MSRI Mathematical Sciences Research Institute

Great Circles 2009
April 16-17, 2009

Thursday , April 16, 2009

Time			
8:00am - 8:30am	*Continental Breakfast fare and Conversation*		
8:30am - 8:40am	Robert Bryant, MSRI Director	Welcome, Overview	**Simons Auditorium**
8:40am - 9:30am Plenary Talk	Mark Saul (Bronx High School, Retired)	What is a Math Circle?	**Simons Auditorium**
9:30am - 10:45am Math Circle Demonstrations	Bob Kaplan (The Math Circle)	"Collegial Math Circles: a Demonstration and Discussion"	(4 and 5 year olds) **Simons Auditorium**
	Paul Zeitz (University of San Francisco)	The Divisors of Pascal's Triangle.	Advanced HS **Commons Room**
	Tatiana Shubin (San Jose Math Circle)	Fractions and Circles	**Teachers Circle Baker Board Room**
10:45am – 11:15am	Coffee, tea in the atrium		
11:15am – 12:05pm	Harold Reiter (UNC Charlotte) Anna Burago (Seattle) Mary O'Keefe (Albany, NY)	Great Circles I	**Simons Auditorium**
12:05- 12:15pm	Sam Vandervelde (St. Lawrence University)	Mathematical Diversions	**Simons Auditorium**
12:15pm – 2:10pm	**LUNCH**		
1:30 pm - 2:00pm	Brandy Wiegers / Josh Zucker	www.mathcircles.org	**Baker Board Room**
1:00pm – 2:10pm	Book / Display	Order forms	**Library**

2:10pm – 3:00pm Plenary Talk	Zvezdelina Stankova (University of California, Berkeley)	"A Decade of the Berkeley Math Circle - the American Experience. What have we learned?"	**Simons Auditorium**
3:00pm – 3:30pm	Coffee, tea in the atrium		
3:30pm – 5:00pm	Sam Vandervelde (St. Lawrence University)	Mathematical Battle	**Simons Auditorium**
5:00pm – 6:00pm	Reception at MSRI		
8:00am – 8:30am	Continental Breakfast fare and Conversation		
8:30am – 9:20am Plenary Talk	Janet Mertz (University of Wisconsin)	Gender, Culture, and Math	**Simons Auditorium**
9:20am – 10:30am Math Circle Demonstrations	Sam Vandervelde (St. Lawrence University)	"Boxing Dots"	(High School level) Geometry/Number Theory **Commons Room**
	Mark Saul (Bronx High School, Retired)	TBA	**Atrium**
	Jamylle Carter (SFSU)	Bottle Blastoff!	(Middle School level) Geometry (Angles and Similar Triangles) **Baker Board Room**
	Ellen Kaplan (The Math Circle)	"Collegial Math Circles: a Demonstration and Discussion"	9-11 year olds **Simons Auditorium**
10:30am – 11:00am	Coffee, tea in the atrium		
11:00am - 11:50am	Julia Brodsky (Maryland) Tom Davis (Bay Area, CA) Alex McFerron (Chicago, IL)	Great Circles II	**Simons Auditorium**
11:50am - 12:00pm	Sam Vandervelde (St. Lawrence University)	Awards for Diversions	**Simons Auditorium**
12:00pm - 1:45pm LUNCH	(1:00pm-1:20pm) Gwyn Whieldon	www.math.cornell.edu/~mec/	Baker Board Room
1:20pm - 1:45pm	brandy Weigers/Josh Zucker	www.mathcircles.org	Baker Board Room

Plenary Talk 1:45pm - 2:35pm	Fred Smyth (University of Virginia)	Implicit Attitudes and Stereotypes matter in Math and Science	**Simons Auditorium**
2:35pm 3:30pm	Panel Discussions I (Concurrent Sessions listed Below) Five Minute break for optional move to new room at 3:00pm		
2:35pm 3:30pm Panels	Matt Beck (San Francisco Math Circle), Kentaro Iwasaki (San Francisco Math Circle), Yvonne Lai (University of Michigan)	Vertical Integration for Math Circles	**Simons Auditorium**
	Blake Thornton (Washington University Math Circle) David Brown (San Diego Math Circle) Tatiana Shubin (San Jose State University)	Funding Models for Math Circles	**Commons Room**
	Amanda Serenevy (Riverbend Community Math Center), Bob and Ellen Kaplan (The Math Circle), Mark Saul (Bronx High School, Retired), Ken Fan (Girl's Angle)	Adapting Math Circles for different audiences	**Atrium**
	Joshua Zucker (MSRI) Lori Mains (American Institute of Mathematics), Jonathan Kane (University of Wisconsin), Silas Johnson (Stanford University)	Mathematical Festivals and Team Competitions	**Library**
	Fred Smyth (University of Virginia) Brandy Wiegers (MSRI) Irina Mitrea (University of Virginia), Jim Sotiros (MSRI)	Evaluating Math Circles	**Baker Board Room**
3:30pm – 4:00pm	Coffee, tea in the atrium		
4:00pm – 4:50pm Panels	Panel Discussion II (Same as above) (Concurrent sessions)		

| 4:50pm | Kathy O'Hara (MSRI) | Final Remarks | **Simons Auditorium** |

David Brown

The San Diego Math Circle has grown as a consortium of local interests charitably collaborating for the benefit of students with enthusiasm for mathematics. These interests include the University of California San Diego, The Art of Problem Solving, Inc., corporate supporters, a cadre of volunteer and quasi-volunteer instructors, and of unsung but critical importance, the parents of our students. The San Diego Model differs from others possibly most prominently in the degree to which parents assume the responsibility for math circle operations and funding.

