would like to know, in number theory, but typically in a highly encoded form. Much of Nick's research involves attempting to tease out this information, and he has written nine papers on these topics. Nick has actively organized seminars and conferences during his time at Illinois.

Amita Malik is a native of Bhainswal, India. She received an MS from the Indian Institute of Science in Bangalore. She has co-authored 3 published papers and 2 submitted papers. Her research falls in three distinct areas: analytic number theory for studying geometric statistics of Ford circles, the theory of partitions, and new bounds for the Siegel norm to generalize a theorem of Burnside and Cassels on characters in representation theory. Amita was one of the five student organizers for the recent Graduate Student Conference in Number Theory and the Illinois Number Theory meeting in memory of Professors Paul and Felice Bateman and Heini Halberstam. She is also a graduate mentor in the Illinois Geometry Lab, and co-organizer of the graduate student number theory seminar. Amita is co-advised by Professors Bruce Berndt and Alexandru Zaharescu.

Dr. Lois M. Lackner Mathematics Fellowship

Darlayne Addabbo received the Lois M. Lackner Mathematics Fellowship this past fall. This fellowship was established through a generous gift by U of I mathematics alumna Dr. Lois Lackner. Darlayne is a fourth-year graduate student advised by Professor Maarten Bergvelt. Darlayne's research focuses on representation theory and integrable systems, which are topics at the intersection of abstract algebra and modern mathematical physics. Before coming to Illinois, she received her undergraduate degree at Rutgers University, graduating summa cum laude with high honors in mathematics. She is an officer for the University of Illinois chapter of the Association for Women in Mathematics, and enjoys participating in the department's Integrability and Representation Theory Seminar.

Math contest results

Strong showing by UI students at national competitions

At the 75th William Lowell Putnam Mathematical Competition, held on December 5, 2014, the University of Illinois had one of its strongest showings at the Putnam in recent history. The UI Putnam Team placed 14th among the 431 participating institutions, its highest rank in over a decade, and the second-highest placing in the past twenty-five years.

The individual performances turned in by UI participants at the Putnam were equally impressive: Zehan Chao and Haidong Gong received Honorable Mentions; this is only the second time in recent history that two UI students earned Honorable Mentions on the Putnam in the same year. Three UI students—Chao, Gong, and Yifei Li—made the "Top 100" list on the Putnam, the highest such number among public universities in the U.S.

Haidong Gong also placed an impressive seventh, and was the top-ranking participant from a public university, at the 2014 Virginia Tech Regional Math Contest, a nationwide Putnam-style math contest held October 25, 2014.

UI Undergraduate Math Contest

Forty-six students participated this year's UI Undergraduate Math Contest, held February 14, 2015, the highest number in the history of this contest. Haidong Gong, a Sophomore in Mathematics and the winner of last year's UI Undergraduate Math Contest, continued his sweep of the local contest scene with a first place finish and a perfect 60/60 score. In second place was Tomas Longeri, a Senior in Electrical Engineering, while Tong Li, a Sophomore in Computer Science, and Yiming Huang, a Freshman in Computer Science, tied for third place.

Illinois Integration Bee

Liming Wang, a Sophomore in Electrical Engineering, and Yi Xuan, a Junior in Mathematics, were the co-winners of the inaugural Illinois Integration Bee, held April 18, 2015. Modelled after the long-running MIT Integration Bee, the Illinois Integration Bee is an integration-only competition, consisting of a written contest involving twenty challenging integrals, and a one-on-one face-off round on the blackboard. The contest was organized by M. Tip Phaovibul, with the assistance of Bob Murphy, Timur Oikhberg, and A.J. Hildebrand.

For more information about the UI Math Contest program, visit www.math.illinois.edu/contests.html.

UNDERGRADUATE AWARDS

H. Roy Brahana Prize

Yiwang Chen is a graduating senior in mathematics who has been a James Scholar and has taken an impressive array of upper-level undergraduate and graduate courses while maintaining a high GPA.

Established in 1961, the Brahana Prize is the department's longest running and most prestigious undergraduate award. It is named after H. Roy Brahana, a distinguished member of the mathematics faculty at Illinois from 1920–1963, to recognize the student with "the most exceptional undergraduate mathematics career."

Most Outstanding Major in Actuarial Science

Rui Song will graduate this May with a double degree in Actuarial Science and in Financial Planning (the latter curriculum is in the College of ACES). She has passed four professional actuarial exams and has a GPA of over 3.90. In addition to her substantial coursework, Rui has been active outside the classroom: she was an LAS 101 course instructor, an undergraduate teaching assistant in Finance 230, and participated in the University of Illinois Leadership Program. She has had several corporate internships during her undergraduate years.

Hyunsu Kim was a December 2014 graduate of our Actuarial Science Program, with a perfect 4.0 GPA and highest departmental honors. He passed four professional actuarial exams prior to graduation, and also served as an undergraduate teaching assistant in the Finance 230 Introduction to Insurance class. Upon graduation, Hyunsu went to work as an actuary at Allianz, one of the world's largest insurance and financial services companies.

Most Outstanding Major in Mathematics

Feng Liang is a senior in Mathematics. He has compiled an outstanding record in his classes, with a 3.92 GPA. However, this tells only part of the story—he has taken 11 graduate classes for credit, including the two semester sequences in Complex Variables and Algebraic Topology.

Mengyi Wang transferred to UI in Fall 2013. She is a senior majoring in Mathematics and Statistics. Mengyi essentially completed the undergraduate curriculum and has started taking graduate courses. Mengyi was a member of a winning team of the Axis Student Challenge in 2014.

