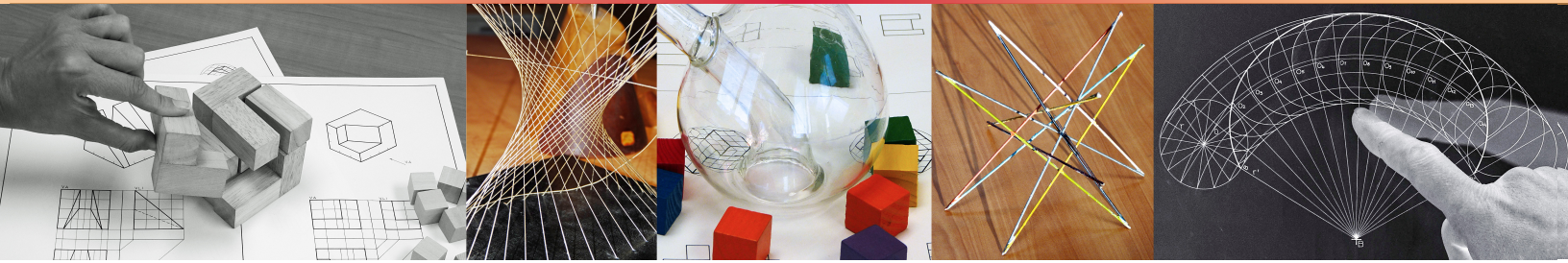
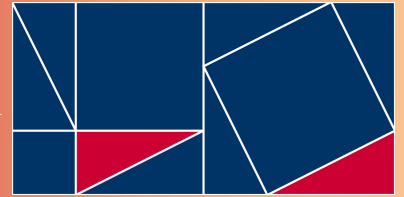
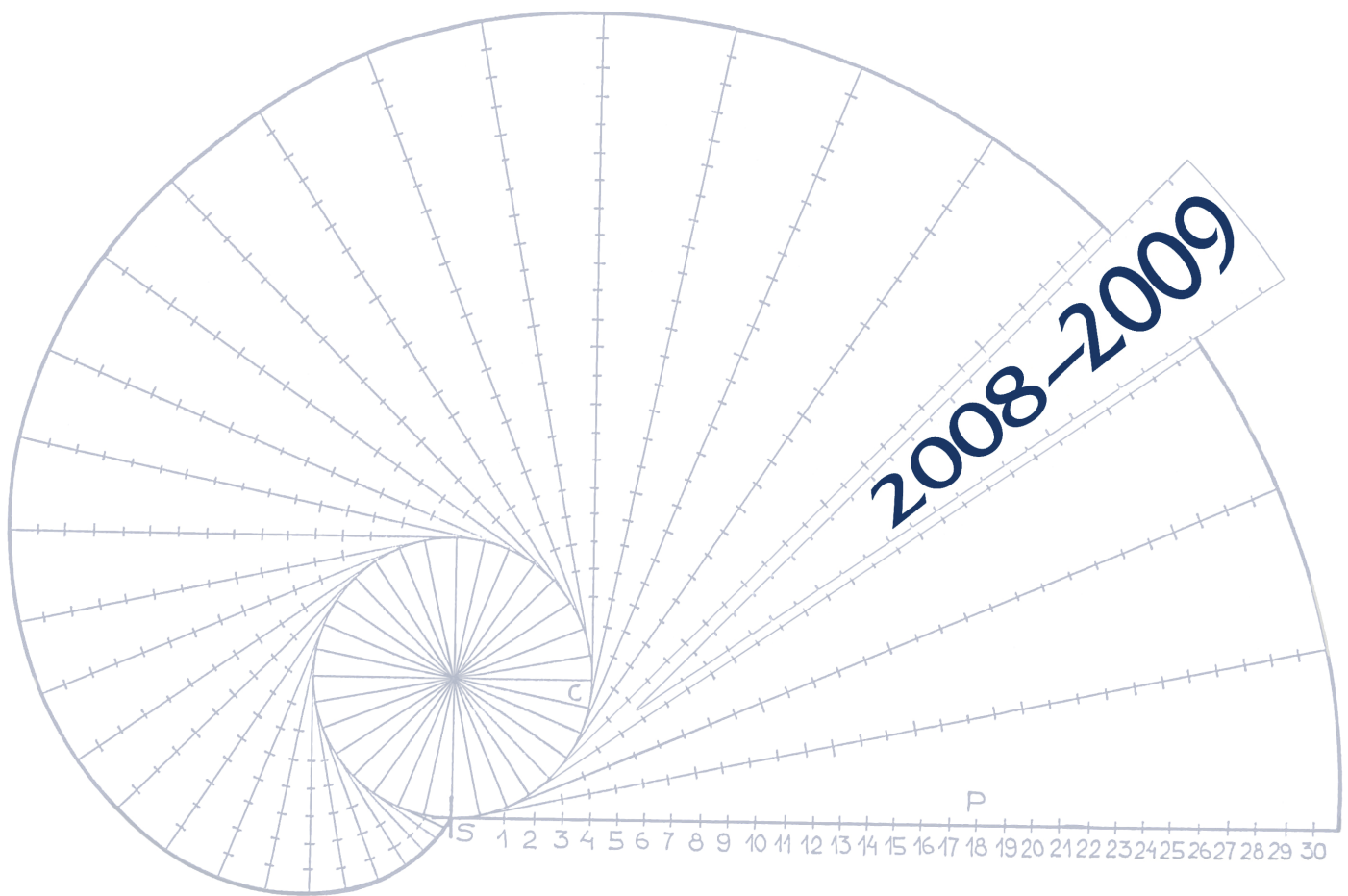


