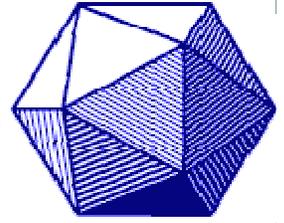


# NEWSLETTER



Volume V, Number 1

August 2010

## SEE YOU SOON IN NEW ORLEANS!!

### Dates to Remember:

January 6-9, 2011  
Joint Meetings in New Orleans

### Inside this issue:

2011 JMM	2
Conference Calendar	3
History of Math Events	4
In Memory of Sanford Segal	5
Convergence call for papers	6-7
Reports and opportunities	8-9
Math Study Tour to Greece and Italy	10-11

### 2010 Joint Mathematics Meetings, San Francisco

The 2010 HOM SIGMAA annual guest lecturer at the JMM in San Francisco was renowned Archimedes Palimpsest scholar Reviel Netz. His lecture was entitled “The Archimedes Palimpsest and Its Infinite Possibilities.” HOM SIGMAA also sponsored a two-day short course, “Exploring the Great Books of Mathematics,” at the JMM organized by Amy Shell-Gellasch and Glen Van Brummelen. Fernando Gouvêa and Amy Shell-Gellasch organized the contributed paper session, “Mathematical

Texts: Famous, Infamous, and Influential.” Other math history events at the JMM included an AMS-MAA Special Session on the History of Mathematics organized by Craig Fraser, Deborah Kent, and Sloan Despeaux, an AMS Contributed Paper Session on the History of Mathematics, and two mini-courses: “The Mathematics of Islam and Its Use in the Teaching of Mathematics,” organized by Victor Katz, and “Learning Discrete Mathematics via Historical Projects,” organized by Jerry Lodder, Guram Bezhanishvili, and David Pengelley.

*MAA Secretary Martha Siegel retired in January after 14 years of service.*

### MathFest 2010, Pittsburgh, Pennsylvania

MathFest 2010, was just held August 3-5 in Pittsburgh. HOM SIGMAA sponsored a contributed paper session on “The History of Mathematics and its Uses in the Classroom” organized by Herb Kasube, John Lorch, and Joanne Peeples.



## Greetings from the HOM SIGMAA Chair

*Robert Bradley, Adelphi University*

I'd like to start my first column as chair of HOMSIGMAA by thanking *all* members of our group for making it the largest of the MAA's Special Interest Groups. According to the latest membership numbers, HOMSIGMAA has 572 members. Furthermore, we are a highly connected bunch: on average every HOMSIGMAA member is a member of 0.925 other MAA SIGs. Not surprisingly, the largest overlap is with POMSIGMAA, the Philosophy of Mathematics SIG. 123 HOMSIGMAA members are also members of POMSIGMAA – that accounts for about 22% of our membership and 43% of theirs. Indeed, this partnership between the mathematical humanities is the largest intersection between any pair of MAA Special Interest Groups. (continued on page 2)

## 2011 Joint Mathematics Meeting, New Orleans, Louisiana

The 2011 JMM will be held in New Orleans on January 6-9. David Pengelley, Danny Otero, and Amy Shell-Gellasch will organize a HOM SIGMAA contributed paper session, "Treasures from the Past: Using Primary Sources in the Classroom." As usual, the HOM SIGMAA annual meeting and guest lecture will be held on the first evening of the meetings. Joe Albree of Auburn University-Montgomery will be the 2011 guest speaker.

## Greetings from the HOM SIGMAA Chair (continued from page 1)

The past year has been a busy one for HOMSIGMAA. As usual, there was a great variety of historical events at the Joint Mathematics meeting in San Francisco and at MathFest in Pittsburgh. To mention just one, at the annual HOM SIGMAA meeting in San Francisco our members were treated to a fascinating presentation on the Archimedes Palimpsest by Reviel Netz of Stanford.

The annual meeting also marked the beginning of new three-year terms for two members of the executive committee. We are extremely fortunate to have Andy Perry continuing in his role as our Electronic Resources Coordinator. Andy's primary duties include maintaining homsigmaa.org and our mailing lists. It was an honor for me to be elected to follow in the footsteps of our illustrious past Chair, Dan Curtin. Dan has done a wonderful job of shepherding HOM SIGMAA through a period of growth and stability and I know that I speak for the entire membership when I thank him for his efforts over the last three years.

It's not too early to start thinking about the 2011 Joint Mathematics Meeting. Once again, the meeting will be held in New Orleans. Many of us have fond memories of the last Joint Meeting in New Orleans in 2007, which was a most enjoyable event, as well as a pleasant way to make a small contribution to the city's recovery in the aftermath of Hurricane Katrina. I also remember the 2001 New Orleans meeting with fondness, because it was there that HOM SIGMAA was conceived. At that meeting, Victor Katz and Fred Rickey hosted a reception for alumni of their summer Institutes on the Uses of the History of Mathematics in Teaching. It was Victor who reported that the MAA had begun encouraging the formation of Special Interest Groups and suggested that the assembled members could easily form a nucleus of charter members for a History of Mathematics SIG. Indeed we did, and within a year HOM SIGMAA was a reality! And because no good deed goes unpunished, Victor and Fred were pressed into service as Program Coordinator and Chairman, respectively, during our inaugural year.

