Meeting: 1002, Pittsburgh, Pennsylvania, SS 3A, Special Session on The History of Mathematics

1002-01-91 **Lawrence D'Antonio*** (ldant@ramapo.edu), 24 Meadoway, Dobbs Ferry, NY 10522.

Mathematics the World Forgot: Euler's Work on the Elastic Curve.

Euler's work on the elastic curve, published as an appendix to his 1744 treatise on the calculus of variations, has been forgotten and rediscovered several times. This talk examines the genesis of this work and its relation to the later work of Coulomb, Navier, and Kirchhoff. The use of a variational principle in studying elastic curves was suggested to Euler by Daniel Bernoulli in a letter of October 20 1742. Bernoulli obtains an expression for the potential energy of a bent rod and suggests to Euler that the rod will assume the shape that minimizes this energy (or vis viva as Bernoulli calls it). This problem, of finding the curve with fixed endpoints and minimal total curvature, is still significant today. One finds references to Euler's work in areas such as computer vision and minimum energy models of the shape of the DNA molecule. (Received September 05, 2004)