Department of Mathematics Newsletter

Mathematics Department

2012

# Bytes of π, Spring 2012

Department of Mathematics and Computer Science, Bridgewater State University

Volume 3
Number 2

## Recommended Citation

Department of Mathematics and Computer Science, Bridgewater State University. (2012). *Bytes of π, Spring 2012*. 3(2).
Retrieved from: http://vc.bridgew.edu/math_news/3

# Bytes of π

**The newsletter of the BSU mathematics and computer science department**

Volume 3, No. 2:  Spring 2012

Editor: Heidi Burgiel
Staff: Paul Fairbanks, Laura Gross, Shannon Lockard, Annela Kelly

## Letter From the Editor

As the 2011-2012 academic year draws to a close, the department is selecting equipment and software to be used in the new building and planning improvements to our courses and programs.  Over the summer we will pack, move and unpack while working on our own and our students' research projects and perhaps teaching a course or two.

On 31 December 2012, newsletter founder Tom Moore will be retiring after 44 years of service to our department.  During his time here at BSU Professor Moore envisioned and organized the Abramson Colloquium, enriched the mathematical lives of countless freshmen in math courses 105, 107 and 108, and guided our majors through their advanced algebra and number theory courses.  As Professor Moore departs, Professor Vignon Oussa will be joining our department.
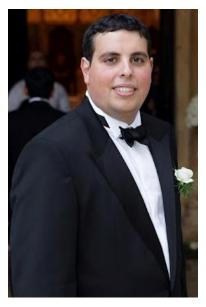
Thank you for supporting this newsletter this year, and best wishes for your future!

Heidi Burgiel

## Faculty Profiles



Dr. *Irina Seceleanu* is in her second year at Bridgewater after joining us in the fall of 2010. She received her M.A. and Ph.D. from Bowling Green State University in 2010; she also holds a B.S. in economics. Irina's research lies in functional analysis and operator theory, specifically in the area of hypercyclicity. This past year she has published a paper in the Journal of Operator Theory as well as given national and international talks on her research. More recently, she has been collaborating with other members of our department on the scholarship of teaching and learning. Outside of Bridgewater Irina enjoys reading, traveling, hiking, and kayaking. She also recently became an aunt for the first time to little Sophie Anne.
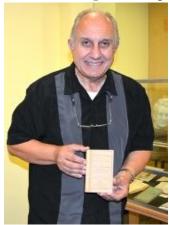
Dr. *Chadi El Kari* joined Bridgewater State University this fall as an assistant professor. Prior to joining our department, Chadi received his Ph.D. in computer science from the University of Connecticut. His research interests lie in the area of computer science that is at the crossroads of distributed computing and approximation algorithms. He has published papers that focused on the design and analysis of approximation algorithms for optimization problems that usually arise in resource constrained and dynamic networks (e.g. wireless ad-hoc networks and sensor networks) and large-scale storage systems that are crucial components in data-intensive applications (e.g. search engine clusters, sensor networks, cloud and grid computing). Chadi will periodically offer undergraduate and graduate courses on wireless networks and mobile computing.

# Feature Article

### History by Numbers
Story and photo by David K. Wilson, '71, Office of University Advancement

Professor **Philip Scalisi**, professor and chairperson of the Department of Mathematics and Computer Science, has spent decades researching the history of mathematics and traveling worldwide to collect ancient and modern math-related artifacts.

"I've been teaching a course on the history of mathematics at Bridgewater for 35 years and over that span of time I've traveled to Egypt, Russia, throughout Western Europe, Asia and I've even trekked through the jungles of the Yucatan in Mexico to find objects," said Professor Scalisi.

Recently, he assembled an exhibit in the Maxwell Library, where more than 100 of those items were displayed. The items ranged from a 2,000 year-old clay cuneiform tablet inscribed by a stylus to a combination of ancient and modern scientific instruments and mathematics textbooks.