INSTITUTE FOR  
MATHEMATICS &  
EDUCATION



ANNUAL REPORT



**MATHEMATICS**  
UA SCIENCE



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## About the Institute

### Our Vision

The Institute was created in 2006 by William McCallum, Distinguished Professor of Mathematics at the University of Arizona. The principal mission of the Institute is to support local, national, and international projects in mathematics education, from kindergarten to college, that pay attention to both the mathematics and the students, have practical application to current needs, build on existing knowledge, and are grounded in the work of teachers.

### The Need

Mathematics is crucial for innovation in science, technology and engineering; competitiveness in a global workforce, and informed participation in democratic government. Three decades of reports, from the Department of Education's *A Nation at Risk* (1983) to the National Academies' *Rising Above the Gathering Storm* (2006) offer ample evidence for the need to improve mathematics education in the United States.

### Our Approach

The problems of mathematics education cannot be solved by one group alone. Taking its cue from pioneering collaborations of recent years, the Institute includes participants from communities that are sometimes worlds apart: mathematics departments, colleges of education, school systems, government agencies, business, and commercial and non-profit education organizations. It engages mathematicians, statisticians, scientists, education faculty, teachers, parents, business people, and policy makers in collaborative work in which each group plays a key role and for which each group takes responsibility.

### Our Goal

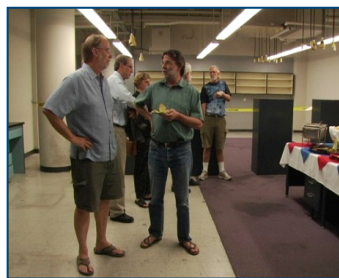
Our long-term goal is to become a permanent, high-level institute that builds capacity for collaboration, stores institutional knowledge about collaboration, and influences professional cultures towards collaboration on a critical concern of our time: the mathematical education of our future scientists, engineers, workers, citizens and leaders.

### Funding

The Institute of Mathematics and Education is supported by funds from the University of Arizona Provost's Research Initiative Fund, the College of Science, and the College of Education; grants from the National Science Foundation, and collaborative arrangements with other institutions. The Institute is also seeking support from private foundations and donors in order to expand the range of its programs and help sponsor its ongoing activities. If you are interested in supporting the work of the Institute, please contact Guadalupe Lozano Terán, Executive Director, 520.621.1562 or [ime@math.arizona.edu](mailto:ime@math.arizona.edu).



The IM&E Planning Room



The Old Chemistry Lab



The IM&E Conference Room



## Ongoing Programs

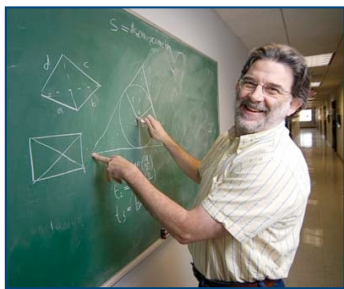


### Arizona Teacher Initiative (ATI)

DAN MADDEN, PI

The Arizona Teacher Initiative is funded by a 5-year, \$4.8M National Science Foundation *Math and Science Partnership* grant (award no. 0634532) awarded to the IM&E in September of 2006. The Principal Investigator is Daniel Madden, the co-Principal Investigators are William McCallum and Rebecca McGraw of the Department of Mathematics in the College of Science, along with Erin Turner of the Department of Teaching and Teacher Education in the College of Education, and Margaret Shafer, assistant superintendent of the Tucson Unified School District. This grant has led to the development of a part-time 3 year Master's degree in *Middle School Mathematics Leadership* for current elementary-certified middle school mathematics teachers, a one-year full-time *Math Specialist in Teacher Mentoring* residential program for high school teachers, and a Postdoctoral Fellowship in Teacher Preparation for recent Ph.D.s in mathematics.