Many thanks to Dan, Victor, and Fred from a grateful HOM SIGMAA!!

**What HOM Sessions Would You Like to See at Future MAA Meetings?** Keeping in mind that paper sessions, panel discussions, and special lectures are approved about a year in advance, please share your ideas for HOM events at the JMM and Mathfest with HOM SIGMAA Program Coordinator Amy Shell-Gellasch at [shella@beloit.edu](mailto:shella@beloit.edu). Also, please contact her if you are willing to organize or co-organize such an event, or are interested in helping out in any way, big or small, with HOM. All suggestions are welcome!



## Latin Course Update

Plans for offering a Latin course are still in the works. The current plan is to have a one or two day meeting before or after the 2012 JMM in Boston. More details will be provided as they become available.

HOM SIGMAA misses you Ed! Our thoughts are with you and we look forward to seeing you at future meetings soon.

# 2010-2011 Meeting and Conference Calendar

## Mathematical Tour of Greece

July 10-19, 2010

Fred Rickey and Douglas Furman led a 10-day mathematical tour of Greece, July 10-19, in conjunction with SUNY-Ulster. Participants visited the cities associated with the famous mathematicians of the ancient Greek world (including Thales, Pythagoras, Euclid, Archimedes, and Aristarchus), as well as the major cultural icons to learn about the various aspects of ancient Greek culture (mathematics, myth, art, philosophy, history and society). Read about this tour on page 10. Doug is planning a mathematical tour of Italy in Summer 2011.

## Philadelphia Area Seminar on the History of Mathematics

September 2010 – April 2011, Villanova, Pennsylvania

This monthly seminar meets at Villanova University, usually on a Thursday at 6 p.m., and begins with a light dinner. Karen Hunger Parshall is scheduled to deliver the first lecture, “Algebra: Creating New Mathematical Entities in Victorian Britain,” on September 16. John Dawson is the scheduled speaker for November 18.

## ARITHMOS Reading Group

Danbury, Connecticut

Readings in the History of Mathematics from Original Sources seminars are 24-hour workshops on the classics of mathematics, read in the original or in a English translation. A dozen pages of mathematics is typically covered per session, which usually runs from 2 –6 p.m. on the first day, and 9 a.m. to 12:30 p.m. on the second. Organized by Ed Sandifer, Rob Bradley, and Chuck Rocca, ARITHMOS meets three to five times per year at Western Connecticut State University. The first meeting of the fall is scheduled for October 23-24 and the topic of discussion will be Chapter 4 of L'Hospital's *Analyse des infiniment petits*. For more information, visit <http://www.arithmos.org/>.

## HPM-Americas West Coast Meeting

October 23-24, 2010, Pasadena, CA

HPM-Americas is pleased to announce a meeting on Saturday and Sunday, October 23-24, 2010, on the campus of CalTech in Pasadena, California. A special feature of this meeting will be a visit to the Huntington Library on Saturday afternoon. Prospective speakers should send a title, abstract, and contact information to Dave Roberts at [robertsdl@aol.com](mailto:robertsdl@aol.com) by September 15. For more information, see <http://www.hpm-americas.org/>.

## AMS-MAA Joint Mathematics Meetings

January 6-9, 2011, New Orleans, LA

## BSHM-CSHPM Joint Meeting

July 15-17, 2011, Dublin, Ireland

The Canadian Society for History and Philosophy of Mathematics will hold its Fifth Joint Meeting with the British Society for the History of Mathematics in 2011. The meeting will be held Friday through Sunday, July 15-17, 2011, at Trinity College Dublin, Ireland. The deadline for abstracts is March 1, 2011. More details are available at [www.cshpm.org](http://www.cshpm.org).

# EVENTS CELEBRATE THE HISTORY OF MATH

## 2010 HOM SIGMAA Student Paper Contest

*Amy Shell-Gellasch, Program Coordinator*

HOM SIGMAA is pleased to announce the results of the seventh annual Student Paper Contest in the History of Mathematics. Three students tied for first place and were named as co-winners of this year's award:

Jennifer L. Nielsen, University of Missouri-Kansas City, "The Heart is a Dust Board: Abu'l Wafa Al-Buzjani, Dissection, Construction, and the Dialog Between Art and Mathematics in Medieval Islamic Culture"

Palmer Rampell, Harvard University (composed at Phillips Academy in the 12th grade), "The Use of Similarity in Old Babylonian Mathematics"

Stefanie Streck, Pacific Lutheran University, "The Fermat Problem"

All three papers are posted on the HOM SIGMAA website at <http://www.homsigmaa.org/>. A special thank you to all the contest judges: **Joel Haack, John DuBois, George Rosenstein, Dorothee Blum, Kathy Clark, and Craig Wotherspoon.**

Details regarding the eighth annual Student Paper Contest will be posted on the HOM SIGMAA website when they are available.