"I've been collecting since I was a young boy and I've visited just about any venue one could name, from auction houses to antique shows and from private sales to yard sales," said Professor Scalisi. "Mathematics is one of the great endeavors in human thought and my objective in creating an exhibit is to illustrate the development of mathematics from the earliest times possible to the present."

Professor Scalisi spent the spring 2011 semester on sabbatical preparing the library exhibit, which has two sections: a display of materials under glass cases in the Special Collections area and a separate display in an adjacent lobby of 18th and 19th century mathematics textbooks.

"One of the exhibits in the textbook section of particular interest to us at Bridgewater is one published in 1849 and written by two Bridgewater graduates who dedicated their book to Nicholas Tillinghast, our first principal," said the professor. "The title is *First Steps in Numbers* and it was written by D. F. Colburn and G. A. Walton, identified as 'graduates of the State Normal School at Bridgewater.'"

Years of exploring the world for vintage mathematical items led Professor Scalisi to conclude that among all the hard-to-find pieces of historical value, textbooks are the most challenging. "Early editions in particular are difficult to locate, and because of that, and also because of their mathematical significance, textbooks have attained the status of fine art," he said.

Searching for the textbooks, and acquiring them, can be very expensive, said Professor Scalisi. "My approach has been to make inquiries to various libraries to see if such books are on the market, and what the price is," he said, holding up as an example a book published in 1591 on Euclid's *Elements of Geometry*. "I found this many years ago at an antiquarian book fair. Today I'm sure the price would be far, far more than I paid for it back then."

Professor Scalisi's search for rare materials continues today. "One thing I would love to acquire is a copy of 'Principia Mathematica,' a work by Sir Isaac Newton, first published in 1687. It's considered to be one of the top two or three mathematics books ever written. Although it went through several editions, all of them are rare books and extremely hard to find. But I keep on looking," he said.

What drives Professor Scalisi in his pursuit of collecting so many math artifacts is his great respect for the achievements of so many men and women mathematicians throughout recorded history whose works have changed human existence.

"This is really my motivation: to bring to those interested the wonderful stories of the people who have pioneered, and who continue to pioneer, the many dimensions of mathematics that affect all of us," said Professor Scalisi. "Every aspect of our lives is affected by their accomplishments. Appreciating their significance is absolutely fundamental to understanding human progress."

# Faculty News

## New Hire

Vignon Oussa will join the department in fall 2012. He successfully defended his PhD thesis "Admissibility for Quasiregular Representations of Exponential Lie Groups" at

Saint Louis University on 22 March, 2012. Professor Oussa brings teaching experience from Saint Louis University, Southern Illinois University of Edwardsville, and Southwestern Illinois College at Belleville.

**Joint Mathematics Meetings,** researched by Amanda Sullivan.

In January of 2012, over 7000 mathematicians from around the world attended the Joint Meetings of the MAA, AMS and SIAM in Boston, MA. Many faculty from BSU attended courses, talks and workshops there. Faculty who gave talks or organized sessions are listed below.

Annela Kelly presented "Probability Density Functions from Real-World Applications".

Laura Gross presented "Linear Instability in a Combustion Problem".

On 4 January, Rebecca Metcalf presented "CONNECT Math: A Partnership in Higher Education" at the MAA General Contributed Paper Session: Assessment and Outreach.

Shannon Lockard presented "Multiple Choice Versus Open Response Assessment in Calculus" at the MMA invited Paper Session on Calculus on January 4th; Irina Seceleanu is a co-author of this result.

Shannon Lockard was one of the organizers of the MAA Invited Paper Session on the Beauty and Power of Number Theory.

Kevin Rion presented "The Aluthge Sequence of a Shift Operator" at the AMS Session on Functional Analysis and Operator Theory, on January 6.