In 2008–09 the Faculty Senate approved the new Master's degree program, and the only remaining step is the approval of the Arizona Board of Regents. There are already three groups of students working toward the existing Master of Arts with a teaching option who will transfer to this degree when it is approved. So far four high school teachers have completed the pilot certificate program including Robert (Mike) Schmidt and Alyssa Keri in 2008-09. This year, Caroline Torres has joined the program. In the post-doctoral program Dr. Carolyn Wright is in her second year, and Dr. Ji Li will finish her third and final year in Summer 2010

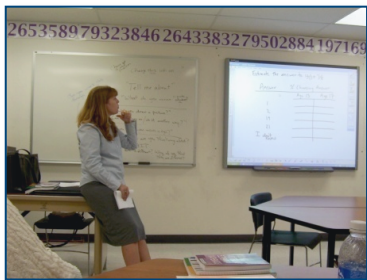


### Making Connections

WILLIAM MCCALLUM, PI

The Making Connections project is funded by a 4-year, \$300K National Science Foundation *Distinguished Teaching Scholar* grant (award no. 0525009). The principal investigator is William McCallum. Making Connections aims to establish a model for collaboration between mathematicians, educators, and teachers that is centered around analysis of student work on algebra problems. These three groups are brought together to participate in regional teams at a summer workshop where they undertake a joint analysis of school algebra problems and student work, which has been collected during the preceding semester by the teacher participants. The summer workshop is a laboratory for developing a model for collaboration between these three groups by focusing on concrete examples. Each team uses the workshop to develop instructional materials and collaborative activities in their own regions.

In March of 2009, the North Carolina team held a local Making Connections workshop in Charlotte, NC. A final workshop is planned for Spring 2010 to disseminate what has been learned from the project about collaboration between mathematicians, educators, and teachers.



## Untangling KnoTSS

REBECCA MCGRAW, PI

The Untangling KnoTSS (Knowledge for Teaching Secondary School) program is funded by a 3-year, \$788K National Science *Discovery Research* K-12 grant (award no. 0821996). The principal investigator is Rebecca McGraw. The program, modeled on the MSRI Elementary Mathematics Project, investigates the nature and processes of collaborative work between mathematicians and mathematics educators.

The Untangling KnoTSS program brings together teams of mathematicians and educators who co-teach courses aimed at building an integrated knowledge of mathematics content and pedagogy. The project documents different approaches to collaboration, along with the methods and practices associated with those collaborations, and student learning associated with them. Through analysis of the nature and processes of collaboration, and the interactions between content and pedagogy, the project generates critical knowledge about what teachers need to know for teaching secondary school mathematics and how that knowledge can be developed, and about methods and models of productive cross-disciplinary collaboration.

In 2009 three new teams became part of the grant. The team from the University of South Florida (Gladis Kersaint, Denisse Thompson, and Catherine Beneteau) is collaborating in courses in geometry and teaching high school mathematics. The Virginia Tech team (Anderson Norton and Charles Parry) is co-teaching history of mathematics and mathematics for secondary school teachers, whereas the Illinois State University team (Saad El-Zanati, David Barker) is co-teaching a mathematics capstone course and a secondary methods of teaching mathematics course. All team members joined the KnoTSS PI and project staff at the IM&E in August for a 2-day meeting. The meeting focused on methods and models of collaboration, and methods for researching collaboration.



## Tucson Teachers' Circle

GINNY BOHME, FACILITATOR  
NATE CARLSON, JI LI, CO-FACILITATORS

The Tucson Teachers' Circle brings together both teachers and university faculty members who meet one evening a month to engage in problem solving related to the night's theme. All middle school and high school mathematics teachers who are interested in exploring engaging, accessible topics in mathematics and who strive to incorporate a problem solving approach in their

classrooms are encouraged to participate in the Tucson Teachers' Circle. Participants gain access to a variety of resources, membership in a dynamic community of mathematics educators, and a renewed sense of appreciation for the fascinating world of mathematics. In 2008—2009, themes have included recursive patterns, symmetry, Catalan numbers, and error-coding messages. Teachers earn re-certification credits for their involvement.



