Abstracts

The Euler Lecture – Euler's First Book: the *Mechanica*
Stacy Langton, University of San Diego

In 1736, at the age of 29, Euler published his first book, Mechanics, or the Science of Motion, analytically expounded, in two volumes (E15 and E16). In this talk I will give an overview of the Mechanica and its place in Euler's career, and I will look in particular at some of the gems it contains.

The rules and principles of the differential calculus from l'Hôpital to Euler
Rob Bradley, Adelphi University

L'Hôpital's *Analyse des infiniment petits* (1696) was the first textbook of the differential calculus and there is ample evidence that it was from this book that many continental mathematicians learned the basics of the new calculus during the first half of the 18th century. In 1755, Euler published *Institutiones calculi differentialis* (E212), which may be considered as the first significant step in the evolution of the modern differential calculus. In this talk, we will contrast l'Hôpital's conception of the infinitely small with Euler's, as well as their different takes on the rules of the differential calculus.

Render unto Bernoulli: The Origins and Contents of de l'Hôpital's *Analyse*
Rob Bradley, Adelphi University

Guillaume François Antoine de l'Hôpital's *Analyse des infiniment petits* (1696) was something of an enigma: it was published anonymously, although de L'Hôpital's authorship was no secret, and it made no mention of the integral calculus. Instead, its introduction to the differential calculus was followed by what can only be described as an advanced text on differential geometry, motivated by what were then cutting-edge problems in mechanics and optics.

However, the oddest aspect of this book is its genesis. The introductory chapters were based on Johann Bernoulli's *Lectiones de calculo differentialium*, lessons that only ever existed in manuscript form and were unknown to the scholarly community until 1921. De l'Hôpital received his copy when he hired Bernoulli to tutor him in 1691-92. Subsequently, he "purchased" the advanced material of the later chapters, in an arrangement under which he supported Bernoulli with a stipend in 1694-95.

In this talk, we will consider both the mathematics that was presented in the *Analyse* and the process by which in came into being. We will compare de l'Hôpital's exposition of the elements of the differential calculus with that of Bernoulli and examine some of the more advanced results presented in the *Analyse*.

From publications to letters and back again: Euler's early work on the Riccati equation
Roseanna Cretney, Open University

I will investigate the ways in which Euler's correspondence relates to published works by him and his colleagues, and what the correspondence can tell us about Euler's working practices. In particular, I will focus on a series of letters exchanged by Euler and Goldbach in the early 1730s regarding the Riccati differential equation. I will situate these letters within the context of existing published works, and trace the development of their contents into journal articles subsequently published by Euler.

An interesting four body problem: Euler, Knutzen, Kant, and the Comet of 1744
Larry D'Antonio, Ramapo College

In 1738 Knutzen, a teacher of Kant, predicted that a comet, seen in 1698, would reappear in the winter of 1744. When a comet did appear in 1744 as predicted, Knutzen was celebrated and his reputation as a scientist and scholar was firmly established.

Unfortunately, in E68 (Fortgesetzte Beantwortung der Fragen über die Beschaffenheit, Bewegung und Würckung der Cometen), Euler showed that the comet that appeared in 1744 was not the same as the comet of 1698. Knutzen's reputation doesn't seem to have greatly suffered, perhaps because in all his future writings, Knutzen conveniently avoids any mention of Euler's findings.

In this talk we examine the history of this interesting controversy and some of the metaphysical issues that it highlights.

Euler's role in the origin of the theory of natural selection
Dominic Klyve, Central Washington University

It is fairly well known that Darwin was inspired to come up with this theory of natural selection by reading Thomas Malthus's Essay on the Principle of Population. It turns out, from reading Darwin's notebooks, that we can locate one particular sentence which got Darwin thinking about population and selection. What has not been done before is to explain exactly where this sentence -- essentially Malthus's ideas about geometric population growth -- came from. In this talk we will show that Euler is responsible for this sentence, and is thus partly responsible for the creation of the theory of natural selection. We will look at the fascinating path taken by a mathematical calculation, the many different interpretations put on it, and see how it ended up leading Darwin to an important idea.