On 7 January, Irina Seceleanu presented "Cyclicity of vectors inducing an orbit with a non-zero limit point" at the AMS Session on Functional Analysis and Operator Theory.
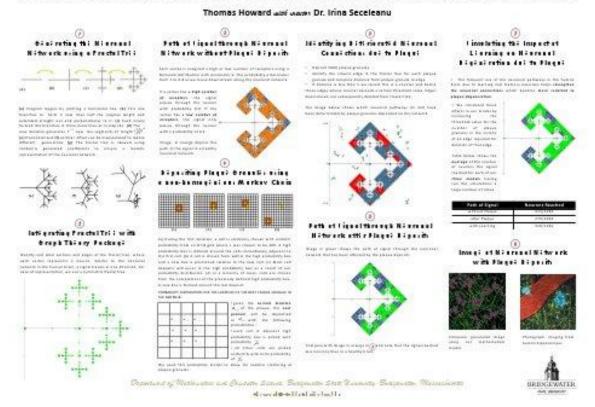
# Student News

### Thomas Howard's Poster Presentation

Thomas Howard presented a poster titled "A Mathematical Model for the Effects of Plaque Aggregation on the Neuronal Network" – on research he completed with Professor Seceleanu – to the MAA Undergraduate Poster Session at the Joint Mathematics Meetings in Boston this January. This is a great accomplishment; with over 7000 attendees, the JMM is one of the largest gatherings of mathematicians in the world. The abstract for his poster is as follows:

"In this project we build a mathematical model to study the effects of plaque deposits on the neuronal pathways in the human brain. To simulate the complex biological system of the neuronal network, we use a computer algorithm to generate a fractal image that

resembles the neuronal connections in the brain. Given that plaque deposits form in clusters, we employ a non-homogeneous Markov process to model the location in the brain where the plaque granules are deposited. Finally, to study the effects of the plaque granules on the neuronal network, we integrate the two models and use graph theoretical tools to measure the number of neuronal connections before and after the plaque depositing. We also present the computer generated images from our simulations and draw a parallel to the actual image of plaque deposits in the human brain. Our mathematical model can be used in the field of medicine to study the influence of different treatments that slow the degeneration of neuronal pathways due to plaque aggregation."



## Library Links:

New titles: http://tinyurl.com/mathnewtitles
Math Research databases:  http://tinyurl.com/mathdatabases
Math Club Events:  http://tinyurl.com/mathclubevent
Pi Mu Epsilon:  http://tinyurl.com/pimuepsilon

# Publications, Grants, & Awards

In March, Toby Lorenzen, Lee Mondshein, Abdul Satar and Seikyung Jung will have a paper on "A Code Snippet Library for CS1" published in the journal of the Special Interest Group on Computer Science Education.

Phil Scalisi was invited to participate in a celebration of the centennial of Arizona's statehood in February. He organized and presented material pertaining to mineralogy and crystallography, subjects that have played an important role in the history of Arizona. He saw old friends and met new people from all over the world.

On Wednesday, 1 February, Dr. Irina Seceleanu gave a presentation jointly with Dr. Steven Haefner of the Chemistry Department on what first-year students know about mathematics when they come into our programs at BSU, what/when/how we teach them, and what we expect them to know.

In January, Heidi Burgiel and Matt Salomone published a paper on [Logarithmic Spirals and Projective Geometry in M.C. Escher's "Path of Life III"](#) in the Journal of Humanistic Mathematics.

Ward Heilman writes: "On my sabbatical I am investigating elliptic curves and how they are used in elliptic curve cryptography (ECC). The study of elliptic curves by themselves forms a fascinating and important branch of mathematics which played a central part in Wile's proof of Fermat's Last Theorem. In addition, there is growing evidence that the use of elliptic curves over finite fields provides a faster and more efficient delivery of keys for both public and private key encryption schemes."

Annela Kelly published "Analysis of One-pile Misère Nim for Two Alliances" in the Rocky Mountain Journal of Mathematics, Vol. 41, No. 6, 2011.

Shannon Lockard gave a joint presentation on October 18 with Jenny Shanahan on Inquiry-Based Learning entitled "Why Inquiry?" in which she discussed her experiences with and thoughts on using IBL in the classroom. The presentation was sponsored by STREAMS.