## Tucson Math Circle

PHILIP FOTH AND MATT THOMAS, CO-ORGANIZERS

The Tucson Math Circle, run and co-organized by mathematics professor Philip Foth and graduate student Matthew Thomas, challenges pre-college students to sharpen their problem-solving skills in an informal setting. Student participants work on interesting problems and explore a variety of



mathematics topics together with faculty and graduate students from the University of Arizona. The goal is to share the excitement about mathematics and learn through fun activities without formal tests and examinations. The circle meets weekly during the Fall and Spring semesters, each academic year.

In 2008-09 the Circle problems covered various topics in number theory, combinatorics, probability, geometry, and logic. The problems were primarily chosen to have a statement with a certain entertainment value, to make them appear more interesting, engaging, and easier to comprehend, such as the famous problems on Konigsberg bridges, Friends and Enemies, The Monty Hall problem, and many others.



Photo by La Monica Everett-Haynes, UA News, <http://uanews.org/>

### Graduate Students and Teachers Engaging in Mathematical Sciences (G-TEAMS)

JOCELINE LEGA, PI

G-TEAMS (Graduate Students and Teachers Engaging in Mathematical Sciences) is a 5-year, \$2.95 M, NSF-funded *Graduate STEM (Science, Technology, Engineering, and Mathematics) fellows in K-12 Education* program that pairs University of Arizona applied mathematics, mathematics, and statistics graduate students with K-12 teachers and their students. The

program provides an innovative and dynamic opportunity for graduate students and teachers to collaborate on the development of novel, rigorous, and relevant material for K-12 mathematics courses. Run by the Institute for Mathematics and Education and the Department of Mathematics at the University of Arizona, G-TEAMS builds on a long-standing relationship between these two units and schools in the Tucson area. Fellows are recruited from the graduate programs in Mathematics and the interdisciplinary programs in Applied Mathematics and in Statistics at the University of Arizona. They work with high school teachers on the development of new courses, such as probability and statistics and mathematical modeling, on ways to promote algebraic thinking in K-8 grades, and on strategies to facilitate transitions between elementary, middle, and high school.

G-TEAMS promotes STEM disciplines to underrepresented K-12 student populations and fosters a synergetic relationship among fellows, teachers, and K-12 students. Fellows learn to communicate mathematical ideas to diverse audiences, implement a range of teaching techniques, and increase their understanding of K-12 educational issues. Teacher partners are involved in professional development workshops and appreciate how mathematical concepts may be applied to a variety of situations. K-12 students learn about the wide variety of possibilities offered by STEM disciplines by interacting with individuals who are planning a career in the Mathematical Sciences.

## Events

### Southwestern Network Meeting and Proof Workshop, September 27, 2008

ORGANIZER: Department of Mathematics VIGRE Committee

The goal of the UA VIGRE Southwestern Network is to foster a broad exchange of ideas and people (faculty and students) throughout a seven-state region in the southwestern United States. The ultimate aim is to increase the number of students who pursue advanced training in the mathematical sciences and to increase the depth, breadth, and quality of their training.



The 2008 Network meeting and workshop, hosted by the IM&E, brought together participants from colleges and universities in Texas, Colorado, Arizona, and New Mexico. Workshop participants sent, in advance, examples of areas of logic and proof where students have particular trouble. At the workshop they broke into four groups and produced modules and problem-sets aimed at helping students grapple with the following three issues: understanding linear independence, quantifying variables, and recognizing the need for mathematical proof.

### *Facing Choices about the Fourth Year in Arizona, an IM&E Policy Retreat, October 18, 2008*

ORGANIZER: *William McCallum*

The Arizona State Board of Education recently voted to increase the high school graduation requirement to include four years of mathematics. This policy will first apply to the class entering high school in 2009. At the 2007 IM&E policy retreat, entitled *Making Sense of Testing in Arizona*, a project to develop a report on existing options for fourth year courses was launched. The 2008 policy retreat, entitled *Facing Choices about the Fourth Year in Arizona* brought together decision makers from the mathematics education system in Arizona and the nation, to help develop fourth year mathematics courses that will meet the needs of all Arizona students. Three white papers on potential fourth-year mathematics courses and materials were produced collaboratively during the event.

### *The “Who Wants to Be a Mathematician?” Competition, November 15, 2008*

ORGANIZER: *American Mathematical Society*

In this event, co-sponsored by the IM&E and the American Mathematical Society, students from Tucson area schools proved that math is fun and rewarding when they competed with peers in a game of skill and excitement based on the popular TV show *Who Wants to be a Millionaire*. The student contestants vied for the top prize of \$3,000 in cash by answering multiple choice questions. The game rewards math performance in an exciting, entertaining way. The American Mathematical Society has been performing the game for over seven years at various locations.