Most Outstanding Major in Mathematics & Computer Science

Abigail Turner is a senior in Math & CS who has a stellar performance in both math and computer science classes with many appearances on the Dean's List. Abigail has conducted extensive research with the Illinois Geometry Lab (IGL) and has made outside presentations on her accomplishments. In 2012–2013, she and Ananya Uppal visited Urbana High School and Leal Middle School to give presentations on their work. They participated as IGL representatives at the UI Public Engagement Symposium and at the LAS Admitted Students Day. She will attend graduate school at Cornell University this fall.

Ananya Uppal is a senior in Math & CS. She has repeatedly made the Dean's List and she has conducted extensive undergraduate research, including a highly competitive undergradute research summer program at Brown University in 2013. Since 2012, Ananya has been working in the Illinois Geometry Lab (IGL). Ananya has an outstanding record of research presentations, including the PiMuEpsilon session at the 2013 MAA MathFest, and an award-winning poster presentation at the 2013 UI Undergraduate Research Symposium. She was featured in the UI Parents Newsletter in an article about the IGL. Since Fall 2013, Ananya has served as mentor with NetMath, our outreach learning program. She earned a NetMath Mentor Excellence Award and she now serves as Lead Mentor. She will attend graduate school at Carnegie-Mellon University this fall.

Most Outstanding Major in Teaching of Mathematics

Margaret Brewick is one of our graduating seniors in the Secondary Education Program. She is finishing her studies with a 3.8 GPA and this semester is completing the student teaching phase of the program in Champaign. In addition to the conventional course load, she has also completed a number of honors courses in Psychology.

Salma Wanna Memorial Award

Boris Xu is a computer science major in his first year at University of Illinois. He is a James Scholar and has been taking graduate math courses including Algebra, Topology, Algebraic Topology, Differential Geometry, Algebraic Geometry, and Algebraic Number Theory, achieving very high grades and being described by one of his professors as exceptional and comparable to the best graduate students.

This award, which honors the memory of Salma Wanna who received her PhD from the University of Illinois in 1976, was established by her family after her untimely death in 1980.

Elsie Thomas Fraser Scholarship

Kelley Mack hails from Orland Park, Illinois, and is majoring in math and computer science. In her first semester at Illinois she made the Dean's list and earned a 4.0 GPA, with an A+ in Math 347; Professor Elena Fuchs notes that Kelley is impressive in her mathematical talent, inquisitiveness, and persistence. This award was established by alums Elsie Thomas Fraser (BA in Science and Letters, 1939) and her husband, Edward (BS in Civil Engineering, 1939).

Honors and Awards

Emily Mann Peck Scholarship

Danni Sun is a graduating senior in mathematics with minors in computer science and business. She is a James Scholar and has been taking honors courses in math since her first semester, maintaining a very high GPA. Even more impressive is the research experience that she has gained through the Illinois Geometry Lab and Math 496. She has also conducted research with Professor Kay Kirkpatrick that resulted in the publication "Kinship accuracy: Comparing algorithms for large pedigrees" in the *Stanford Undergraduate Research Journal,* Vol. 13, 2014. Danni has been in a study abroad program at Arcadia University and Cass Business School, City University of London, and has been an intern at Deutsche Borse Group London. She will graduate this May and in the fall she will be in the Master of Finance program at MIT.

This scholarship was established in honor of Emily Mann Peck, a former mathematics faculty member and LAS Associate Dean, to recognize a student in mathematics who, in addition to academic excellence, displays a well-rounded personality with eclectic interests and a passion for the arts.

Dr. Lois M. Lackner Mathematics Scholarship

Chloe Marshinski is an actuarial science major, with a minor in Spanish, and as a sophomore (with junior standing), she is currently working on a 4.0 GPA. She is also active in the Marching Illini and the Hindsley Symphonic Band. On top of everything else, Chloe is doing study abroad this semester in Costa Rica!

The Lackner Scholarship was established in 2007 through a generous gift by Dr. Lois Lackner-Strong, a University of Illinois alumna with degrees in the teaching of mathematics and in education.

Bradley M. and Karen A. Smith Scholarship for Actuarial Science Majors

Fan Yang is in his second year in the Actuarial Science Program, with a perfect 4.00 GPA. He has already passed two professional actuarial exams and is planning to graduate after three years at Illinois. Fan has had an internship at the insurance organization AIG China.

State Farm Actuarial Science Scholarship

The State Farm Actuarial Science Scholarships are awarded each year to ten first- and second-year actuarial students, based on the promise they show both in our program and in their future actuarial careers. The 2014–2015 recipients are:

First-year students:

- **Christian Arjona**
- **Helen Babb**
- **Jeffrey Chen**
- **Jonathan Chen**
- **Brittany Hall**

Second-year students:

- **Timothy Barnett**
- **Alice Chi**
- **Jimmy Huang**
- **Chloe Marshinski**
- **Allison Schroeder**

The five first-year recipients together have a median GPA in excess of 3.85. The five second-year recipients are all James Scholars, and together have a median GPA of 3.95. Several recipients have also achieved additional individual recognition. For example, Tim Barnett and Chloe Marshinski both received the 2014 Illinois Mathematics Excellence Scholarship. Chloe Marshinski is also the recipient of the 2015 Dr. Lois Lackner Mathematics Scholarship, and this semester is studying abroad in Costa Rica.

Award recipients at the annual Department of Mathematics Awards Banquet held in the Illini Union Ballroom on April 14, 2015.

