



MathScience Innovation Center

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FOR IMMEDIATE RELEASE

CONFERENCE INTRODUCES THE “GEOMETRY OF NATURE” 85 Middle and High School Teachers from the Metro Richmond Area Learn About Growing Trends in Mathematics

Imagine the shapes from your high school geometry class – circles, spheres, cones. Because natural objects do not follow these simple mathematical shapes, you may think that they cannot be described mathematically. Not so, according to Rachel Martin, Educator at the MathScience Innovation Center. With fractal geometry, a new branch of mathematics defined in 1975 by Benoit Mandelbrot (Sterling Professor Emeritus of Mathematical Sciences at Yale University), the complex patterns found in trees, lungs, and rivers can be analyzed. Within the last thirty years, fractals have become the foundation of a mathematical revolution that is changing the way we perceive nature, compress and restore images, and create music and art.

Two conferences hosted at the MathScience Innovation Center in June 2008 introduced 85 middle and high school math and science teachers to fractal geometry and showed them the importance and relevancy of the subject. The goal of the program was “to be energized to make a change,” said presenter Frank Cardella.

A trip to the Center’s Fractal Keys classroom jump-started educators’ mathematical adventures. The Fractal Keys classroom allows 5th grade students to see patterns in architecture, music, art and nature, which are presented as islands in the Fractal Keys. While one project in the Metro Richmond area can not solve our mathematical challenges, Fractal Keys can provide a vehicle for introducing area students and teachers to the “beauty and power” of mathematics through an engaging multidimensional lesson that relates modern and traditional mathematical topics and provides opportunities for continued learning through a website and special courses on Saturday and during the summer. Fractal Keys represents a major contribution to grades 5-12 mathematics education.

Through 55 conference sessions, educators experienced ways to relate fractal geometry to Virginia's Standards of Learning and learned how fractal geometry is being applied to problems such as the spread of forest fires, the detection of breast cancer, and the movement of pollutants. Each model lesson adhered to at least one, but usually multiple educational standards. The conference included a session on integrating fractals into the local curriculum.

Dr. Jose Rial, a professor of geophysics at the University of North Carolina, Chapel Hill, and one of the keynote speakers showed science teachers the breathtaking and often bizarre loss of scale among geological formations. "Everything in geology has this scale-invariance," he said. "It will enchant your students." Dr. Rial also demonstrated the power that fractal technology has in creating computer-generated images. Going even further, Dr. Robert Devaney, professor of mathematics at Boston University, challenged math teachers to use their knowledge of geometry to interpret fractal movies programmed by students and to design a "natural fractal" that could become part of a movie set.

While the general public recognizes the critical importance of reading for literacy, fewer recognize the critical importance of mathematics for 21st century literacy. The students in today's schools, the millennial generation, will enter a workforce in which 8 of the 10 jobs that will exist in 2010 do not exist today. Mathematics is the gatekeeper to these careers and is the primary determiner of an individual's earning potential. Unfortunately, many students still do not see the relevance of mathematics and remain unengaged in classrooms that use traditional teaching methods and focus on the past, rather than the future. Our nation's economic future is directly tied to our ability to change this pattern, for on international tests American students perform poorly, with students from fourteen to twenty countries typically outperforming American students at the high school level.

In the early nineties, the National Council of Teachers of Mathematics developed standards for American students and massive efforts have gone into implementing these standards nationwide. Virginia's Standards of Learning for Mathematics are based upon these standards and reflect increased emphasis on algebra, geometry and statistics beginning in elementary school. Although substantial progress has occurred on Virginia's assessment of students' mathematical achievement, much remains to be done, including motivating students to engage in further mathematical study and to enter mathematical careers. For example, at a time when most of the scientists and mathematicians produced in the sixties are retiring, fewer students are completing college degrees in science and mathematics. In contrast, other nations such as China and India have increased their college enrollments with two-thirds of graduates earning degrees in the sciences. The MathScience Innovation Center aims to prepare educators to prepare students for an ever-changing, highly competitive, and global work environment.