### *Mapping the High School Algebra Curriculum Workshop, February 19–20, 2009*

ORGANIZING COMMITTEE: *Fran Arbaugh, William McCallum, and Dick Stanley*

This workshop was based on a set of explanatory essays, written by mathematicians, that carefully examined core areas of school algebra. The essays were developed under a grant from the Noyce Foundation through the Charles A. Dana center. At the workshop, teams of mathematicians, educators, and teachers revised the essays and produced support materials for them, such as problem sets, case studies, and curriculum guides, which can be used in teacher preparation, teacher professional development, standards development, and task design.

### *Mapping the High School Geometry Curriculum Workshop, March 19–21, 2009*

ORGANIZING COMMITTEE: *James Madden (chair), Rebecca McGraw, Kristin Umland*

Geometry is a major curricular strand, yet when standards suggest that particular concepts are central to the domain, it is often not clear that authors and readers interpret them in the same ways. This workshop sought to identify and describe core ideas in geometry and to develop tools for examining mathematical competence related to these ideas.



Participants identified and described some domains of competence that teachers, educational researchers and mathematicians agree are central to the geometry curriculum. Then they created written tasks useful for assessing these areas of competence.

### *Mathematicians in Mathematics Education (MIME), April 1–3, 2009*

*ORGANIZING COMMITTEE: William McCallum (chair), Deborah Ball, Hyman Bass, Roger Howe*

The demand is increasing for mathematicians who can constructively contribute to work in mathematics education, such as standards development, validation of tests, curriculum design, textbook review, and the preparation and professional development of teachers. The MIME workshops are aimed at the general audience of university mathematicians who wish to become involved in helping solve the problems in mathematics education.

The 2009 workshop, the second in the MIME series, continued to orient mathematicians on key issues in mathematics education: the core mathematics of K–12 education, the mathematical content knowledge of teachers, the nature of the K-12 educational system, the profusion of Mathematics Standards documents, the variety of curricula, and mathematics education research.

### *Mapping the Calculus Curriculum Workshop, April 18–20, 2009*

*ORGANIZING COMMITTEE: Guershon Harel (chair), Joceline Lega, Pat Thompson, and Alejandro Uribe*

In this first installment of a two-workshop series, participants articulated a set of problems in the learning and teaching of calculus and their conceptual basis (e.g., what are some of the difficulties students encounter in understanding the integral as accumulation of change? How does students' lack of understanding of the concept of function affect their understanding of other ideas in calculus?).

In a follow-up workshop in 2010, participants will produce guide pamphlets to help instructors deal with the problems identified at this workshop.

## Upcoming Workshops

### *Assessment Workshop and Common State Standards Forum Series, TBA (Spring 2010)*

Following the development of a set of Common Core State Standards (CCSS) by the National Governors' Association (NGA) and the Council of Chief State School Officers (CCSSO) the IM&E will offer a series of forums aimed at K-12 educators. At those meetings members of the CCSS development committee will meet with teachers and K-12 administrators to reflect on the meaning of the standards and on their practical application. Other workshops will focus on identifying instruments for assessing how the standards are met.

### *Mathematicians in Mathematics Education (MIME), TBA (Spring 2010)*

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### *Mapping the Calculus Curriculum, TBA (Spring 2010)*

In this second workshop in the *Mapping the Calculus Curriculum* series, participants will produce guide pamphlets on specific high school calculus topics, starting from an analysis of selections from existing curriculum materials. Each pamphlet will be produced at the workshop by a team of 3–5 people including at least one mathematician, a mathematics educator, and a teacher, and will include (1) a discussion of the mathematics, (2) a discussion of the teaching of the topic, based on both research and practical classroom experience, and (3) a set of tasks that could form the basis of a small instructional unit on the topic usable by a wide range of mathematics teachers.

## Featured Programs

### *UA Program Working to Improve Math Instruction, Learning*

By LA MONICA EVERETT-HAYNES, University of Arizona Communications  
June 2, 2009

*Text and photographs courtesy of the UA News, <http://uanews.org/>*



The purpose behind the newly initiated program is to help K-12 educators to incorporate more contemporary math instruction in their classrooms while encouraging students to consider studying in science, technology, engineering and mathematics disciplines.

fundamental shift in instruction so that students are not just learning equations but applying the principles of mathematics to thought and practice.