Vincent O. Greene Scholarship in Mathematics

The Vincent O. Greene Scholarship is awarded to deserving undergraduate students based on academic merit with preference to candidates who plan to teach mathematics. Mr. Greene, a University of Illinois retiree, wanted to "give students a boost!" The 2014–2015 recipients are:

- **Scott Dabrowski**
- **Emily M. Elliott**
- **John A. Haug**
- **Steven Pavlakis**
- **Xueqi Wang**
- **Cameron Wieczorek**
- **Joseph Zeller**

Four of these students, Scott, Steven, Cameron and Joseph, are Juniors or Seniors in the Secondary Education Program, and collectively they average a 3.8 GPA. Emily and John are both Freshmen (John with Junior standing and Emily a James Scholar with Sophomore standing) and both are working on a 4.0 GPA. Finally, Xueqi is a Junior with a 4.0 GPA (through 125 credit hours) and already doing research. In 2014 she was the recipient of the departmental award for the most outstanding major in mathematics. She has worked on two IGL projects and served as a Math Ambassador this past year.

Elizabeth R. Bennett Scholarship

The Bennett scholarship is usually given to students at the sophomore or junior level and serves as a gateway to "senior" awards such as the Most Outstanding Major Awards or the Brahana Prize. The 2014–2015 recipients are:

- **Devin Akman**
- **Chris Formosa**
- **Haidong Gong**
- **Keran Huang**
- **Jing Mu**
- **Yiming Peng**
- **Lenin Sandoval**
- **Yuliya Semibratova**
- **Yunsi Wang**
- **Konrad Wrobel**

Devin Akman is a freshman with senior standing and Yuliya Semibratova is a sophomore with senior standing. Kevin and Yuliya also stand out from the rest because both are both James and Chancellor's Scholars.

But the variety of these students is also significant. Three are transfer students (Keran, Jing, Yiming), two are Actuarial Science majors (Lenin and Yunsi), and three are double majors (Chris is majoring in math and statistics; Yunsi is majoring in math and actuarial science; and Konrad in math and physics). And, in addition to their studies, Haidong, Keran, Jing, Yiming, Yuliya, and Konrad are already doing undergraduate research.

Research experience develops student problem-solving skills

Photo by Laura Schaposnik.

Kent Place High School senior Jessica Li was named one the semifinalists in the Intel Science Talent Search, the nation's oldest and most prestigious pre-college science competition, for her project "On the Modeling of Snowflake Growth Using Hexagonal Automata." She completed her project through the MIT PRIMES-USA program, a year-long research program where selected participants are matched with mentors to complete a math research project in their specific areas of interest. Only 13 students were selected nationwide for the MIT PRIMES-USA in 2014.

Her mentor was Laura Schaposnik, a J.L. Doob Research Assistant Professor in the Illinois Department of Mathematics who supervised Jessica through PRIMES-MIT and IGL via Skype meetings. For her project, Jessica designed and 3D-printed puzzles to share information on snowflake geometries and modeling.

"I have found mathematics research to be quite valuable not only in allowing me to hone my skills and increase my knowledge in mathematics but also in developing my problem solving abilities that can be applied to almost any discipline," said Jessica Li.

Jessica was on the University of Illinois campus during the MoSAIC festival in November 2014 and ran the workshops on snowflakes.

"Mathematics research showed me how to approach entirely new problems, to collaborate, to communicate my ideas to diverse audiences, and to construct concise, clear, and logical arguments."

When asked what the future holds, Jessica says "I plan to start a nonprofit organization that provides guidance and resources for underprivileged students in the developing world in completing mathematics research and generally exploring the beauty of mathematics."

Faculty News

Jockusch and Rezk named 2015 AMS Fellows

The Department is pleased to announce that Professor Emeritus Carl Jockusch and Professor Charles Rezk have been selected to the 2015 class of Fellows of the American Mathematical Society (AMS). Jockusch was cited for his contributions to logic, computability theory, and Turing structures. Rezk was cited for his contributions to theoretical and computational aspects of algebraic topology and homotopy theory.

The AMS Fellows program, created in 2012, recognizes AMS members for outstanding contributions to the creation, exposition, advancement, communication, and utilization of mathematics. To learn more about the AMS Fellows program visit http://www.ams.org/profession/ams-fellows.

Tserunyan awarded Emil Artin Junior Prize

Anush Tserunyan, a J.L. Doob Research Assistant Professor, received the 2015 Emil Artin Junior Prize in Mathematics for her paper "Finite generators for countable group actions in the Borel and Baire category settings", *Advances in Mathematics*, 269 (2015) 585–646. Established in 2001, the Emil Artin Junior Prize in Mathematics carries a cash award of $1,000 and is presented usually every year to a student or former student of an Armenian educational institution who is under the age of thirty-five for outstanding contributions to algebra, geometry, topology, and number theory—the fields in which Emil Artin made major contributions. The prize committee consisted of A. Basmajian, Y. Movsisyan, and V. Pambuccian.

Baryshnikov receives CAS appointment

Professor Yuliy Baryshnikov has been appointed an Associate for 2015–2016 in the Center for Advanced Study. His research project, "Applied Configuration Spaces," deals with an area in applied topology, a young emerging sub-discipline of algebraic topology. The development of the area over the course of the 20th century saw an enormous amount of groundbreaking and beautiful discoveries, ever trending towards more and more abstract apparatus. Nevertheless, algebraic topology remains indispensable for many several communities neighboring mathematics, such as biology, engineering, computer science, data analysis, economics, to name a few. Baryshnikov will work on several classes of configuration spaces differing from either mechanical or classical ones. They all play important roles in various areas outside topology, and all have beautiful and intriguing properties, mostly under-explored.

Gorvett named editor-in-chief

Rick Gorvett, Director of the Actuarial Science Program at Illinois, has been named the Editor-in-Chief of *Variance*, the scholarly peer-reviewed journal of the Casualty Actuarial Society.

