

WCU Mathematics Visiting Speakers Program – 2012-2013

The talks below are available for visits by WCU Mathematics Faculty in regional schools for K-12 classrooms, extra-curricular events, Math club meetings... etc. If you would like to invite a particular presenter to one or several of your classes, or to an event you are sponsoring in your school, please contact them early so that a satisfying meeting time can be arranged. Travel for these talks is provided through the School University Teacher Education Partnership. You may also consider a visit to our campus with your students and include one or several of these talks as part of the day's activity.

There may be talks added to the list later in the year, please check the WCU Math and Computer Science website for the most up-to-date list of talks.

Title: Fractals and the Chaos Game

Presenter: Julia Barnes*, jbarnes@email.wcu.edu, 828-227-3943

Abstract: Fractals have been a buzz word for several years now, and this talk will hit on some of the most common ideas. We will look at what it means to be a fractal and talk about some examples of fractals. We will generate some fractals by hand, some by paper folding and some by using an activity on Bob DeVaney's web page that creates a Sierpinski triangle. Then we will use a computer program to generate more accurate fractals. As time permits, we would also explore target practice, which is an applet on DeVaney's web site that is related to the Sierpinski triangle.

Room requirements / constraints: For the computer demonstrations, I would need to use a computer projector and connect my laptop to it. I would also need an internet connection. For the hands-on activity, it would be best to have movable tables or flat desks at least the size of a piece of paper, however, any writing surface could work. I would also need either an overhead projector or a document presenter. I would need to know how many students are going to be there.

Level: This could be done in any middle school or high school classroom.

Length: One class period... I can adjust to 50 min or 75 min classes, etc.

***Note: Dr. Barnes will have more availability during the spring 2013 semester**

Title: Pythagoras, his Followers, and his Theorem

Presenter: Sloan Despeaux*, despeaux@email.wcu.edu, 828-227-3825

Abstract: A 50- minute talk on Pythagoras, the Pythagoreans, the Pythagorean theorem, proofs of the theorem, and the theorem BEFORE Pythagoras.

Level: Middle school.

*** Note: Dr. Despeaux will limit her travels to Cullowhee Valley School, Fairview Elementary, and Smokey Mountain High School**

Title: The First Attacks on a ‘Man-Eating Problem’: the Four Color Problem in Nineteenth-Century Britain

Presenter: Sloan Despeaux*, despeaux@email.wcu.edu, 828-227-3825

Abstract: A 50-minute talk on the history of the Four Color Problem. This problem took over a century to prove, and engaged some of the best mathematical minds of the 19th and 20th centuries.

Level: High school

*** Note: Dr. Despeaux will limit her travels to Cullowhee Valley School, Fairview Elementary, and Smokey Mountain High School.**

Title: Mathematics and Poetry

Presenter: Sloan Despeaux*, despeaux@email.wcu.edu, 828-227-3825

Abstract: A fifty-year-old movement that began in France called Oulipo (Ouvroir de littérature potentielle, or Workshop on potential literature) uses math to create poetry. I’ll give some examples. I will also discuss how poetry can be used to do or to remember mathematics, presenting examples from ancient India and medieval India. Finally, I’ll give some examples of modern-day mnemonics.

Level: Middle/High school

*** Note: Dr. Despeaux will limit her travels to Cullowhee Valley School, Fairview Elementary, and Smokey Mountain High School**

Title: How proportional are we?

Presenter: Axelle Faughn*, afaughn@email.wcu.edu, 828-227-3829

Abstract: How do paleontologists reconstruct an entire skeleton from only a few bones found in the ground? How can a forensic scientist determine the height, weight, and age of a body with as little evidence as a skull? We will use measurements and proportionality to show how mathematics combines with science in these real-world

situations. – 50-90 minutes.

Level: Middle school

*** Note: Dr. Faughn is available on Wednesdays during fall 2012 and will limit her travels to within 30 miles of travel from WCU. She will have more flexibility in the spring 2013 semester.**

Title: What is it like to major in Mathematics at WCU? What will I do afterwards?

Presenter: A group of students accompanied by Axelle Faughn *,
afaughn@email.wcu.edu, 828-227-3829

Abstract: Thinking about College? Why not choose the Mathematics and Computer Science Department at WCU? Currently enrolled students will answer questions regarding our programs, life on campus, and what makes WCU unique.