“Focusing on equations is not very pleasant. It can make math feel boring or extremely mechanical, which it is not,” said Joceline Lega, a UA mathematics professor and the principal investigator for the program, which is run jointly by the UA mathematics department and the Institute for Mathematics and Education.

**The purpose behind the newly initiated program is to help K-12 educators to incorporate more contemporary math instruction in their classrooms while encouraging students to consider studying in science, technology, engineering and mathematics disciplines.**

At the same time Arizona's high school freshman must begin taking four years of math to graduate, University of Arizona graduate students will begin serving as math specialists in area schools.

A new UA program funded at nearly \$3 million for five years by a National Science Foundation grant is pairing graduate students in applied mathematics, mathematics and statistics with K-12 teachers in an effort to help improve both math instruction and learning.

The “GK-12 Graduate Students and Teachers Engaging in Mathematical Sciences,” or G-TEAMS, program serves to create a



“Math is very creative. It’s like the construct of the mind in some ways,” Lega said. “What’s really important is to teach students this, and that’s true at all levels.”

She believes it is especially important at younger ages when students have the tendency to lose interest in the subject.

The effort at the UA, Lega said, “is part of a broader picture.”

In an age of advanced communication and more complicated social problems, modern students must be better prepared to think and problem solve in more complex and abstract ways.

Numerous national reports, including one released last year by the U.S. Department of Education, have noted that an educated workforce must have a solid grounding in math – and science, among other disciplines – to help strengthen the nation’s economy, security, global competitiveness and also the quality of life.

Of note, programs – much like G-TEAMS – at the UA and elsewhere are working to improve math instruction while boosting the number of students studying in the STEM fields: science, technology, engineering and mathematics.

At the state level, the Arizona State Board of Education approved requiring freshman to take four years of math to graduate beginning during the fall of 2009.

At the national level, the NSF initiated the GK-12 (Graduate STEM fellows in K-12 education) program 10 years ago and has since funded more than 200 projects. The agency’s Division of Graduate Education, which manages the program, has funded three other projects to initiate GK-12 programs at the UA.

### *Adding “Depth” to Math Instruction*

Each year as part of the new program at the UA, 10 graduate students will aid elementary, middle school and high school teachers and their students in the Sunnyside Unified School District and Tucson Unified School District for one full academic year. Also, a teacher from Casa Grande is participating in the program.

David Kukla, a math teacher at Sabino High School, said having the additional support will help him add depth. Teachers like himself have such a limited amount of time to spend on mathematics that “students give up before they see the magic and beauty of it,” he said.

“It’s really hard to be casual about math because mathematicians are not casual and the complexities of the concepts are also not casual,” he said.

Kukla will work with UA graduate student Yuliya Gorlina, a doctoral degree candidate in the mathematics department. Gorlina initially met Kukla last year after being invited to speak about math with some of his students. The two opted to join the program together.

The program provides a \$4,500 stipend for each of the participating middle and high school teachers and elementary teachers will receive \$2,750.

Though the UA students won’t begin their work in the classrooms until the fall – spending, on average, 15 hours on activities – the fellows and K-12 teachers met for the first time Monday as part of the program’s week-long Summer Institute.



Joceline Lega, a UA mathematics professor, is the principal investigator on the University’s new “GK-12 Graduate Students and Teacher Engaging in Mathematical Sciences,” or G-TEAMS, program.



“We want the fellows to develop an awareness of K-12 issues and education,” Lega said, adding that once students graduate they will then be able to encourage initiatives and outreach that promote education.

“The other piece is the development of communications skills because most students stay here on campus and will only talk to either their peers and their professors,” she said.



UA graduate student fellows and the K-12 teachers they have been paired with met for the first time on Monday and will spend this week in an intensive summer institute.

Lega also said that the intention of the program is to introduce concepts to the classroom that otherwise would not be introduced.

“Hopefully the lessons will be different from what the students would normally see in their classrooms so they will get a different perspective,” she said. Also, fellows will have the opportunity to interact with other teachers in varying subjects.

“Teachers don’t necessarily have time to talk to one another, so the fellow can be a resource to the school to help it to be more integrated,” she said.

### *Keeping Curriculum Current*

But fellows are not meant to serve as student teachers, but rather as expert mathematicians who can help the K-12 educators structure curriculum, plan projects, evaluate lessons, introduce concepts about math and assess materials that can be used in the classroom.