NetMath program highlights

NetMath has moved: In January 2015 NetMath moved from Altgeld Hall to a new location on campus at 912 South Fifth Street, Champaign. Everyone is invited to our open house celebration in June. More information will be posted soon.

New NetMath REGS Program: NetMath REGS offer summer support to qualifying graduate students on a competitive basis. These awards are available to both US and international students and require at least three semesters of TA appointments with NetMath. Congratulations to the recipients of NetMath REGS awards for Summer 2015: Itziar Ochoa de Alaiza Garcia, Arindam Roy, Hannah Spinoza, and Juan Villeta-Garcia.

Partner High School Program: Lane Tech Preparatory School in Chicago, IL and Grant Community High School in Forest Lake, IL are two new high schools joining the NetMath Partner Program this year. NetMath will host the fourth annual Partner High school Jamboree in June. Teachers and administrators from all fifteen Partner High Schools are expected to attend this event on the University of Illinois campus.

NetMath at NCTM Boston: Bruce Carpenter and Joe Nance presented a talk titled "Useractive Mathematics in High School Classrooms" at the April 2015 National Council of Teachers of Mathematics (NCTM) annual meeting in Boston. NetMath also host a booth for conference attendees to publicize their online course offerings and the Partner High School Program.

Summer Illinois Mathematics Camp for high school students

Summer Illinois Math (SIM) Camp is a free, week-long math camp for high school students that will introduce students to proofs and applications of math in areas of active research such as algebraic topology and number theory. Students will compete in daily math challenges for prizes. Students will also visit the Department of Chemistry to learn how math relates to chemistry.

The camp is supported by the Department of Mathematics, and the Illinois Geometry Lab at Illinois, the Association for Women in Mathematics, the National Science Foundation, and the UI Office of Public Engagement through a Student Fellow Grant awarded to Claire Merriman, a second-year PhD student in the department working with advisers Jayadev Athreya and Richard Laugesen.

Learn more about SIM Camp at http://math.illinois.edu/SIM.

CUNY system named in honor of Kenneth Appel

The City University of New York (CUNY) has selected SGI to support the university's interdisciplinary research and educational activities through SGI's platinum partner Comnetco Inc. To maintain the computational power needed to solve complex graph theory problems, CUNY selected to upgrade its infrastructure to the SGI UV 300 advanced symmetric multiprocessing (SMP) system.

The CUNY SGI UV 300 system will be named after Kenneth Appel, CUNY alumnus and former UI faculty member who, in 1976 with UI colleague Wolfgang Haken, solved the four-colour theorem in graph topology, proving that any two-dimensional map, can be filled in with four colors without any adjacent "countries" sharing the same color. This theorem was the first to be proved using a computer. In 1979 the American Mathematical Society and the Mathematical Programming Society awarded the Delbert Ray Fulkerson Prize to Appel and Haken.

Appel received his PhD from the University of Michigan in 1959. From 1961 to 1993 he was a mathematics professor at the University of Illinois. In 1993, he retired from the University of Illinois to chair the mathematics department of the University of New Hampshire where he worked until his retirement in 2003. In 2012 Appel was elected a Fellow of the American Mathematical Society. He died in 2013.

The new SGI UV 300 system will enable a broad range of research projects in fields including psychology, cryptography, and genomics and phylogeny.

"At CUNY today, we are seeing increased emphasis on collaboration and interdisciplinary research across the social sciences, computer science and mathematics. And new research in psychology, sociology, and linguistics increasingly depend on applying graph theoretic algorithms and combinatorics to discover relationships embedded in large, complex social science datasets", stated Paul Muzio, director, CUNY HPC Center. "The SGI UV 300, with its large shared memory, provides a unique capability for researchers."

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Sloan Foundation grant to improve STEM minority representation at UI

The University of Illinois at Urbana-Champaign is one of three institutions awarded a grant by the Alfred P. Sloan Foundation's expanded Minority PhD Program to support underrepresented minority doctoral students in science, technology, engineering and math fields.

The grant aims to double the number of underrepresented students in STEM fields. Involved are six departments from the College of Liberal Arts and Sciences, including the Department of Mathematics, and twelve departments from the College of Engineering. One of the co-investigators on the grant is Richard Laugesen, Professor and Director of the Mathematics Graduate Program, who says "This Sloan grant is a terrific honor for our department, and a terrific opportunity too—the first students supported by the grant will arrive on campus this fall!"

The three-year, $3 million Sloan Foundation initiative asks each institution to create a Center of Exemplary Mentoring, a campus-wide center that would provide scholarships to minority doctoral students in the physical and mathematical sciences, and engineering. With the expansion, the Sloan Foundation will have eight centers nationally.

The Illinois center will coordinate a host of activities designed to help students succeed in their graduate studies and careers, including an extensive orientation program for new students, research opportunities, workshops and seminars, professional development, scholarships and stipends, and a three-tiered mentoring program that provides peer, academic and research mentors to students.

"Increasing the diversity of graduate education in the sciences, mathematics and engineering means getting talented minority candidates into quality PhD programs and helping them succeed once they get there," said Elizabeth S. Boylan, the director of the STEM Higher Education program at the Alfred P. Sloan Foundation. "(The Centers of Exemplary Mentoring) are designed to support graduate students at every point in the graduate study pipeline."

In addition to Sloan Foundation funds, the universities have made substantial cost-sharing commitments in the form of direct support to students, program activities, and the personnel costs of running the program. Selected graduate students will receive tuition, a stipend and professional development support through the new UCEMs over the next three years.