The MathScience Innovation Center is a 42-year-old organization dedicated to futuristic math and science education for K-12 teachers and students. Its vision for 2015

focuses on implementing new programs in fractal geometry, engineering, nanotechnology, environmental modeling, and distance learning. The MathScience Innovation Center is an educational consortium comprised of eight school divisions: Chesterfield, Colonial Heights, Hanover, Henrico, King William, Petersburg, Powhatan, and Richmond. Other divisions also participate through abbreviated memberships: Charles City, Hopewell, Prince George, and the Steward School.

Among the attendees were 24 mathematics teachers from Chesterfield County Public Schools: Nora Adkins from Charles City Middle School; Azam Bejou, Tommye Finley and Samantha Oliver from Alberta Smith Elementary School; Stephanie Burton, Sandra Judge-Harden, Lorraine Kilpatrick, and Maureen Tyson from Providence Middle School; Frank Cardella from Manchester High School; John Ferucci, Pamela Haner, Matthew Parks, and Kristine Vester from Manchester Middle School; Nichole Fowler and Lisa Howell from Monacan High School; S. Hilliary Logan from Thomas Dale High School; Sandra Marr and Carrie Persing from Chester Middle School; Judy Raviotta from Swift Creek Middle School; Megan Wade from Salem Church Middle School; Deborah Waguespack, Beth Weber, and Kathy Wheeler from Matoaca Middle School; and Dana Wilson from Carver Middle School.

The science-oriented conference brought four Chesterfield teachers: Frank Cardella from Manchester High School, Timothy Crane and Dalence Landes from James River High School, and Kelley Motyka from Matoaca Middle School.

Among the attendees were two science teachers from Colonial Heights Public Schools, Katherine Kelley and Melinda Kelley, both from Colonial Heights High School.

Among the attendees were 10 mathematics teachers from Hanover County Public Schools: Thomas Abernathy, Thomas Boser-Perran, Lynette Culpepper, and Beth Kovacs from Lee-Davis High School; Patti Beach from Patrick Henry High School; Joe Broscious and Megan Keaney from Hanover High School; Shelley Hooker and Gretchen Shaw from Atlee High School; and Renee Simpkins from Oak Knoll Middle School.

The science-oriented conference brought five science teachers from Hanover: Barbara Alsterberg, Megan Marshall, and Elizabeth Moore from Patrick Henry High School; Jessica Orth from Atlee High School; and Janice Weiglein from Stonewall Jackson Middle School.

Among the attendees were nine mathematics teachers from Henrico County Public Schools: Lynda Green, Herbert Morris, and Lisa Palen from Henrico High School; Jim Guthrie from Hermitage High School; Sharon Henderson from Wilder Middle School; Vicki Hiner from Godwin High School; Gwendolyn Hutter from Elko Middle School; Elizabeth Layne from Brookland Middle School; and Kelly Moore from Pocahontas Middle School.

The science-oriented conference brought six science teachers from Henrico: Heidi Bard and Kelly Ostrom from Varina High School; Peter Hill from Godwin High School; Carolene Lewis from Henrico High School; and Lauree Morgan and Carrie Puryear-Wilson from Hermitage High School.

Among the attendees were five mathematics teachers from King William County Public Schools: Jean Ballard and Allena Poles from King William High School and Dave McCracken, Lewis Phillips, and Tamara Phillips from Hamilton-Holmes Middle School.

The science-oriented conference brought one science teacher from King William, Nicole Phillips from Hamilton-Holmes Middle School.

Among the attendees was one mathematics teacher from Petersburg Public Schools, Dona Edmondson from Petersburg High School.

Among the attendees were three mathematics teachers from Powhatan County Public Schools: Kedy Keller, Catherine Mordan, and Merya Schleife from Powhatan High School.

Among the attendees were eight mathematics teachers from Richmond City Public Schools, including: Anthony Bird and Joanne Seaton from Lucille Brown Middle School; Wayne Booker and W.R. Wilder from Huguenot High School; Angela Dews from Thompson Middle School; Yvette Medley and Regina Turner from Franklin Military School.

The science-oriented conference brought three science teachers from Richmond: Yvonne Smith and Crystal Wood from Thomas Jefferson High School and Regina Turner from Franklin Military School.

WHAT: 85 middle and high school teachers attended a conference that instructed them on fractal geometry and its relevance in math and science education.

WHEN: Mathematics Conference: June 18 – 20, 2008
Science Conference: June 23 – 25, 2008

WHERE: 2401 Hartman Street, Richmond, Va. 23223