## Save these dates for future MAA meetings!

Winter 2011	New Orleans, LA	January 6-9
Summer 2011	Lexington, KY	August 4-6
Winter 2012	Boston, MA	January 4-7
Summer 2012	Madison, WI	August 2-4
Winter 2013	San Diego, CA	January 9-12
Summer 2013	Hartford, CT	August 1-3
Winter 2014	Baltimore, MD	January 15-18
Summer 2014	Portland, OR	August 7-9
Winter 2015	San Antonio, TX	January 10-13
Summer 2015	Washington, D.C.	August 5-8
Winter 2016	Seattle	January 6-9

Several HOM SIGMAA members organized, led, and participated in meetings, conferences, and workshops featuring the history of mathematics this past year.

The **Americas Section of the International Study Group for Relations Between History and Pedagogy of Mathematics (HPM)** held its annual (East Coast) meeting at the MAA Carriage House in Washington, D.C. on March 13-14, 2010. The agenda included 19 talks and an opportunity to visit the Dibner Library, which houses the Smithsonian's extensive collection of rare books. For information regarding plans for the 2011 meeting, contact Bob Stein at [bstein@csusb.edu](mailto:bstein@csusb.edu).

The bi-annual meeting of the **Smoky Mountain Undergraduate Conference on the History of Mathematics (SMURHOM V)** was held at Western Carolina University in Cullowhee, North Carolina on March 20, 2010. Participants enjoyed a keynote address by Adrian Rice of Randolph Macon College who presented a succession of purported proofs on the divergence of the harmonic series and its relationship to the distribution of prime numbers. More than thirty undergraduates had the opportunity to present their research in contributed paper and poster sessions. The conference was organized by Sloan Despeaux and funded by the National Science Foundation through the MAA Regional Undergraduate Mathematics Conferences program.

The annual summer meeting of the **Canadian Society for History and Philosophy of Mathematics** Annual Meeting was held May 29-31, 2010, at Concordia University in Montreal in conjunction with the Canadian Federation for the Humanities and Social Sciences. Hardy Grant of York University, Toronto, delivered the annual Kenneth O. May Lecture, "Mathematics and the Liberal Arts: The Beginnings." Several HOM SIGMAA members made the trip to speak in the contributed paper sessions, including HOM SIGMAA officers Rob Bradley, Andrew Perry, and Charlotte Simmons.

# In Memory of Sanford L. Segal (1937-2010)

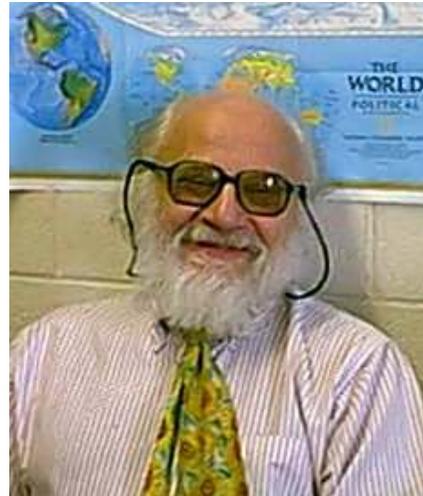
Bonnie Gold, Monmouth University

Sanford L. (Sandy) Segal, an analytic number theorist at the University of Rochester, best known by historians of mathematics for his book *Mathematicians under the Nazis* and related work, died on May 7 shortly after suffering a cerebral hemorrhage and stroke.

Sandy wrote his thesis in analytic number theory at the University of Colorado at Boulder under the supervision of Sarvadaman Chowla, finishing in 1963. He took a position at the University of Rochester that fall, where he remained for his academic career. Most of Sandy's early work was in analytic number theory or complex analysis, approximately 35 articles over the course of his career—including one jointly with Erdős. Starting in 1978 with an article for the *Mathematical Intelligencer*, "Riemann's Continuous Non-differentiable Function Continued," Sandy began publishing articles in the history of mathematics, a total of seven in addition to his book *Mathematicians under the Nazis*. Sandy's work in the history of mathematics centered around German mathematicians, thanks in part to two Fulbright fellowships. He recently published a translation, *History of Mathematics: Highways and Byways of Routes et Dédales* by Amy Dahan-Dalmedico & Jeanne Peiffer. He also gave talks at three AMS-MAA special sessions on the history of mathematics at the joint mathematics meetings in 1991, 1999, and 2007 (and numerous invited talks elsewhere), and participated in several electronic discussion groups devoted to the history of mathematics.