Boylan said the UI was chosen for its already proven commitment to minority PhD students in the sciences and engineering, its efforts to expand that support and its comprehensive assessment of doctoral students' experiences and outcome. MIT and the University of California, San Diego, are the other two institutions included in the Sloan Foundation initiative.

The Alfred P. Sloan Foundation is a philanthropic, not-for-profit grant-making institution based in New York City. For more information go to www.sloan.org.

In memoriam: Robert Ash, 1935-2015

Robert B. Ash

Robert B. Ash died in Urbana, April 15, 2015. Bob was born in New York City in 1935.

He received a BS (1956), MS (1957) and PhD (1960) in Electrical Engineering from Columbia University. He came to the University of Illinois Department of Mathematics in 1963 and retired in 1990.

Bob wrote thirteen textbooks but he was most proud of the eight books he posted on his web page during his retirement that were available for free downloading. He got many emails of thanks for those books, like this one:

"I want to give my deepest gratitude to your service to the mathematics society by your book, lecture notes. Live a long and healthy life knowing that you did a lot of good things."

His career followed an unusual path, said Harold Diamond, a professor emeritus who knew Bob in the years after he came to the U of I in 1967. Instead of focusing on authoring research papers, Bob spent time teaching and writing textbooks on a "staggeringly wide" array of topics ranging from statistics to algebraic number theory, Diamond said.

Robert J. McEliece, a former member of the Illinois Department of Mathematics called Bob "one of the best scientific minds on campus."

One of his former students said, "I took several of Professor Ash's graduate level math classes. Professor Ash would not just "grade" the homework, but would explain in detail what was missing or where I took a wrong step. A great teacher and a good man."

In addition to teaching and writing math Bob loved learning (he had just started studying elementary physics) and he loved jogging. After his first sabbatical his required report to the department chairman that listed sabbatical accomplishments included a 5:08 mile.

Bob was also a chess player. He played as a boy and started again in 1973, averaging a dozen tournaments a year through 1995. He played throughout the midwest and in New York, Toronto, Berkeley, Vancouver and more. Bob relished his wins over higher-ranked players. The best player he beat was a Senior Master with a rating of 2436 and after that Bob used 2436 as his password as often as he could.

A few years ago he was diagnosed with Parkinson's. He was still doing relatively well, enjoying daily walks and working with a trainer at a gym. Near the end of one of those walks in Urbana, he was hit in a crosswalk by a car and died 6 hours later of his injuries.

His wife of 59 years, Carol, and brother, Charlie, of Manchester NH, will miss him very much.

Golden anniversary of a book

By Joseph Rotman, Professor Emeritus

It's now fifty years since *An Introduction to the Theory of Groups* was published. It first appeared in 1965, but I began working on it several years earlier. I am happy to say that the book, now in its fourth edition, is still in print.

I received my PhD in 1959; my advisor was Irving Kaplansky, and my dissertation was about mixed abelian groups; that is, abelian groups having elements of finite order and elements of infinite order. My first job was here at Illinois. Mahlon Day hired me as a Research Associate (nowadays we call it a postdoc); I taught 3 hours per semester (while everyone else taught 9), I was exempt from committees, and I wallowed in the luxury of a $5,500 annual salary. I didn't complain. Gas cost 28 cents a gallon, and Timpone's Italian beef sandwich with French fries was 45 cents.

Algebra here was attractive. Michio Suzuki had just found his infinite family of simple groups, Irving Reiner was studying representation theory (while writing his book with Curtis), Alex Heller was doing categories and homological algebra, Norman Hamilton, who refused to write up his ideas, knew everything and loved to speak mathematics. (R. Baer had just returned to Europe, and G. Hochschild was on leave at Berkeley.) Bill Boone was on his way, having just found a finitely presented group with an unsolvable word problem.

In 1961, I asked Suzuki whether I could teach the first graduate group theory course. He was very kind to me, and encouraged me. Having taught the course, I thought I would write up my notes. While I was writing, Paul Schupp joined our department and John Britton visited in 1963. It was John who rewrote Bill Boone's unsolvability result, using the recent result of Higman, Neumann, and Neumann. All of this went into my book.

I was very lucky, for my book received a wonderful review by Roger Lyndon. And W. Magnus (George Francis's father-in-law) sent me a letter saying he enjoyed my presentation. Even Irving Kaplansky told me he liked it; especially the "meaty" part about the word problem.

About twenty years ago, I was lecturing in Oxford. A student came up to me after a lecture to tell me how much she enjoyed my father's book. I didn't tell her that it was I who wrote the book, and that I was her age at the time.

I am happy to say that my book is still used all over the world. Well, almost. I still get email about it from every continent except Antarctica. Alas, this good reception of my group theory book infected me with the book writing bug. I've now written about 20 books, if we count various editions. Indeed, I am now writing a new edition of my *Advanced Modern Algebra*. It keeps me off the streets.

Elyse Yeager

by Jim Dey

Elyse Yeager

Elyse Yeager's sense of adventure and interest in education have taken her from Alaska, where she grew up, to Africa, where she taught as a member of the Peace Corps, to the University of Illinois, where she's completing a doctorate in mathematics.

Her next stop is the University of British Columbia in Vancouver, Canada. She'll start teaching math there in the fall as a tenure-track faculty member.

Along the way, she's held education workshops for and tutored inmates at a Danville prison and mentored minority students studying math and science.

Yeager said providing educational opportunities to those in need is a great way to help people. But beyond that, Yeager said, teaching "is super-fun."

"I love it," said the 30-year-old Yeager. "When I'm teaching, I'm more the kind of person I want to be. I usually leave the classroom feeling really good."

