

Midwest History of Mathematics Conference

Fall 2006

Conference Schedule (tentative)

Friday October 13, 2006

Registration. Starting at 3:00. Reed Building. Wintergarden.

Talks 3:30-5:00 See Schedule below for times and abstracts

Banquet 5:30. McGarvey Common

Banquet Speaker Dr. Daniel Curtin: A Preliminary history of the MHMC, the varnished truth.

Saturday October 14, 2006

Talks 9:00-11:00 See Schedule below for times and abstracts

Invited Address 11:00 Dr. William Dunham: Euler in Three Acts.

Speaker Schedule

Friday 3:30-5:00 p.m.

3:30 -3:55 *Ellis and Venn on Probability as Frequency.* Byron Wall from York University

4:00-4:25 *Artemas Martin: A Local Mathematician and Math Historian.* Antonella Cupillari from Penn State Erie- The Behrend College

4:30-4:55 *Henry J. S. Smith's Papers on Crystallography: Part 1.* Francine Abeles from Kean University

Banquet: *A Preliminary History of the MHMC, the Varnished Truth.* Daniel Curtin from Northern Kentucky University

Saturday 9:00-11:00 a.m.

9:00-9:25 *The Quaternion Debate-From Hamilton to Computer Graphics.* Paul R. Bouthellier from University of Pittsburgh-Titusville

9:30-9:55 *Babylonian Math.* Jana Kucharik from Grove City College

9:30-9:55 *Egyptian Math.* Cassandra Cisek from Grove City College

10:00-10:25 *Teaching “Mathematics History for High School Teachers.”* Mike McConnell from Clarion University

10:00-10:25 *Alan Turing – Statistician.* Chris Christensen from Northern Kentucky University

10:30-10:55 *The God-Fearing Life of Leonhard Euler.* Dale McIntyre from Grove City College

10:30-10:55 *Mayan Math.* Ramon Voltz from Grove City College

11:15-12:30 PM **Euler in Three Acts. William Dunham**

Abstracts

Invited Addresses

Euler in Three Acts.

William Dunham

Koehler Professor of Mathematics

Muhlenberg College

To recognize next year's 300th anniversary of Leonhard Euler's birth, we examine three short but ingenious theorems from this great mathematician. In Act One, we see Euler as *number theorist*, with his 1750 explanation of how to generate amicable numbers by the busload. Act Two features Euler as *geometer*, with a 1748 theorem relating the sides and diagonals of a convex quadrilateral. And finally comes Act Three with Euler as *analyst*, as we consider a 1749 proof of his famous identity using integral calculus. Taken together, these results remind us why it is so fitting that we celebrate his birthday in 2007. NOTE: This talk should be accessible to anyone familiar with calculus.

A preliminary history of the MHMC, the varnished truth

Daniel Curtin

Northern Kentucky University

This talk will present a mostly serious look at the history of our conference, since its inception in 1985, under the leadership of J D Wine, University of Wisconsin-Lacrosse and Doug Cameron, University of Akron. Both generously share their memories of the early meetings. The speaker will also include what he knows of the meetings since his involvement in 1997. Some in the audience will have things to add, and the talk will make room for a call for those who have attended the meetings to share their files and their recollections for future work.

Contributed Talks

Faculty

***Henry J. S. Smith's Papers on Crystallography: Part 1.* Francine Abeles from Kean University**

In 1876, the Oxford Mathematician, Henry J. S. Smith, read two papers on the subject of mathematical crystallography, a topic considered tangential to his serious interests. An abbreviated version was read to the Crystallographic Society, and the full version to the London Mathematical Society. The two papers are unknown in the history of crystallography, and were given scant attention by the Professor of Mineralogy, N. S. Maskelyne, who had asked Smith to write on the topic. In this paper I will explore possible reasons for why this work is unknown, why Maskelyne dismissed it, and show that this work was one of Smith's serious interests.

The Quaternion Debate-From Hamilton to Computer Graphics. Paul R. Bouthellier from University of Pittsburgh-Titusville

In this talk we shall consider the history of quaternions from their creation by Hamilton in 1843 to their use in modern computer graphics. In particular, the mathematical atmosphere which existed at the time of their creation, the vector analysis/quaternion “wars” of the 1880s and 1890s, and the current debate over the use of quaternions in computer graphics will be discussed.

Of particular interest is how the arguments in the computer graphics community over the use of quaternions mirror the vector/quaternion debate of over a century ago-with participants invoking the arguments of Gibbs, Heaviside, and Tait to justify their views.