Janet Liston, an International Baccalaureate program math teacher at Cholla Magnet High School, said she was drawn to the program because she likes to bring people into her classroom to enrich the learning experience for her students.

“It keeps me fresh and learning,” said Liston, who has been teaching for 35 years. She and her fellow, she said, intend to introduce projects that will help students prepare for their math research paper, which is required as part of the International Baccalaureate program.

“Coming up with research questions and putting together a research paper are very different,” Linton said. The challenge in such a project, she said, will be in helping students to think about math in ways they may not have previously learned.

Chantel Blackburn, a doctoral degree candidate in mathematics, said that as a fellow she hopes to both influence students and aid in their growth.

“I want to help cultivate mathematical thinking in students to help them with structural thinking and reasoning,” said Blackburn, who has been assigned to Cholla Magnet High School.

“I feel that is really important because when you learn to think carefully and logically in life you can anticipate problems and solutions,” she added.

Lega said the G-TEAMS program shows great promise for not only improving math instruction, but also in encouraging students to consider studies and jobs in STEM disciplines.

“It’s not just about training graduate students, but also communicating to the public,” Lega said. “Hopefully their presence in the classroom will also help the students to realize that mathematics is an option that is open to them.



## Who Wants to Be a Mathematician at the University of Arizona

November, 2008

*Text and photographs courtesy of the AMERICAN MATHEMATICAL SOCIETY,  
<http://www.ams.org/wwtbam/archive/arizona.html>*



**"Thank you so much for everything! Thank you also for the materials! I loved that most of the contestants chose peers instead of their teachers to be their lifeline."**

**"Cholla High was so honored to be a part of this contest. It was really a lot of fun, and out of 9 students in my AP Calc. class, 7 came to the contest to cheer for Jun. It was also very good for the other students (and me!) to see the kind of questions you asked. They were great questions. So keep doing what you are doing to inspire and reward young math students. Sometimes, I just need to see math minds at work like I did on Saturday, because I, too, get inspired."**

**"We had a great time! All of our students enjoyed the Math Talk and were challenged by the questions that were asked during the competition. It was a great opportunity and we appreciate the work that you did arranging it."**

Richard Spence of the Sonoran Science Academy won US\$3000 when the University of Arizona's Institute for Mathematics and Education hosted Who Wants to Be a Mathematician on November 15. Two games with five players each were held that morning and followed a talk by Ken Ono, University of Wisconsin Solle P. and Margaret Manasse Professor of Letters and Science and the Hilldale Professor of Mathematics. In his lecture, Ken gave the audience a tour through some of Srinivasa Ramanujan's results, mostly in number theory. The contestants are pictured below with Who Wants to Be a Mathematician emcee and AMS Public Awareness Officer Mike Breen.



Front row, left to right:

- Julie Zhang, University High School
- Mike, AMS
- Jun Yeon Lee, Cholla High Magnet School
- Elizabeth Toller, Empire High School
- Sean Topping, Buena High School

Back row, left to right:

- Sean Ross, Marana High School
- Ian Montijo, Sabino High School
- Benjamin Ferrell, Canyon del Oro High School
- Sean Campbell, Basis Tucson Upper School
- Richard Spence, Sonoran Science Academy

(Not pictured: Dixie Bungard, Tucson High Magnet School)

Richard was the winner of game one, answering every question correctly. Elizabeth Toller finished second, and had a rooting section (some of whom are pictured below) with some impressive signs.



In fact, many of the people who came to root for the contestants came up with some good signs and clever t-shirts. Not only were the audience members well-appointed, but they were smart as well, choosing the correct answer whenever asked (after the contestants had answered).



Dixie and Jun



Richard, Elizabeth, and Sean (Topping)



Some of Elizabeth's rooting section



Some of Sean Campbell's rooting section

Game two was very close. Julie Zhang was the winner, edging out Sean Campbell (by 100 points), and Benjamin Ferrell. Although he didn't finish first, Ian Montijo did entertain the crowd with the way he managed his signaling device and by doing "Rock, Paper, Scissors" with his contestant helper.



Some of the Canyon del Oro High School rooting section still in campaign mode



Some of the Sabino High School rooting section



Sean (Campbell) and Benjamin



Ian, Sean (Ross), and Julie

The two game winners, Richard and Julie, then moved to the Square-Off Round, in which the first person to answer a question correctly moves on to the Bonus Round and a chance at \$2000. Richard answered the question before all the choices had been revealed. His answer was correct and so he earned a shot at the Two-Grand Prize Bonus Question.