It's not, of course, that Yeager is short on interests. She grew up in the ski town of Girdwood, Alaska, a small community near Anchorage, and loves outdoor activities like backpacking and kayaking.

"Those are my two favorite things," Yeager said, who also sings and plays the violin.

She followed a circuitous route to become a mathematics student. Initially tempted to study chemistry, Yeager chose mathematics after realizing she liked the mathematics in chemistry more than the chemistry. "I just kind of chose it and it happened to work. I'm very lucky," she said.

After graduating from the University of Alaska, Yeager said she planned to go to graduate school but opted for a two-year tour—from 2006-2008— in the Peace Corps. Assigned to a school in the Central River Region of Gambia, West Africa, Yeager taught math and science to students who ranged in age from 12 to 19.

She described her two years in the poverty-stricken Muslim country as "really stressful" but ultimately rewarding. "They weren't used to a lot of foreigners. Many people never got over looking at me like a novelty," Yeager recalled. "It was very eye-opening."

After the Peace Corps, Yeager pursued her Master's degree in mathematics at the University of West Virginia, where her adviser, John Goldwasser, recommended she study for her doctorate at the UI. Yeager said her experience at Illinois has been positive both educationally and socially.

"I got a husband out of the deal, and I'm happy to talk about that. And my advisor, Professor Alexandr Kostochka, is amazing," she said. "He's really super supportive. He's a rare mix of brilliance and understanding."

Yeager is studying combinatorics which she describes as "counting things that are difficult to count." Combinatorial problems—found in algebra, probability theory, and geometry—have a variety of applications, including in computer science and statistical physics. Yeager has a simple way to describe mathematics' appeal, calling it "beautiful."

"It's fun to have a problem, work on it and feel that sense of satisfaction in solving it," Yeager said.

As both a doctoral student and graduate assistant, Yeager has not only taken classes and conducted research but taught math to first- and second-year students.

She's received numerous honors for her efforts in the classroom including the 2015 Campus Award for Excellence in Undergraduate Teaching by Graduate Teaching Assistants and the LAS Lynn Martin Award for Distinguished Women Teachers. She is also the 2012 recipient of the Department of Mathematics' Brahana TA Award, the department's highest award for graduate assistants who teach undergraduates.

Teaching will continue to be her focus when she starts her new job in Canada. Yeager said she intends to continue a "little research on the side," but that she can't wait to begin her primary duties in the classroom. "I'm so excited," she said.

Jim Dey is a columnist and editorial writer for The News-Gazette in Champaign-Urbana.

Joseph M. Rosenblatt retires

Joseph Rosenblatt, Professor Emeritus, was a faculty member of the Department of Mathematics at Illinois from fall 1994 until spring 2014. Before that he was a graduate student at the University of Washington (advisor Isaac Namioka), a postdoctoral faculty member at the University of British Columbia (advisor Edmond Granirer), and a faculty member at both Ohio State University and the University of Missouri-Columbia. He served as the Chair of the Department of Mathematics at Illinois from 1999 to 2004. He retired from the University of Illinois on June 1, 2014. In July 2014, he started as Chair of the Department of Mathematical Sciences at Indiana University-Purdue University Indianapolis.

Dr. Rosenblatt and his wife, Dr. Gay Miller (a veterinarian and economist who is a Professor and Chair of the Division of Epidemiology and Preventive Medicine in the College of Veterinary Medicine at Illinois) have four daughters: Audrey Rosenblatt (RN, CRNA at Lurie Children's Hospital, Chicago), Ivana Rosenblatt (PhD candidate in Art History at Ohio State University, finishing her degree in 2015), Heather Rosenblatt (PhD in Mathematics from Ohio State University and now working as an Instructor at Western Governors University), and Rebecca Rosenblatt (PhD in Physics from Ohio State University, and now an Assistant Professor in the Department of Physics at Illinois State University).

Professors Rosenblatt and Miller can sometimes be found at their farm in rural Illinois, where one of the joys is to, "...stand beneath the boughs and stare as long as sheep or cows." (Leisure by W. H. Davies 1871-1940).

Mathematics Advisory Board contributes ideas and support

The Mathematics Development Advisory Board (MDAB) is an alumni board drawn from the spectrum of the department's academic programs. Created in 2010, the Board has been working diligently in several critical areas supporting the department, its programs, and its students. The MDAB consists of twelve alumni with rotating three-year terms. Professor Sheldon Katz serves as Chair of the Board. Outside of the annual meeting, the Board accomplishes its work through a committee structure and conference calls.

At the October 2014 annual MDAB meeting, the board reviewed the annual progress reports of the department and the board's three committees: the Altgeld Committee, the Scholarships Committee, and the Commercial Track Committee. The board concurred with the department's assessment that the MDAB has catalyzed dramatic results, particularly in the areas of scholarships, the renovation of Altgeld and Illini Halls, and the department's career support structure which was created in response to the urging of the board. It was decided to continue the existing committees into the 2014-2015 academic year. Since then, with critical assistance from the Altgeld Committee and the MDAB more generally, a fundraising feasibility study for the renovation has recently been completed. In the past year, the department has helped arrange a record number of internships and jobs for its students. The Scholarships Committee is encouraged by the dramatic growth in scholarship gifts that has occurred over the past few years and looks forward to increased support from alumni and employers. Furthermore, you can learn more about the most recent scholarships recipients in the Awards section of this issue.

However, it was also recognized that there was less progress relative to our fundraising goals in the areas of faculty and graduate student support. Accordingly, a fourth MDAB committee was formed, the Graduate/Faculty Committee, to help the department in these areas. With help from this committee, we look forward to telling you about successes in the near future.