Sandy was very involved in the Mathematical Association of America, serving on numerous committees and editorial boards. He served on its Committee on History of Mathematics from 1998 to 2004, during which time the online journal *Convergence* was founded. At the time of his death Sandy was on the ad hoc Centennial History Subcommittee (as part of the planning for the MAA Centennial in 2015). Sandy was also very involved in encouraging women and minorities to participate actively in the mathematical community, and was involved locally in teacher education. Very much following the style of his undergraduate mentor, Nobby (Norman Oliver Brown), Sandy was

always happy to pursue whatever intellectual path a conversation wandered toward—history, sociology, psychology, religion.



**HOM SIGMAA extends its condolences to Sandy's family. He will be missed.**

## 2010 HOM SIGMAA Executive Committee

**Chair:** Robert Bradley, Adelphi University

Email: [bradley@adelphi.edu](mailto:bradley@adelphi.edu)

**Secretary/Treasurer:** Charlotte Simmons, University of Central Oklahoma

Email: [cksimmons@uco.edu](mailto:cksimmons@uco.edu)

**Program Coordinator:** Amy Shell-Gellasch, Beloit College

Email: [shella@beloit.edu](mailto:shella@beloit.edu)

**Electronic Resources Coordinator:** Andrew Perry, Springfield College

Email: [perryand@yahoo.com](mailto:perryand@yahoo.com)

**Prize Coordinator:** Ed Sandifer, Western Connecticut State University

Email: [SandiferE@wcsu.edu](mailto:SandiferE@wcsu.edu)

**Past Chair:** Daniel Curtin, Northern Kentucky University

Email: [curtin@nku.edu](mailto:curtin@nku.edu)

# Convergence: Where Mathematics, History, and Teaching Interact

Janet Beery, University of Redlands

Kathy Clark, Florida State University

*Convergence: Where Mathematics, History, and Teaching Interact*, is the Mathematical Association of America's free online journal about the history of mathematics and its use in teaching. Now part of the Mathematics Digital Library (MathDL) and its online journal, *Loci*, *Convergence* is aimed at teachers of mathematics at both the secondary and collegiate levels. Topics are from grades 8-16 mathematics, with special emphasis on grades 8-14 topics: algebra, combinatorics, synthetic and analytic geometry, trigonometry, probability and statistics, elementary functions, calculus, differential equations, and linear algebra.



We encourage you to visit *Convergence* at <http://mathdl.maa.org/mathDL/46/> to see what the journal has to offer. We especially encourage you to view the article, "Mathematical Treasures," which features digital images of mathematical objects and texts from the Columbia University Library George Arthur Plimpton and David Eugene Smith collections.

At the *Convergence* homepage, you'll also find links to:

Problems from Another Time

On This Day in mathematics history

Calendar of upcoming mathematics history events

Reviews of books, websites, and other instructional materials

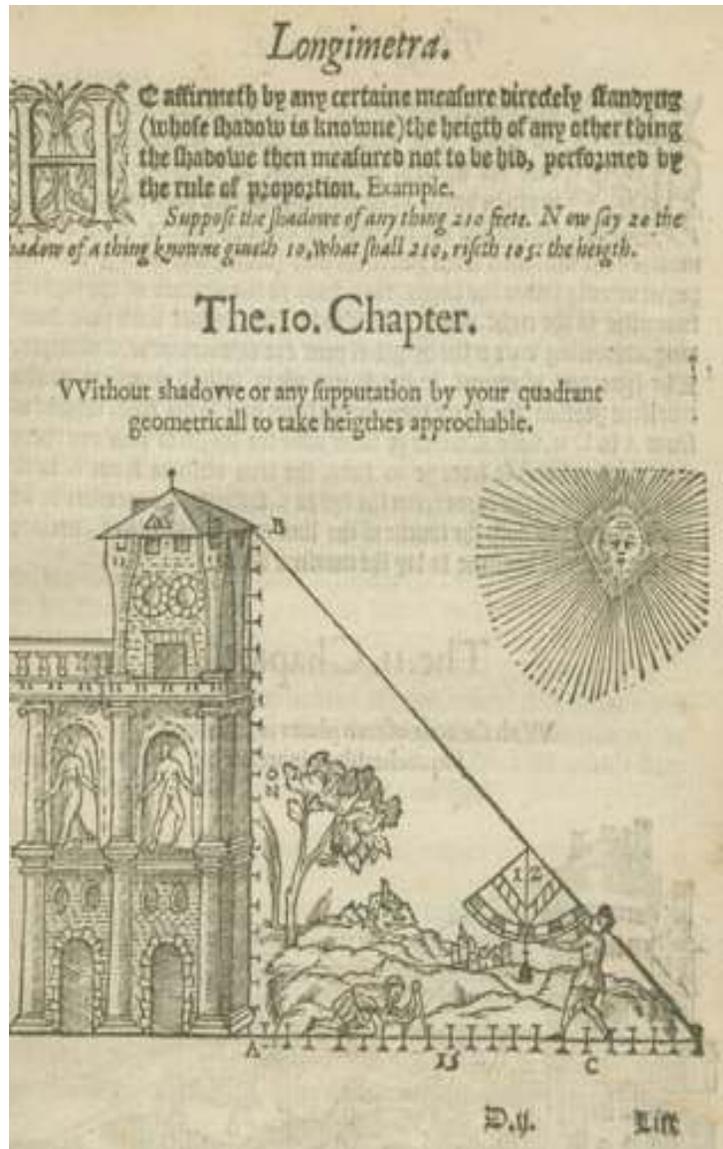
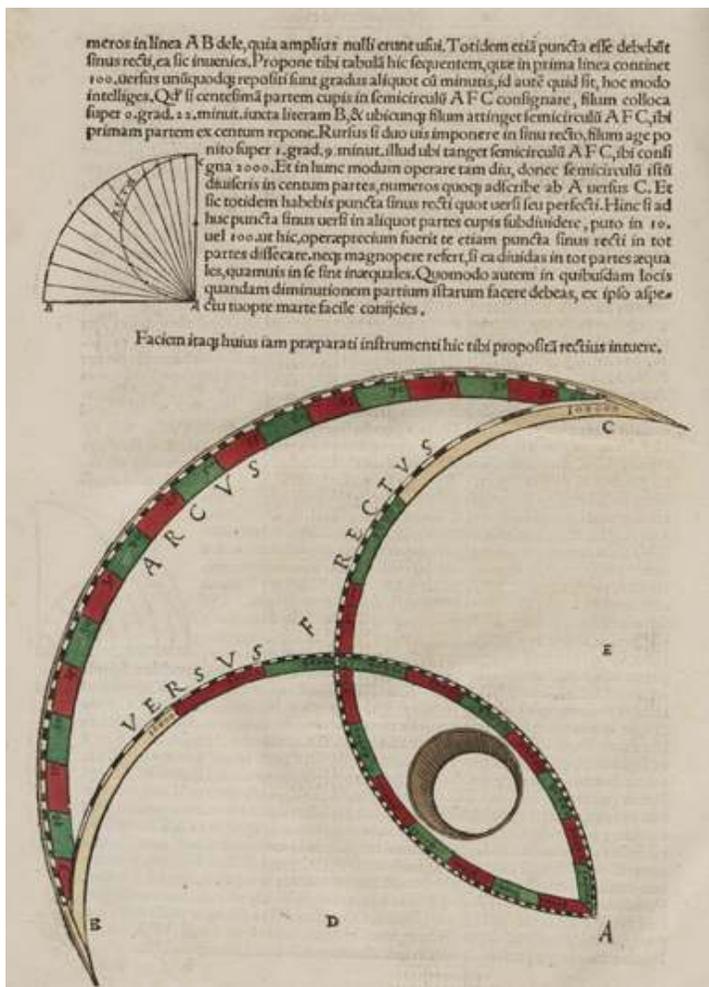
Our newest articles and classroom activities, along with Tables of Contents for all seven volumes (2004-2010) of *Convergence*

Finally, if you would be willing to serve as a referee for articles submitted to *Convergence*, please let one of the editors know what topics and types of articles you would prefer to review.

*Convergence* founding editors Victor Katz and Frank Swetz continue to serve the journal as advisors, as project directors for its NSF grant, and as authors of the ongoing "Mathematical Treasures" project. The journal's current editors are Janet Beery ([janet\\_beery@redlands.edu](mailto:janet_beery@redlands.edu)) of the University of Redlands and Kathy Clark ([kclark@fsu.edu](mailto:kclark@fsu.edu)) of Florida State University.

The *Arithmetic* of Boethius (480-524) dates from the early sixth century. This page, from a vellum manuscript copy from approximately 1294, illustrates square and pentagonal numbers. (Photo from "Mathematical Treasures," *Convergence*, is used courtesy of the Columbia University Library George Arthur Plimpton Collection.)

Petrus Apianus' (Peter Apian's) 1534 *Instrumentum sinuum sive primi* contained the most accurate sine table published up until that time. On this page, Apianus illustrates and explains the nomogram he used to graphically determine his sine and versed sine values. (Photo from "Mathematical Treasures," *Convergence*, is used courtesy of the Columbia University Library.)



Thomas Digges illustrated how to use a quadrant to measure the height of a tower, among other geometric applications, in his *Pantometria* (1571). (Photo above from "Mathematical Treasures," *Convergence*, is used courtesy of the Columbia University Library.)

