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Department of Mathematics Newsletter

Mathematics Department

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Fall 2009

### Bytes of $\pi$ , Fall 2009

Department of Mathematics and Computer Science, Bridgewater State College

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# Bytes of $\pi$

The newsletter of the BSC mathematics and computer science department

Volume 2, No. 1: Fall, 2009

Editor: Shannon Lockard

Staff: Heidi Burgiel, Laura Gross, Tom Moore

## Letter From the Editor

You may have noticed that the newsletter has a new name! We had some great submissions, but after a close vote, *Bytes of  $\pi$*  came out on top. Other favorites were *The Bear Root* and *The Addition Edition*. I also enjoyed the write-in vote of *The Boston Herald* (back when there was talk of selling the paper). *Bytes of  $\pi$*  was submitted by one of our visiting lecturers, Bill Naylor. As promised, he'll receive a prize for the winning submission: a batch of homemade cookies. We at the newsletter believe the new name is a great combination of the two sides of our department. Thanks Bill!

This semester we are excited to welcome four new faculty members to our department. Laura Gross, Seikyung Jung, and Matt Salomone are new tenure-track assistant professors and Chandrika Narayan is a full-time visiting assistant professor. They have already become an important part of our department and have made great contributions in the one short semester they've been here. You can read about their interests and backgrounds in their bios starting on the next page.

Our faculty and math majors have been busy this semester. There are more publications coming out soon and a new undergraduate math club starting. Our faculty seminar continued this semester and we had a lot of representatives at off-campus regional meetings and colloquia. Details can be found in the following pages. In our featured article, retired faculty member Bob Sutherland has written about his recent experience teaching in China. I found it very interesting and think you will too.

As always, send me any ideas you may have for future newsletters. I've already received so many great ideas for future issues, I don't know how we'll fit them all in!

Enjoy reading!

Shannon Lockard

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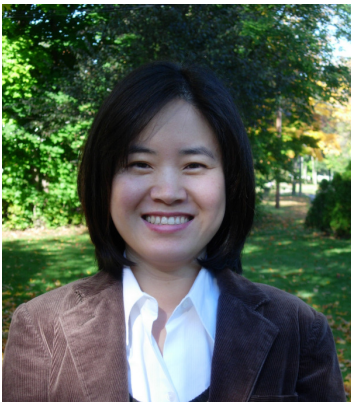
## New Faculty Profiles

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**Laura K. Gross** joined Bridgewater State College this fall as an assistant professor. Last academic year Laura served as Visiting Scholar at Boston University, following eleven years on the faculty at The University of Akron in Ohio. She received her PhD from Rensselaer Polytechnic Institute in 1997. Laura uses differential equations to model nonlinear dynamics in a variety of physical systems, spanning combustion, optics, liquid crystals, and polymers. Laura has lived in twelve states and Taipei, Taiwan. Now she, her partner David Rochberg, and their three-year old Jay Rochberg enjoy living in Cambridge, MA, just a few blocks from Laura's mother, sister, brother-in-law, and nephew.

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**Seikyung Jung** earned her PhD in Computer Science under the direction of Jonathan Herlocker at Oregon State University in 2007. Her research interests are in Computer Science Education (CSE), Web-based Information Retrieval (IR), Collaborative Filtering (CF) and Human Computer Interaction (HCI). Prof. Jung is now a tenure-track assistant professor at Bridgewater State College. She will teach upper level students how to develop recommender systems and search engines in her Web-based Information Retrieval course in Spring 2010. Prior to joining Bridgewater, she served as an assistant professor at Westfield State College. She was born in South Korea and is now living in Braintree with her husband, who is also a Computer Scientist.

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Dr. Matt Salomone arrived at Bridgewater this fall as assistant professor and director of Mathematics Services. For Matt, BSC is the end of a circum-continental journey during which he was a visitor at Bates College last year and a teaching postdoc at the University of Arizona in 2006 and 2007. He received his Ph.D. in mathematics from Northwestern University in 2006, where his dissertation research focused on Lagrangian dynamical systems and celestial mechanics. Matt was also a founding member of The Klein Four, the world's most notorious mathematics *a cappella* group whose debut CD, Musical Fruitcake, has been passed around mathematics departments all over the globe. This October, Matt married his girlfriend of three years, Alison — who this year is a visiting lecturer teaching statistics at BSC.



Chandrika Narayan received her Ph.D. in Physics from the University of Massachusetts Lowell in 1992 and has used her degree to work in both industry and academia. Before coming to BSC, Chandrika worked as an applications engineer in the semiconductor industry for companies in New Hampshire and Massachusetts. She has also taught math and physics at the University of Massachusetts Lowell, College of the Holy Cross, and MLA College in Bangalore, India. Her research interests

are in material science/semiconductor devices, ion beam analysis techniques, and material and surface characterization. As a full-time Visiting Assistant Professor, Chandrika is currently teaching freshman skills and holding weekly physics problem sessions for math majors taking Physics I.

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The GeoGraphics Lab has also hired a full-time research associate, Daniel Fitch. Daniel is a 2008 graduate of the BSC Math and Computer Science department. The GeoGraphics Lab team also includes two undergraduate computer science students, Glen Kidwell and Anusha Allah.