The department's programs and innovations are largely created by the faculty, and the department's reputation is largely a reflection of the reputation of its faculty. Endowed faculty positions carry prestige and monetary resources which encourage faculty members to undertake bold initiatives and accomplish great things. Endowed Chairs and Professorships help attract the very best to join the Illinois faculty, and can also help us retain our existing faculty who are in demand internationally.

The Illinois Mathematics Doctoral program is a top program by any measure—the 2014 US News and World Report rankings place the department in a tie for fifth place among US public institutions. The programs that are ranked higher than we are generally have substantially more faculty and graduate student support than we do. We can and will do better with increased fellowship and research support for our students.

The Mathematics Development Advisory Board welcomes your ideas! You are encouraged to contact Sheldon Katz (katzs@illinois.edu) with your suggestions regarding the work of the board.

Yesilyurt receives Sedat Simavi Science Award

Hamza Yesilyurt, who received his doctorate at the University of Illinois in 2004 under the direction of Bruce Berndt, has recently received the Sedat Simavi Science Award. The award was established in 1977 by the Turkish Journalists Society and is named after the founder of the Society. It is given to individuals who have made significant contributions to areas in the sciences. Yesilyurt's award was given for his paper, "Elementary Proofs of Some Identities of Ramanujan for the Rogers-Ramanujan Functions," *Journal of Mathematical Analysis and Applications*, Vol. 388 (April 2012).

From Green Street to Wall Street

On April 2, alumni gathered in New York City to celebrate the inaugural Green Street to Wall Street event at Goldman Sachs, with about seventy mathematics and engineering alumni in attendance. This event brings together the College of Engineering and the College of Liberal Arts & Sciences. In addition to conversation and networking, the attendees were updated on the efforts to renovate Altgeld and Illini Halls, along with projects underway in the College of Engineering.

The Altgeld and Illini Halls Renovation will benefit mathematics students as well as students all across campus for years to come by providing new spaces for collaborative discovery and learning. The Engineering Visionary Scholarship Initiative will raise new endowment funds to bring the nation's best students to engineering at Illinois by making college more affordable. Together, both the renovation project and the scholarship initiative will help advance the University of Illinois as a whole. The generosity of our alumni and friends will have a great impact on several generations of students to come!

In memoriam: Sanford Roy Schubert

Sanford Roy Schubert earned his bachelor's and master's degrees in mathematics in 1959 at the University of Chicago, and then went on to earn a PhD in mathematics from the University of Illinois at Urbana-Champaign in 1962. He died October 28, 2014, in Hermosa Beach, CA. He was 78. Schubert had a long professional career in aerospace, primarily for the TRW's Space and Technology division in a variety of key roles until retirement, after which serving for 10 years as a consultant. He also wrote on a variety of subjects and coordinated several courses for Omnilore, an organization devoted to life-long learning. As an opera lover, he traveled world-wide to see operas with his wife, also a University of Chicago graduate in 1959, whose novel *The Silence and Beyond* was published in February of 2013. His survivors include his wife, Mahlia Lynn Schubert; their two sons and daughter; seven grandchildren; and a brother.

William Perry retiring as EIU President

William L. (Bill) Perry is retiring this summer after 8 years as president of Eastern Illinois University. Bill received his PhD degree from the Illinois Department of Mathematics in 1972 with a dissertation "Integral Equations with a Product-Type Kernel," written under the direction of Professor T. W. Ting.

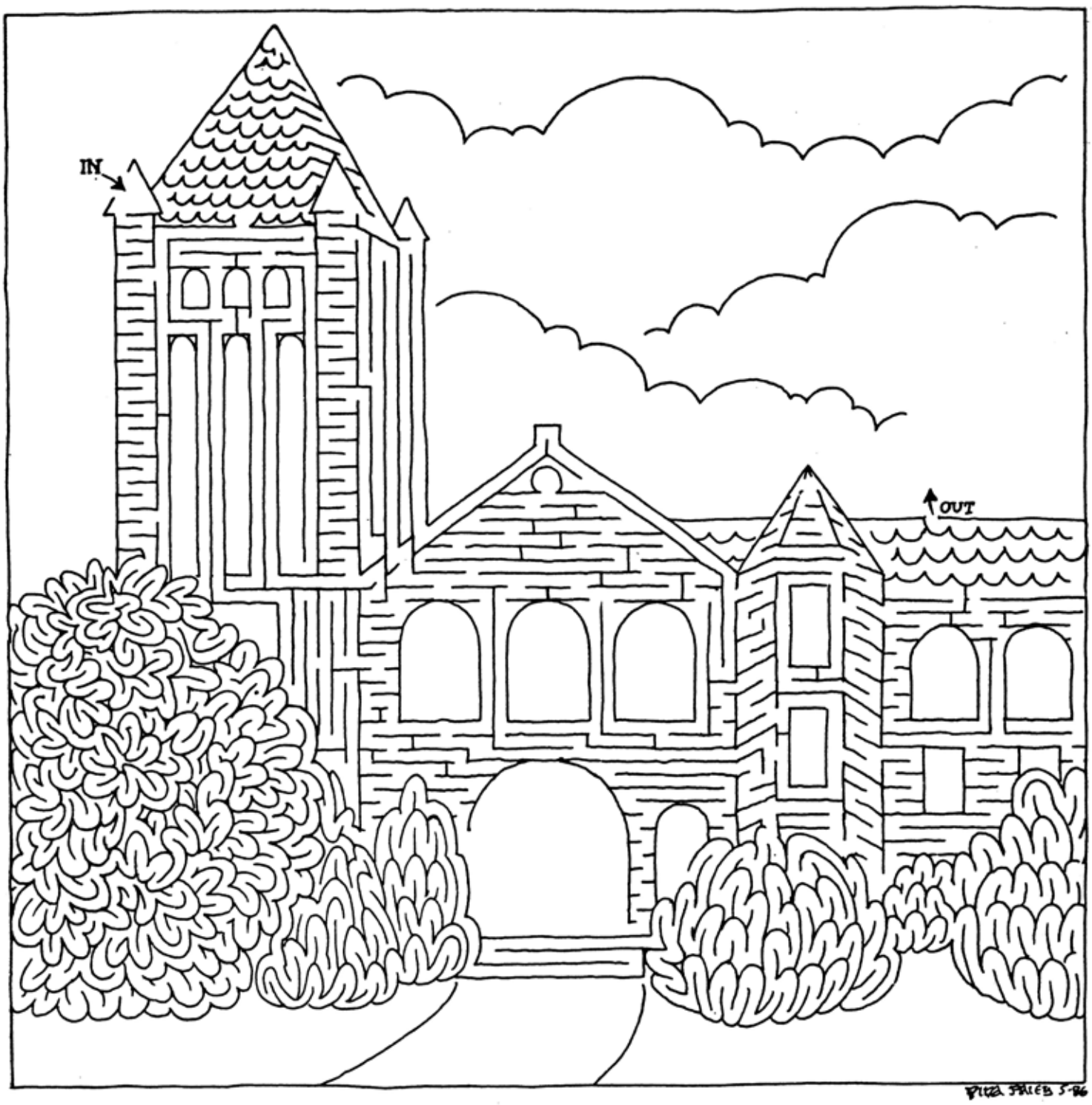
Bill received his BA degree from Park College (now University) in Parkville, MO, with majors in both mathematics and history. When Bill was a student, the college had some 500 students and a two-person mathematics faculty; coming to the U of I was a culture shock.

