Report on the 2011 Meeting at SRJC

On the beautiful campus of Santa Rosa Junior college on February 26, 2011 the now Golden Section enjoyed the first meeting with its new name in a wonderful setting. In preparation for that meeting a somewhat funky online registration process asked participants to create their own 9-digit account numbers. The numbers tell a story (but you'll have to decide what that story might be!) We had counting forward and backward with 123456789 and 987654321. We had some well-known constants in 271828182 and 314159265, and someone was recalling history and doing computer arithmetic with 192719440 and 101010101. Thanks for your creativity!

Former Section Governor Frank A. Farris (Santa Clara) and first speaker Shirley Yap (Cal State East Bay) outside of Newman Auditorium

The day began with a delightful presentation from **Shirley Yap** of Cal State East Bay who told us about her article in Mathematics Magazine (Feb 2010) that shows that "Differential Equations are not just a bag of tricks!" Her exposition of ideas from **Sophus Lie** on choosing the correct coordinate system and finding the symmetry of each equation was very intriguing and insightful. This is the rest of the story I didn't know when I took diffeq oh so long ago.

There was not a dry eye in the house when former section officer **David Sklar** read a tribute to the section's own late **Constance Reid** written by long time family friend and MAA celebrity **Don Albers**. You can see the full text yourself at the section's website. Reid's biography of **David Hilbert** is a tremendous accomplishment that will forever be a classic and her book *From Zero to Infinity* has inspired many young mathematical enthusiasts to pursue careers in our field. A quote from *Mathematical People* -- "mathematicians are people who devote their lives to what seems to me a wonderful kind of play" -- is certainly a great way to put into words what we all love so much.

The poster session was well attended with 14 posters on these diverse topics:

- **Greg Pinto** and **Brandon Dutra** of UC Davis: *Software for Exact Integration of Polynomials over Polyhedra*
- **Garrett Frey** of the University of Nevada Reno and the Desert Research Institute: *Morphology and Optical Properties of Combustion and Mineral Dust Aerosols*
- **Neeti Mittal** and **Anh Nguyen** of San Jose State University: *Isogonic Centers in Plane Geometry, Hyperbolic Geometry, and Spherical Geometry*
- **James Tipton** of CSU Fresno: *Invariants of Graphs in Euclidean 3-Space*
- **Andrew Gabriel, Jessica Enos, Emily Dreyer, and Jesse Cohen** of Santa Rosa Junior College: *Finally a use for Calculus: Intergalactic Warfare*
- **Jesse Cohen** also had *Euler's Formula: A Classic Result from Complex Analysis*
- **Seth Kingman** of San Francisco State University: *Explorations of an interesting function (if $a+b=2^n$ then $f(a)+f(b)=n$)*
- **Erin Kelly** and **Ryan Milhous** of Cal Poly San Luis Obispo: *Investigations on the Dimension to the Tangent Space of the Hilbert Scheme of Points at Borel Ideals*
- **Kevin He** of UC Berkeley and **Allen Chen**, **Rob Scharein** and **Mariel Vazquez** of San Francisco State: *Playing Hooky: Modeling the DNA Unknotting Action of Topoisomerase II*
- **Dido Salazar-Torres** of San Francisco State: *Marked Poset Polytopes*
- **Corwin Ziegler Hunts** of the ZH Academy: *Denesting Radicals*
- **Julian Zeigler Hunts** of the ZH Academy: *The Minsky Circle Algorithm*

- **Sandeep Peddada** of Lynbrook High School and **Alejandro Samaniego**, **Rob Scharein** and **Mariel Vazquez** of San Francisco State: *Using Knot Theory to Identify the Knot Type of Circular DNA Molecules*
- **Caleb Goerzen** of Simpson University: *Comparing Greedy Algorithms for Sorting with Input-Restricted Stacks*

William Stein from the University of Washington told us about his computational program / network / programming environment SAGE (which can be found at http://www.sagemath.org/) which is an open source alternative to Mathematica, Matlab, and the abstract structures package MAGMA. The beauty of this network is its ability to bring to one place much of the great mathematical computing software currently available.

After we proudly presented **Joe Conrad** of Solano Community College as our teacher par excellence, the luncheon talk was given by former section teaching awardee (and 2010 national **Haimo** award recipient) Dr. **Alan Rossman** of Cal Poly in San Luis Obispo. Alan reminds us to "Ask good questions". His talk (which may be found at http://statweb.calpoly.edu/arossman/) contains an entertaining and VERY thought provoking collection of questions from the statistics courses he teaches. My favorite was "Can people better answer math problems if they are presented with Roman letter notation as opposed to Greek letter notation?"

Alan J. Rossman, excited about questions

Erik Demaine's images of blown glass

After lunch it was an absolute treat to hear from Polya Lecturer **Erik Demaine**. The audience delighted to the breaking news that Erik was just tenured in the EE CS department at MIT. He and his father **Martin Demaine** (also at MIT but in the art department) have developed a huge collection of puzzles, sculptures and magic tricks on the boundary between art and mathematics. Check out their interlinked web pages at http://erikdemaine.org/ or http://martindemaine.org/. These include software for producing Origami folding instructions for any maze you might wish to design, a collection of puzzle books like "Games Puzzles and Computations", videos, sculptures of gravity spirals and more. I personally really enjoyed a rope trick using finitely generated groups based on the cancellation that occurs when one of the generators is removed.

The last talk of the day was from MAA officer **Ivars Petersen** who told us about chaos in the solar system. Ivars, who is legendary for his expository writings both for mathematicians and others, showed us that while the insights of **Newton**, **Kepler** and **Poincaré** gives us our modern day understanding of orbits, period times and distances, on closer look there are chaotic elements which, because we do not yet know how to solve the three body problem (much less the n-body problem) are still a mystery.

We finished the day with a rousing math wrangle competition from two high school teams that had been training for this over the past month prior to the meeting.