Cornell University

K-12 Education and Outreach, Mathematics Department

MATH 5080 – Mathematics for Secondary School Teachers

September 22, 2018 ◆ 9:00 am – 2:30 pm (lunch provided) ◆ Malott Hall Rm. 406

8:45 – 9:00 am **Bagels & Juice (provided)**

9:00 – 9:15 am **Introductions**

9:20 – 10:30 am **How Long Is the Coast of Britain?**
Benjamin Kirk (Ithaca High School)

So began Benoit Mandelbrot's 1967 paper on statistical self-similarity and fractional dimension. The deceptively complicated answer was the first step of Mandelbrot's journey to coin the term "fractal" and turn the world of Euclidean geometry on its head. In this talk, we will discuss the surprising complexity of this question and its connections to infinity and scale, and learn why our world is not simply described by three dimensions!

10:40 – 11:50 am **The Imperative of Definition**
David Dickerson (SUNY-Cortland)

Students' misunderstanding of mathematical definition often contributes to their difficulties in writing clear and error-free mathematical proofs. In this talk I will contrast mathematical definitions and more familiar kinds of definition, and draw a distinction between definitions and theorems. This talk draws from an article with the same title, to appear in this month's Math*AMATYC Educator*.

12:00 – 12:30 pm **Lunch (provided)**

12:30 – 2:30 pm **Two Paradoxes, Cartesian Bagels, and Ten-Minute Tidbits**
Severin Drix (Ithaca High School)

I will first discuss a paradox that is short, but bewildering; then a story that actually happened at IHS many years ago and involves Prof. Dynkin, when he first came to Cornell. I will then discuss the Cartesian Bagel, an exploration of graphing functions on alternative surfaces, which will include looking at scaling functions. I will conclude with a collection of small, but useful items in teaching, such as the White Horse Theorem(s), the Pair Tree method of simplifying radicals, and a three-dimensional look at the unit circle and the graphs of sine and cosine. Come prepared to share your own cool, short ideas that you have used or encountered in your teaching!

RSVP by Monday, September 17, 2018

Registration (required): https://cornell.qualtrics.com/jfe/form/SV_cvvdmHJZvze55t3

Questions? **Mary Ann Huntley** (huntley@math.cornell.edu)