**INTRODVCTIO**  
**GEOGRAPHICA PETRI APIANI IN DOCTISSIMAS VER-**  
 neri Annotationes, continens plenum intellectum & iudicium omnis operationis, quae per sinus & chordas in Geographia confici potest, adiuncto Radio astrono mico cum quadrante nouo Meteoroscopi loco longe utilissimo.

**HVIC ACCEDIT** Translatio nouissimi libri Geographiae CL. Ptolemaei, Translationi adiuncta sunt argumenta & paraphraſes ſingulorū capitulū libellū quoq; de quatuor terrarum orbis in plano figuratioib; Authore Veneto.

**LOCVS** etiam pulcherrimus desumptus ex fine septimi libri eiusdem Geogra phiae Claudii Ptolemaei de plana terrarum orbis descriptione iam olim & a uerbis illustata Geographis, vna cum opusculo Amituaci Constantinopolitani de iis, quae Geographiae debent adesse.

**ADIVNCTA** est & epistola IOANNIS de Regio monte ad Reuerendissi mum patrem & Dominum D. Bessarionem Cardinalem Nicenum, atq; patri archiepiscopi Constantinopolitani, de compositione & usu cuiusdam Meteoroscopi armillaris, Cui recens tam opera PETRI APIANI accessit Torquetum instrumentum pulcherrimum sane & utilissimum.



In *A Geographical Introduction* (1534), Petrus Apianus (Peter Apian) explained how to apply trigonometry to geography. (Photo at left from "Mathematical Treasures," *Convergence*, is used courtesy of the Columbia University Library.)



Don Albers, Richard K. Guy (Calgary), and Fernando Q. Gouvêa (Colby) at the Silver and Gold Banquet at MathFest 2010. Photo is part of maanow's photostream from [www.maa.org](http://www.maa.org).

Gouvêa will step down as editor of *Focus* at the end of 2010, after 11 years of service in that role.

## Join our Electronic Mailing List!

*Andrew Perry, Electronic Resources Coordinator*

Our website (<http://homsigmaa.org>) includes HOM SIGMAA news, announcements of upcoming conferences, links to other history of mathematics pages, and other resources. Please check the HOM SIGMAA website for news throughout the year. Suggested additions to the website (for example, conference information, links, or photos) are always welcome at [perryand@yahoo.com](mailto:perryand@yahoo.com).

To subscribe to the HOM SIGMAA list, send an email to [perryand@yahoo.com](mailto:perryand@yahoo.com) with the subject line: subscribe HOMSIGMAA-list ADDRESS, with your own e-mail address in place of the word ADDRESS. See <http://homsigmaa.org/list> for instructions for subscribing to the list in digest form or for unsubscribing from the list.

Please contact Andrew Perry at [perryand@yahoo.com](mailto:perryand@yahoo.com) if you have any problems subscribing, or with any other questions or comments on HOM SIGMAA electronic resources.

## Note from the Chair of the Committee on SIGMAAs

*Amy Shell-Gellasch, Beloit College*

The MAA has launched a Strategic Planning Work Group on SIGMAAs that will be looking into all aspects of the SIGMAA program over the next year and a half. Look for opportunities to give input to this group in the coming months. When that opportunity comes, please take advantage of making your opinions known!

**Visit [homsigmaa.org](http://homsigmaa.org) today!**

## Visit the HOM SIGMAA website today!!

## Cajori Two Project Collects Data on History of U.S. Collegiate Mathematics Education

*Walter Meyer, Adelphi University*

The Cajori Two Project aims to produce an Excel-based data base of undergraduate curricular change in the 20<sup>th</sup> century at a selection of 20 or so interesting American institutions, showing snapshots of their curricula at 10 year intervals. The project is named for Florian Cajori, an early president of MAA, who was the first to extensively record American college curricular history for centuries before the 20<sup>th</sup>.

In the last year we have completed our "inventory" of standardized courses. Every course found at one of our colleges will be mapped to one of these standardized courses. There are 250 of them, all with course descriptions, most of them argued about with joyful but time consuming enthusiasm. We have made what we hope will be final decisions on the format with which information about courses will be entered in cells of workbooks. Work continues on software to extract tabulations and summaries from the workbooks we will create.

In the stumbling block department, we have discovered that some of the librarians who have been kind enough to send us catalog photocopies misunderstood our email instructions. Consequently there is some information we need that we do not have and we are beginning to re-contact these schools.

We gratefully acknowledge HOM SIGMAA's financial support for photocopying expenses. For more information, please contact Walter Meyer at [meyer1@adelphi.edu](mailto:meyer1@adelphi.edu).

## Make a Deposit to the National Curve Bank

Shirley Gray, California State University, Los Angeles

HOM SIGMAA members should find the following two Historical Sketches, recent additions to the National Curve Bank, of particular interest.