Alan Turing – Statistician. Chris Christensen from Northern Kentucky University

When we think of Alan Turing, we probably think of him as a mathematician or a proto-computer scientist or, maybe, as a codebreaker; but Turing, while a codebreaker at Bletchley Park during World War II, made significant contributions to Bayesian statistics. Much of his work at Bletchley Park is still classified, but the *General Report on Tunny* that was declassified in 2000 allows us to peek at his contribution. We will examine Turing’s idea of the deciban.

Artemas Martin: A local Mathematician and Math Historian. Antonella Cupillari from Penn State Erie-The Behrend College

A long time ago Artemas Martin (1835-1918) was working on mathematics in Erie, PA. He made his personal contribution to the American mathematical community through the publication of two of the first journals in mathematics, and he was one of the few American representatives at the International Mathematical Congress held during the World’s Columbian Exposition in Chicago in 1893. Martin relentlessly worked on a variety of mathematical problems, and he was also interested in history of mathematics, as shown by his exploration of Newton’s “pasturage problem” and mathematical textbooks.

Teaching “Mathematics History for High School Teachers”. Mike McConnell from Clarion University

As part of the Masters program for high school Mathematics teachers, the faculty of Clarion University prepared a course in Mathematics History. The students enrolled were practicing high school teachers. I will discuss how the course joined their insights into high school teaching with my knowledge of mathematics history.

The God-Fearing Life of Leonhard Euler. Dale McIntyre from Grove City College

The steps of a good man are ordered by the LORD, and He delights in his way. Ps. 37:23

For the past three centuries it has been fashionable among philosophers and academicians to deny that God and religious faith play a part in serious intellectual inquiry. The Enlightenment and Postmodernism teach that no scholar of highest repute regards God as anything more than a First Cause if, indeed, He exists at all. Yet Leonhard Euler, the greatest mathematician and theoretical physicist of the Age of Reason, was a deeply religious man and a passionate defender of the Christian faith. He emphatically asserted that “the works of the Creator infinitely surpass the productions of human skill” and unabashedly contended for “the divinity of the Holy Scripture,” “the divine sending of Christ into the world,” and “the truth of the Christian religion.” That a God-fearing man would gain such stature and reputation in Europe during the man-centered days of the Enlightenment is indeed noteworthy. What were the religious beliefs of this remarkable man? What were their origins and their effects upon him and how he related to others? What has been his influence? To answer these questions, we first present a brief account of his life as a whole; next we view elements of his character through the lens of his life’s experiences; then we unveil tenets of his theology, as gleaned primarily from his *Letters to a German Princess on Different Subjects in Natural Philosophy* and his *Defense of the Divine Revelation against the Objections of the Freethinkers*; finally we reflect upon his legacy, how his life has impacted persons of his day and of today.

Mayan Math. Ramon Voltz from Grove City College

Mayan Mathematics was an early vigesimal (base 20) numeration system with positional notation and one of the first to use a symbol for zero. They used a modified base 20 for astronomy.

Attendees will receive a packet which contains a brief introduction to Mayan mathematics as well as a large number of problems (with an answer key). We will do selected problems during this session to demonstrate the principles and procedures unique to Mayan mathematics. We will do conversion into (and from) Hindu Arabic numerals, addition, and subtraction.

Ellis and Venn on Probability as Frequency. Byron Wall from York University

Robert Leslie Ellis and John Venn are often linked together as 19th century Cambridge frequentists, meaning that they both held that probability was a measure of the frequency of a particular outcome in a specified series of trials and nothing else. John Venn’s views are well documented in the various editions of his treatise, *The Logic of Chance*, while Ellis’s views are available only in a sparse series of papers in Cambridge journals. This paper argues that their views are actually quite distinct and that Ellis’s major points have been obscured by Venn’s more accessible arguments.

Students

***Egyptian Math.* Cassandra Cisek from Grove City College**

Egyptian mathematics was an early base 10 numeration system.

Attendees will receive a packet which contains a brief introduction to Egyptian mathematics as well as a large number of problems (with an answer key). We will do selected problems during this session to demonstrate the principles and procedures unique to Egyptian mathematics. We will do conversion into (and from) Hindu Arabic numerals, addition, subtraction, fractions, multiplication and division.

***Babylonian Math.* Jana Kucharik from Grove City College**

Babylonian mathematics was a positional, base 60 numeration system.

Attendees will receive a packet which contains a brief introduction to Babylonian mathematics as well as a large number of problems (with an answer key). We will do selected problems during this session to demonstrate the principles and procedures unique to Babylonian mathematics. We will do conversion into (and from) Hindu Arabic numerals, addition, subtraction, fractions, and multiplication.