Level: High school

*** Note: Dr. Faughn is available on Wednesdays during fall 2012 and will limit her travels to within 30 miles of travel from WCU. She will have more flexibility in the spring 2013 semester.**

Title: Fun with cryptography

Presenter: Tuval Foguel, tsfoguel@email.wcu.edu, 828-227-3831

Abstract: cryptography is concerned with message confidentiality (i.e., encryption) — conversion of messages from a comprehensible form into an incomprehensible one and back again at the other end, rendering it unreadable by interceptors or eavesdroppers without secret knowledge (namely the key needed for decryption of that message). Applications of cryptography include ATM cards, computer passwords, and electronic commerce. We present a basic introduction to public key cryptography and Latin squares, then we have the students encrypting and decrypting messages.

Room requirements / constraints: I would need to use a computer projector and connect my laptop to it.

Level: To understand this talk, a student would need to have finished Algebra I.

Length: One class period... I can adjust to 50 min or 75 min classes, etc.

Title: Binary Numbers Card Trick

Presenter: Tuval Foguel, tsfoguel@email.wcu.edu, 828-227-3831

Abstract: Participants will learn a card trick based on binary numbers and use that as an introduction to coding.

Room requirements / constraints: I would need to use a computer projector and connect my laptop to it.

Level: To understand this talk, a student would need to have finished Algebra I.

Length: One class period... I can adjust to 50 min or 75 min classes, etc.

Title: Connect the Dots from Geometry to Botany

Presenter: Kathy Jaqua*, kjaqua@email.wcu.edu, 828-227-3826

Abstract: How can logic and geometric ideas help us determine what tree a particular leaf came from? In this activity, students learn to read a dichotomous key and identify common leaves from the area. – 50-90 minutes.

Level: Middle school or High School

Title: Art and Mathematics

Presenter: Kathy Jaqua*, kjaqua@email.wcu.edu, 828-227-3826

Abstract: Using a variety of grids, students create different cartoon-like pictures that show the effects of nonstandard grids. – 50-90 minutes.

Level: Middle school or High School

Title: 2-D, 3-D, and Mystery Buildings

Presenter: Kathy Jaqua, kjaqua@email.wcu.edu, 828-227-3826

Abstract: Using building blocks, students learn how to read three-dimensional tables and translate them into shapes. These ideas form the basis for multi-dimensional analysis of data at a beginner's level. This activity can be tailored to more or less complexity to include the topics of reading data tables, creating buildings from tables, exploring 3-D shapes through contour plots, even double integrals from a discrete viewpoint. 50-90 minutes.

Level: Middle school or High School

Title: Mira, Mira, on the Special Right Triangles:

Presenter: Kathy Jaqua, kjaqua@email.wcu.edu, 828-227-3826

Abstract: This activity based lesson has students construct 45-45-90 and 30-60-90 special right triangles using MIRAs. As part of each construction, students develop the relationships among the lengths of the sides, and they practice calculating lengths of sides given one side length. This lesson can be adjusted for length of class time available.

Level: Middle school or High School

Title: "H1N1 and Mathematics? Modeling the Spread of a Disease"

Presenter: Erin McNelis, emcnelis@email.wcu.edu, 828-227-3947

Abstract: For this talk, students will participate in a simulation of the spread of a contagious disease (just cups and dice, no added bacteria or germs involved), and we'll collect data to see if we can identify trends. We'll also determine how to represent the spread of the disease in terms of a mathematical system of equations, then implement these in Excel and compare them to the data from our simulations. Finally, we'll discuss how our simulation and model could change to better represent other scenarios --what if you can get vaccinated? What if can you get sick more than once? What if it takes a long time to recover? How is this similar to the spread of a rumor?

Room requirements/ Constraints: A computer that can be projected to screen in the room (preferable; though I can bring a laptop and possibly a projector).

Levels: Middle grades – high school. The talk can be adjusted to the level of the audience in terms of mathematics.

Concepts that can be discussed/used: Data collection, dot plots/time series, logistic functions, horizontal asymptotes or limiting values, discrete math, parameters vs. variables, difference equations, differential equations, formulas in Excel