### NCB Renie Award in Spring 2009 for Quasi-Spherical Orbitals

Galileo's spectacular findings influenced scholarly communities well beyond those of astronomy and religion. In particular, Vincenzo Viviani (1622–1703), also of Florence, posed eight problems in his *Aenigma geometricum* (1692), challenging mathematicians regarding surfaces on a dynamic hemisphere. Those doing analysis were asked to investigate the new Galilean "Architecture of Geometry." One proposition became known as "Viviani's window." But in posing the problem, Viviani used the expression "quadrable Florentine sail." As he noted, a surface removed from a sphere may resemble a sail.

Europe's leading scholarly journal, *Acta Eruditorum*, was the forum of exchange. Those publishing response articles included none other than Leibniz (1691, 1693), [Fig. 5] J. Bernoulli (1692) [Fig. 9 and Fig 10] and l'Hospital (1694). In addition, Viviani's book was reviewed in 1694. His propositions and figures were repeated.

The Huntington Library of San Marino, CA has graciously permitted the National Curve Bank to use these late 17th century illustrations. Moreover, the images taken from Viviani's book are from Edwin Hubble's own copy. [See <http://curvebank.calstatela.edu/qsoschester98/qsoschester98.htm>].

### Renie Award in Spring 2010 for Dandelin Constructions and Animations

The Dandelin definitions and constructions are an enrichment, or refinement, of the conics that involve first placing a sphere inside a cone. If a cone is intersected by a plane, then the foci of the conics are all points where the plane touches the inscribed sphere. This is true for all four conics.

Germinal Pierre Dandelin (1794-1847) published this discovery when he was only 28 years old and having

already lived through extremely difficult times. As an 18 year old Belgium student studying in the elite Ecole Polytechnic in Paris, he volunteered to serve in Napoleon's army. When the advancing armies of Britain, Russia, Austria and Prussia forced Napoleon to retreat to Paris, Dandelin was wounded. He was one month short of his 20th birthday. He would spend the next eight years working as an engineer in the Ministry of Interior, returning to Belgium and becoming a citizen of the Netherlands. While investigating the conics launched his career as a mathematician, he would later publish in stereographic projections, statics, algebra and probability. In particular, his method of approximating roots of an equation is now known as the Dandelin-Graffe method. [See each of three animations starting with <http://curvebank.calstatela.edu/dandelinellipse/dandelin.htm>]

The National Curve Bank is an international database for all kinds of curves. Intended as a resource for both students and teachers, it strives to provide features—for example, animation and interaction—that a printed page cannot offer. If you have a favorite curve and would like to make a deposit, visit the National Curve Bank at [curvebank.calstatela.edu/](http://curvebank.calstatela.edu/) or email Shirley Gray at [sgray@calstatela.edu](mailto:sgray@calstatela.edu).



Fred Rickey, along with Douglas Furman, led a math tour to Greece in July 2010.

### JOIN the HISTORY of MATHEMATICS SIGMAA!

The annual HOM SIGMAA membership fee for MAA members is \$12. The MAA membership form has a check-off box for HOM SIGMAA, and we ask you to check this box when you pay your annual MAA membership fees. If you have already joined or renewed for 2010, please contact the MAA at (800) 331-1622 and ask to join HOM SIGMAA.

# Mathematics in Greece and Italy

One day years ago when our young daughter was sitting in my lap, I said "Ellen, there is a woodpecker in the yard." She responded indignantly (if three year olds can so express themselves), "Dad! That's a red-headed woodpecker." While she became a veterinarian, I never became a birder, but I do admire one of their habits, the life list.

My mathematical life list includes Plimpton 322, *all* of the Rhind Papyrus (including the  $2/n$  table in Brooklyn), and the Archimedes Palimpsest (have you touched it?). A recent two week mathematical tour of Greece and Italy organized by Doug Furman of SUNY/Ulster, provided a wonderful opportunity to extend my life list.

The Tower of Winds in Athens was my first addition. Situated at the base of the Acropolis, it is a 10m tall octagonal tower with a frieze of the eight winds. But my attention was drawn to the remnants of the sundials on each face and the cylinder aside one of the faces which was the reservoir for an overflow clepsydra, that, alas, is no longer extant. From the bar atop our hotel, the view of the Acropolis (etymologically, the top of the city) was magnificent. The climb to the top was not as arduous as anticipated due to low humidity that day, but it was definitely worth it. It was a thrill to see the Parthenon up close. We discussed how the Greeks designed the pillars to bulge about one-third of the way up and to tilt slightly inward just to provide an esthetic perspective. At the new Acropolis Museum, I was surprised to see a sacrificial alter that came from the house of Proclus (whose home was at the base of the Acropolis).