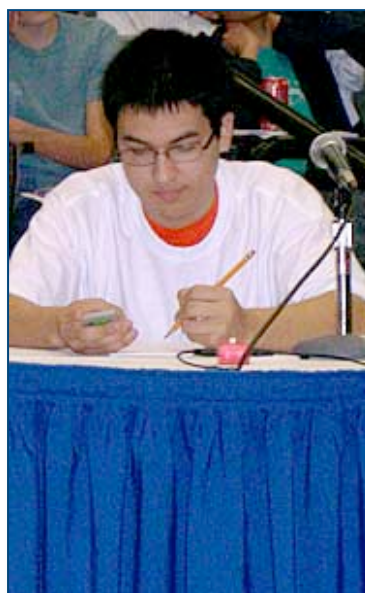
Entering this round, Richard had yet to miss a Who Wants to Be a Mathematician question, from the qualifying test through the day's competition. That performance is made even more astounding by the fact that Richard is only in the ninth grade.

In the Bonus Round, Richard thought very carefully, registering his answer after about two minutes had elapsed. When time had expired, Richard explained his choice but seemed a little unhappy. He said that he had wished he'd made a different choice.

"Do you still want to see what the correct answer is, or would you rather not see it?" asked Mike.

"No, I want to see it."

When Richard saw it, it turned out that his choice was correct (good thing time was up by the time he doubted himself), so he had won \$2000 in the Bonus Round in addition to his previous winnings in game one and the Square-Off Round.



Here are the prizes won by the ten contestants:

- TI-Nspire graphing calculator from Texas Instruments, and \$3000 from the AMS: Richard Spence
- TI-Nspire graphing calculator from Texas Instruments and \$500 from the AMS: Julie Zhang
- Maple 12 from Maplesoft: Elizabeth Toller and Sean Campbell
- Calculus with Early Transcendentals by Anton, Bivens and Davis from John Wiley and Sons: Sean Topping and Benjamin Ferrell
- What's Happening in the Mathematical Sciences from the AMS: Dixie Bungard and Sean Ross
- Five-Minute Mathematics from the AMS: Jun Yeon Lee and Ian Montijo

The AMS thanks the University of Arizona's Institute for Mathematics and Education for hosting the event and Teresa Stovall for the many arrangements she made (including lining up the many most excellent refreshments and



snacks), the National Science Foundation for its support of this event, and sponsors Texas Instruments, Maplesoft, and John Wiley and Sons, for their continued support of Who Wants to Be a Mathematician. Thanks also to the families, friends, and teachers of the contestants who formed a delightful audience for Ken Ono's talk and for the game.

*Photographs by Who Wants to Be a Mathematician judge and co-creator Bill Butterworth (DePaul University Department of Mathematical Sciences) and Mike Breen.*

Find out more about *Who Wants to Be a Mathematician* at <http://www.ams.org/wwtbam/>

Cover Drawings by: Guadalupe Lozano Terán

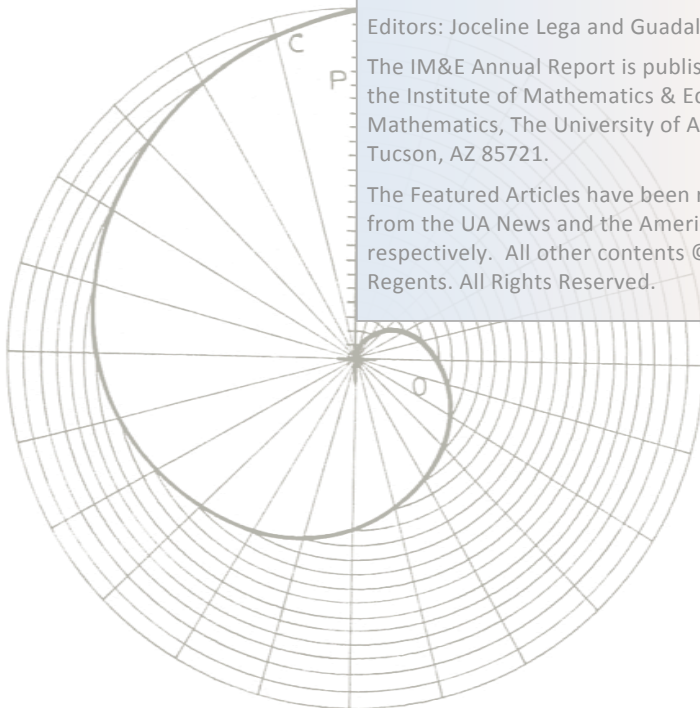
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