CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES
CCSU MATH CLUB

COLLOQUIUM

Thursday, April 24
12:30 – 1:30 PM
Maria Sanford, Room 101

AN INTRODUCTION TO THE CLASSICAL THEORY OF MINIMAL SURFACES

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Abstract: I will first discuss the several different equivalent formulations of the definition of **minimal surface** in three dimensional Euclidean space, such as the property of having minimal area relative to fixed local boundaries. Since surfaces of least area also are surfaces of least energy, it turns out that ideal soap films on bent closed wires represent physically minimal surfaces. Next I will explain how to construct many of the classical examples analytically. These examples include the **catenoid** discovered by Euler in 1741 and the **helicoid** which was proved to be a minimal surface by Meusnier in 1776. Another important family of examples are the **Riemann minimal examples** discovered by Riemann in 1860. I will explain the geometry and properties of all of these surfaces with computer graphics images and hand drawn images, as well as showing pictures of many other classical examples. At the end of the talk I will explain something about a recent theorem which demonstrates that <u>the plane, the catenoid, the helicoid and the Riemann minimal examples are the only properly embedded minimal planar domains in Euclidean three space</u> up to rigid motions and homothety; a surface is called a **planar domain** if it can be parameterized by a domain in the plane.

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