Euler's Infinitesimal Calculus: "Expressions that were a little hard to swallow"
Salvatore J. Petrilli, Adelphi University

François-Joseph Servois (1767-1847) was a priest, artillery officer, professor of mathematics, and museum curator. In this presentation, we will explore Servois' attempts at creating a stable foundation for calculus by following in the footsteps of Lagrange. We also explore the references made by Servois regarding the work done by Euler on the calculus.

Finding an Elephant in the Moon: Euler's Translation of Baudouin de Guémadeuc's treatises on the "Satellite" of Venus
Michael P. Saclolo, St. Edwards University

On June 22, 1761, Euler published his translation, from French into German, of two reports presented to the Paris Academy of Sciences by Baudouin de Guémadeuc on the latest observations of Venus' "moon." In the first report, Baudouin determines the moon's orbit, and in the second, he calculates Venus' mass. Along with the translation, which was apparently commissioned by the Paris Academy, Euler provides a preface as well as further annotations in the form of footnotes. It is interesting to note that the four observations and the original reports were made in May, before Venus' passage across the sun that occurred on the 6th of June, while the translation was done after that date. So did Baudouin's findings conflict with the observations of Venus on June 6th, and what did Euler say about it?

A Survey of some of Euler's later work on Number Theory
Ed Sandifer, Western Connecticut State University

In this expository talk, we consider the contents of a number of papers (E552, E554, E556 and E600) first published in *Opuscula analytica* (1783).

Euler's *Tumultarae*
Ed Sandifer, Western Connecticut State University

We discuss a manuscript that has recently come to light that includes two pieces by Euler that were not included in the Eneström index, essays written prior to his masters thesis.

Some historical events that influenced Euler's life
John Snygg, Upsala College

Euler's life was heavily influenced by historical upheavals in Russia and Western Europe before and during his lifetime. In my talk I will discuss some of these events

Euler's Proof of Fermat's Last Theorem for $n = 3$
Lee Stemkoski, Adelphi Univeristy

Fermat's Last Theorem states that there are no solutions in positive integers a, b, and c to the equation $a^n + b^n = c^n$ when n is an integer greater than two. Euler presented an incomplete proof using the method of infinite descent. However, elsewhere Euler had proven the results necessary to complete his argument. In this talk, we will discuss the details of Euler's work on this problem.

The Mathematics of Albrecht Dürer
Andrius Tamulis, Governors State University

Before Euler, *geometria situs*, and power series, before calculus, and just before the solutions of the cubic and quartic equations, Albrecht Dürer was instrumental in starting the "Northern Renaissance" in Germany. A "Renaissance Man," Dürer was not only an artist, but was knowledgeable in many areas, including mathematics. There are many hints of his knowledge of mathematics in his artworks, but his mathematical leanings show themsleves most clearly in his written works, *Underweysung der Messung mit dem Zirckel und Richtscheyt* (Instructions for Measuring with Compass and Ruler) and the *Vier Bücher von Menschlicher Proportion* (Four Books on Human Proportion). My talk will present some of the mathematics in the *Underweysung*, and discuss applications of this mathematics in classroom projects.

A Stroll Through The Trigonometric Forest
Erik Tou, Carthage College

In 1749, a short astronomy paper of Euler's appeared in the *Mémoires* of the Berlin Academy. This paper, "Méthode de trouver le vrai lieu géocentrique de la lune par l'observation de l'occultation d'une étoile fixe" (Method for finding the true geocentric location of the moon by observing its occultation of a fixed star), is an exercise in spherical trigonometry and makes extensive use of a diagram to illustrate the method. Using only our mathematical enthusiasm and some modern 3-dimensional graphing, we will stroll through the trigonometric forest to discern how Euler would have us find the location of the moon in the night sky.