Jonathan Kane

The Purple Comet! Math Meet is a free, on-line, international, team mathematics competition for middle and high school students conducted annually since 2003. In 2008 the meet attracted over 7000 students from 13 countries. Competition problems come from a wide range of topics and difficulty levels. We discuss the history, mechanics, advantages, and problems from this competition. The 2009 meet will take place April 27 through May 3.

Janet Mertz

Using data from the US and other nations, we examine gender differences in mathematics performance in the general population, among the mathematically talented, and among students with profound mathematical talent. We show that girls have reached parity with boys in the general population in the US. More males than females score above the 95th or 99th percentile, but this gender gap has narrowed over time in the US and is not found among some ethnic groups or in some nations. Evidence from several studies contradicts the Greater Male Variability Hypothesis with respect to mathematics. Furthermore, numerous females exist who possess profound mathematical talent. However, both the size of the measured mean math gender gap and the frequency of identification of gifted and profoundly gifted females are significantly linked to socio-cultural factors, including measures of gender equality across nations.

Harold Reiter

A crawl is a bijection f from the nonnegative integers to the integer lattice points of the plane such that for every n, f(n) and f(n+1) differ by at most \sqrt 2. We ask several questions about specific crawls and invite readers to create their own crawls.

Ken Fan

Girls' Angle: A Math Club for Girls

The mission of Girls' Angle is to nurture and foster girls' interest in mathematics and empower them to be able to tackle any field no matter the level of mathematical sophistication. Girls' Angle is a comprehensive approach to math education and seeks to improve the overall quality of math education in the US. Girls' Angle is also a supportive community for all girls and women who study, use or create mathematics. When a girl comes to Girls' Angle, she finds a room full of other girls and women engaged in activities that aim to further knowledge and understanding of mathematics. Women who love math and have a deep understanding of the subject work with the girls as mentors. Professional women who use math in their work visit the club and show the girls how they use math to make interesting and important contributions to society. The girls also receive a bimonthly magazine, the Girls' Angle Bulletin, which features articles about anything mathematical, including interviews with women in mathematics. At the deepest level, Girls' Angle encourages thinking and helps girls improve their ability to think by using mathematics as a vehicle. Girls' Angle is based in Cambridge, Massachusetts and began operations in September of 2007.

Girls' Angle relies on involvement by people, both men and women, who love math, understand it deeply and care very much about helping others learn it. If you're interested in getting involved with Girls' Angle or just want to find out more, please feel free to contact Ken at girlsangle@gmail.com.

Math Circle: **"Art of Inquiry",** www.artofinquiry.com, Rockville, Maryland.
Math Circle leader: Julia Brodsky, info@artofinquiry.com
Student population: Group I (6-7 years old), Group II (8-9 years old)
Class structure: Weekly, 1 hr class: warm-up, harder problems, bonus fun.
Topic to be showcased: *"Out of the box thinking"* , hands-on

Summary:
"Out of the box thinking", also known as" insight" thinking, is a popular topic in both educational and high-tech industry discussions. However, I was unable to find any systematic approach for development of this type of thinking in younger students. My observations show that kids are highly attracted by this type of problems, and do not require any external motivation to work on them. I have also observed that kids who expect an "insightful" solution are much more likely to find one. "Insight" problems also motivate kids to look for "insightful" ways of solving "regular" problems, approaching them from different angles, recognizing and avoiding clichés. As part of my circle activities, I have been compiling a database of "insight" problems appropriate for younger kids.
Sample problems:

1.
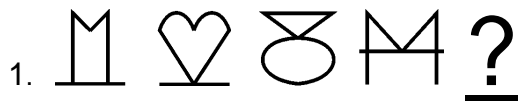
2. Measure the internal diagonal of a brick with a ruler – no computation allowed.

3. Is it possible to put 5 checkers in such a way that each checker touches 2 others?   3 others?

4. A farmer, a goat, a wolf, and a cabbage have to cross a river. A nearby boat has just enough room for the farmer and one other thing. What is the fewest number of trips he must take so that the goat does not eat the cabbage, and the wolf does not eat the goat?
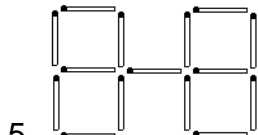
5.   Move 2 matchsticks to get 5 equal squares.

Tatiana Shubin

Title: Fractions and Circles

Level: This is a demo of a Math Teachers' Circle (MTC) for Middle School Teachers

Abstract: It will demonstrate characteristic features of an MTC: (a) interplay between discussion and individual and group work on problems; (b) an easily accessible task leading to deep mathematical content; (c) engaging teachers in audacious problem solving with a view on the classroom realities.

Lori Mains oversees AIM's outreach programs for the Morgan Hill community and talented math students in grades 4-12. Lori has a Bachelor of Science in Computer Science from Union College in Schnectady, NY. A former IBM employee, Lori has spent the past ten years working with school age children and math, through both school based programs and one-on-one tutoring. The current programs which she administers include the Math Mardi Gras (a one day community math event), Mathletics (4th-6th grade), MathCounts (6th-8th grade) and Mu Alpha Theta (9th-12th grade).