The next day we were treated to a peripatetic lecture by physicist Theo Mertzimekis on ancient astronomy that terminated in a grove of olive trees facing the Acropolis. At the National Archaeological Museum of Athens I got my first glimpse of Linear B (which was not decoded until after World War II), but it was far more thrilling to see the Antikythera mechanism. It was discovered in a shipwreck near the island of Antikythera in 1901, and Derek de Solla Price was the first to give a good explanation of what it was (scholars are still debating the details). It shows the motions of the planets and was used to predict eclipses; a truly sophisticated device. Price's 1980 model was there alongside the original. If you looked carefully you could see some of the inscriptions, gears, and even the tiny gear teeth.

Before we left Athens, we had a curated visit to the mathematics exhibit at the Hellenic Center with its lovely exhibits designed for school children. The cleverest exhibit dealt with how Thales might have found the height of a pyramid using the shadow of the sun (projected via a moving light) at an equinox. In another display there was a prescient quotation from a fourteenth-century manuscript: "May the devil claim your soul Diophantus, because all your problems are difficult, especially this one." This annotated proposition, II.8, was the very same one where Fermat added his famous marginal note.

We left Athens on an overnight ferry for Samos, where we visited the Tunnel of Eupalinos, which is named after the engineer who designed it. Its purpose was to bring water to the town, but an aqueduct around the mountain was deemed too susceptible of attack, so a tunnel was dug instead. This is an amazing feat of engineering, for the tunnel was dug from both sides of the mountain. The tunnel is 1036 meters long and the two shafts missed by only half a meter. Today one can only walk 120 m into the tunnel. The entryway is exceptionally narrow and there are places in the tunnel that are not 5'9" high – you can take my word for that. Not far away from the tunnel is the seacoast town of Pythagoreo, which is on the site of the ancient city of Samos. In the harbor is a large statue in the form of a right triangle, with a statue of Pythagoras representing the upright leg. There are many fanciful diagrams on the statue, but we could not find the Euclidean diagram for the proof of the Pythagorean Theorem or even a pentagram. Seeing this statue was a moment of glee for our newsletter editor; today a small model graces her office. Serendipity led to another fascinating bit of mathematics. One of our group paid for something in Euros and received change in Turkish Lira. We were all surprised when the 10 Lira note had a picture of Cahit Arf (1910-1997), and his eponymous topological invariant, on the reverse. As

evidence of how small the mathematical world is, Charlotte Simmons's doctor-father studied with Arf.

In Delos we walked down the sacred way to the Temple of Apollo where the Delphic Oracle supposedly posed the problem of doubling the cube. This occasioned a good discussion of what the problem was and why it was important. It is amazing how much of the ancient city has been preserved.

In Syracuse we walked along the walls of the city, discussing how Archimedes helped to defend the city. Sadly, we later learned that these walls were built much later. We drove by the tomb of Archimedes; there are several sites that claim this honor, but it was fun to see nonetheless. We found out that there was a Tecnoparko Archimede Siracusa, but it was closed when we arrived. The fence wasn't too high so we climbed up and looked over. A caretaker saw us and took pity and let us in. They had reproductions of several of the devices that are associated with Archimedes including his screw, parabolic mirrors, and an onager. That evening several of us had "Archimedes Pizza". It was quite good, but I had never had pizza with french fries on top before. We also got to see a vendor making papyrus.

On our first night in Rome we visited the Pauline Chapel of Santa Maria Maggiore. On the ceiling of this chapel was a fresco by Ludovico Cigoli which portrayed a vision from the Apocalypse, Chapter 12: "A Woman clothed with the sun and the moon under her feet, and upon her head a crown of twelve stars." Cigoli painted a maculate moon, exactly as he had seen it in Galileo's telescope (they were close friends) and as displayed in his *Siderius Nuncius*, the most exciting scientific book ever written. Cigoli's moon was not the perfectly spherical moon of Ptolemaic astronomy that was the customary accompaniment of the immaculate Virgin, but showed the "jagged dividing line" (the terminator) and the "many little islands" (craters) that Galileo and Cigoli saw. Consequently, the Vatican calls the fresco the *Assumption of the Virgin*.

The trip was not all history, for in Rome I spent one afternoon with a student from Siena discussing a paper on logic that we will soon submit. The internet is wonderful, but it does not replace face to face discussion.

Of course we wanted to see the Sistine Chapel. We wisely purchased tickets for a tour and that spared us the long lines. On the way to the Chapel we saw several anamorphic paintings. We were thrilled to get a good look at the magnificent frescoes by Michelangelo. Sadly, our time was very short at the Vatican Museum and we did not get to see Raphael's *School of Athens* which pictures a number of mathematicians and scientists, including Hypatia.

In summary, it was a wonderful two weeks. We saw a great deal, but there is much yet to add to my mathematical life list, so I will have to go back.

An annotated version of this article, with links, references and pictures, is available at <http://www.dean.usma.edu/departments/math/people/rickey/hm/Greece-Italy.html> .

V. Frederick Rickey  
USMA, West Point, NY  
[fred-rickey@usma.edu](mailto:fred-rickey@usma.edu)



Gleeful editor with statue of Pythagoras