At the Wabash Extramural Modern Analysis Miniconference at Indiana University – Purdue University, Irina Seceleanu presented "Dichotomous Behavior for the Hypercyclicity of Weighted Shifts".

On 9 March, Phil Scalisi gave a presentation on the history of mathematics to students and faculty at Bridgewater-Raynham High School. On 28 March he will present a talk on non-Western history of mathematics to students and faculty at Bristol Community College.

Polina Sabinin has been awarded a CART Summer grant to work on a publication resulting from her dissertation. She has also accepted an invitation to serve on the Mathematics Subcommittee for the state-wide High Expertise Teaching (HET) project. HET is part of the Knowledge and Skills of Professional Teaching Project (KSPT) which is sponsored by the Department of Elementary and Secondary Education (ESE) and the Working Group for Educator Excellence (WGEE).

# Mathematical Humor

Edited by Paul Fairbanks

In literature, no one is more renowned for his "deductive" powers than Sherlock Holmes.

Holmes and Watson are on a camping trip. In the middle of the night, Holmes nudges Dr. Watson and says "Look up at the sky, and tell me what you see."
"I see millions of stars and from their position I deduce that it's about 3:15AM. What do you see, Holmes?"
"Watson, you idiot, someone has stolen our tent!"

First, Sherlock Holmes observes the situation, and generalizes from his prior experience using analogy and probability, which we call "induction". Holmes' skill has been incorrectly called deduction.

We leave you with this question: If a man tries to fail and succeeds, which did he do?

# Events

Chadi El-Kari will present a seminar on his work on Monday, 9 April at 3:30 PM in room 309 of the Moakley Center.

Ward Heilman will present a seminar on Elliptic Curve Cryptology on Tuesday, 17 April at 3:00 PM in Hart Hall room 217.

The **Pi Mu Epsilon** math honor society induction will take place at BSU Sunday, 22 April, 2012 at 2:00 p.m. Marty Kemen of Wentworth Institute of Technology will give the **Abramson Colloquium**. She plans to show examples of contemporary artwork that (unintentionally) illustrate mathematical concepts. Marty enjoys working with prospective teachers. More information on Pi Mu Epsilon and Dr. Murray Abramson is posted on the BSU library web site: http://tinyurl.com/pimuepsilon.

Bridgewater State University will be hosting the **2012 Meeting of the Northeastern Section of the Mathematical Association of America** on November 16-17, 2012. The theme will be Mathematical problems: their creation, solution and publication.
**Local Arrangements Committee:** Dr. Rebecca Metcalf (chair), BSU; Dr. Polina Sabinin, BSU; Dr. Glenn Pavlicek, BSU; Dr. Kevin Rion, BSU
**Program Committee:** Prof. Tom Moore (chair), BSU; Dr. Shannon Lockard, BSU; Dr. Matt Salomone, BSU; Dr. Ralph Bravaco, Stonehill College; Prof. Margaret Stevenson, Massasoit CC, Dr. Tommy Ratliff, Wheaton College

## Did you know…

By Shannon Lockard

…This is the second incarnation of the department newsletter?  The first newsletter was started in the 80's by Tom Moore, who also instigated this newsletter.  The first, called *Parameters*, was similar to the current newsletter.  It included information about local and regional events, alumni and student news and activities, along with professional contributions of department faculty.  Sadly, *Parameters* was set aside for other more pressing obligations after about three years.  We'll hope that Bytes of $\pi$ lasts much longer!

## Problems

Submitted by Annela Kelly

My three nieces are coming to visit during summer vacation.  My neighbor came over and asked their ages.  I told her the product of their ages is 72.

"That's not enough information for me to figure out how old they are," she complained.  I offered that the sum of their ages is my street address.

"But that's still not enough information."  After a moment's thought, I added that my eldest niece loves strawberry ice cream.

She then knew how old the girls were… but was afraid to ask their names.

**How old are my nieces?**

## Call for Information

If you'd like to respond to an article in this newsletter, or if you have some news you'd like to share, please email Heidi Burgiel (hburgiel@bridgew.edu).  We look forward to hearing from you!