The first assistantship Bill held was as a TA in a Calculus I class of 227 students with Professor Harold Diamond as lecturer. The class provided lessons in how to organize a course, set and administer exams, do mass grading, and teach a class.

After leaving Illinois, Bill served as a professor, dean of faculties, and executive associate provost at Texas A&M University for the next 36 years, leaving in 2007 to assume the leadership at Eastern. Bill reported that the extensive notes he made on his Illinois courses served him well in (at least the instructional part of) his later career.

At Eastern, both the University Administration and the Mathematics Department are housed in Old Main. This was convenient for Bill in the several semesters when he made the trip upstairs to teach a math class. His academic interest shows clearly in his presidential portrait, newly displayed in Old Main, with him carrying a copy of the Courant-Hilbert book "Methods of Mathematical Physics."

After retiring, Bill is moving to Dallas, TX, where he and his wife, Linda, will be able to more closely inspect grandchildren. Also, he looks forward to much reading, art, photography, travel and mathematics.



Everyone enjoys a maze! Try your hand at this one designed in 1986 by Nina Paley, daughter of Hiram and Jean Paley. Since drawing this maze Nina has become a syndicated cartoonist, animator, Guggenheim Fellow, director, quilter, and copyright abolitionist. She's currently animating her second feature film, Seder-Masochism, and making robot-assisted art quilts with her partner Theodore Gray. Hiram Paley was a professor in the department from 1959-1998 and Jean Paley was Assistant Chair from 1999-2004.

Department of Mathematics Giving Form

Today, more than ever, the Department of Mathematics relies on the generosity of its alumni and friends. Join us in ensuring a brilliant future by supporting the department in its educational and research missions.

❑ Yes! I believe in the importance of excellence in mathematics and wish to show my support!

$_____ **Mathematics Partnership Fund** (332346)
Your gift to the Partnership Fund will have the widest impact as it supports a range of activities including student awards and travel, distinguished lecturers, the recruitment of excellent faculty, and alumni events.

$_____ **Actuarial Science Fund** (330225)
Support Actuarial Science through scholarships, fellowships, graderships, and faculty support.

$_____ **Illinois Mathematics Scholarship Fund** (341016)
Scholarships enable the most promising admitted undergraduate mathematics students to pursue their education at Illinois.

$_____ **Mathematics Research Experience Endowment Fund** (772913)
Support research experiences for undergraduate students (REUs).

$_____ **Fund for Altgeld and Illini Halls** (338168)
Support our bold plan to renovate Altgeld and Illini Halls to create a collaborative environment for mathematics learning and discovery.

5NAZ3 332346

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Engaging girls in hands-on math

This year the local Illinois chapter of the Association for Women in Mathematics (AWM) has been involved in a number of outreach activities with local middle school and high school girls. This spring, the AWM held a second Girls Engaged in Math and Science (GEMS) Workshop for middle school girls at the Orpheum Science Museum. The theme was Geometry and Art, and the girls explored various areas of mathematics by utilizing a variety of artistic media including origami, pottery, and crochet. The AWM also held its fourth Sonia Math Day for high school girls this spring. The theme was Knots and Braids, and graduate students in the Departments of Mathematics and Chemistry presented a number of topics including toroidal knots, Seifert surfaces, and real world applications of knot theory. The GEMS workshops and Sonia Math Day activities are made possible from a Public Engagement Grant through the Office of Public Engagement as well as financial support from the Department of Mathematics at the University of Illinois at Urbana-Champaign.

Photos at left from the top: Priyanka Nair studies Seifert surfaces by experimenting with soap film; middle schooler Lauren Brademas and graduate student Cara Monical explore polyhedra by assembling modular origami; middle school girls Bianca Rubel and Natalia Pittendrigh learn about tessellations by painting pottery. Photos by Laura Schaposnik.