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## Feature Article

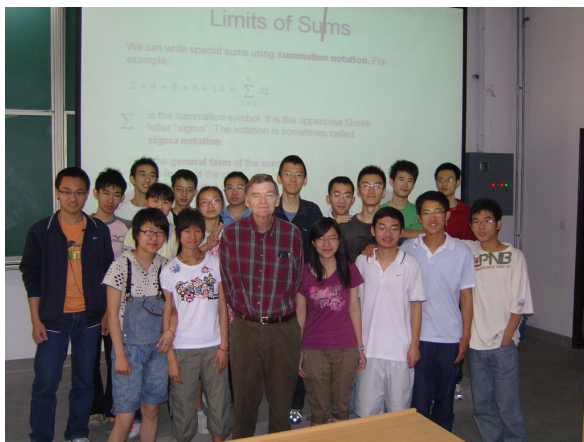
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In the spring of 2008, retired faculty member Bob Sutherland spent a semester teaching in China. Below is his account of his experiences.



Over some minor objections from our children and grandchildren, my wife and I decided to go to the other side of the world. The adventure may have started about ten or 15 years ago when I asked my friend and colleague Hang-Ling Chang to teach me a few Chinese phrases, and he stretched the truth by saying my pronunciation was good.

More than two years ago Hang-Ling visited Beijing and met with a longtime friend, the dean of the School of Humanities and Social Sciences at Beijing Jiaotong University (BJTU). The dean asked Hang-Ling if he knew of anyone who would come to BJTU and teach some content courses in English; at Chinese universities students are required to take at least one course studying the English language, but not content courses taught in English. Hang-Ling recommended me: a colleague who would soon retire.



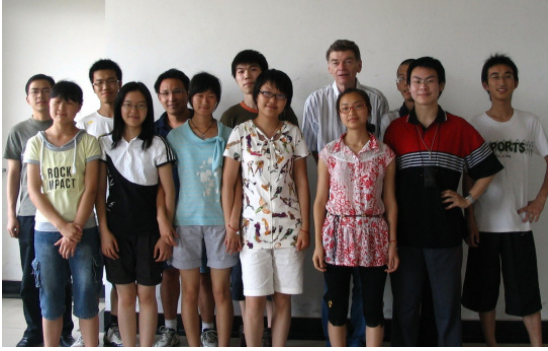
I taught two sections of introductory calculus (like MATH 144) to math majors, all of whom already knew the mathematics---but not in English. The students in one section were all freshmen, all juniors in the other.

The first part of the first class was a gentle introduction but also an eye-opener. I mentioned a few things from pre-calculus, like difference quotients, and got blank looks. They knew the word "difference" but not the mathematical

meaning. They didn't know "quotient." I wrote "quadratic formula" on the board. The students knew "formula" but not "quadratic." Then I wrote the formula on the board and saw many smiles and nodding heads. I would have to augment "English-Calculus" with terms for concepts one learns well before entering university.

My evaluation consisted of a midterm examination, a final examination, and oral presentations. For the oral presentations, the students would present the solution to a problem from the text at the board. They would describe the solution using the English mathematical terms and in the best general English they could put forth. The 18 freshmen gave three oral presentations each. The 46 juniors gave two presentations each. In general, my students' ability to read English was at least adequate, followed by listening and, trailing noticeably behind, writing and speaking. Some students' English skills were excellent, but more than a few were very weak. I had been told that there is very little teacher-student interaction in Chinese university classrooms. I struggled mightily to get students to speak in class. When I asked them to explain something or answer a simple question, there was often no volunteer, although the students all knew calculus already. Sometimes I would preface a question by looking at my roster (which had been generously translated into English by a helpful mathematics professor) and saying "Now, let's see who the next volunteer will be." I would select a student who would reluctantly give as short an answer as possible. I almost gave up when a "volunteer" stood (Chinese students stand when they are speaking in class) and said nothing. After repeating the question a few times, I allowed him to sit. The freshmen were better in class participation than the juniors. By the end of the term most of the freshmen would at least answer a question. There were a half dozen juniors who would freely enter into classroom discussions, but there were a few who, even at the end of the term, would mumble "I don't know" to any question asked of them.

The required oral presentations were different. Most of the students were pretty well prepared. I required a solution presented in English, using statements that were as complete as possible. I also told them that I might ask a question or two at the end of their presentation and would expect a response in acceptable English. For the first presentation, I allowed them to read from notes, and many did. For the second presentation, the only things allowed on a piece of paper were the equations that would be written on the board. I evaluated first presentations fairly leniently but was stricter



after that. For some, the struggle was to find the correct words to use; for others it was pronunciation. Sometimes I had them slowly repeat words or phrases I could not understand. I would often slowly repeat my own words, knowing that they probably had difficulty understanding me. By the final presentation, only one freshman, but several juniors, gave unacceptable presentations.

These students wrote the required equations on the board and said something like “First do this” (pointing at the first equation), “then this, and this, then done.” Even at my urging to go back and use some mathematical terms, they wouldn’t or couldn’t. This was my biggest frustration and disappointment.

A few days before I left for Beijing I found out there are no required office hours at BJTU. Nevertheless, I held office hours three afternoons a week in a large area that was essentially a staircase landing between floors, containing several wooden chairs and benches.

Fortunately, the math department could not find me a desk in a math department office. Why “fortunately”? Because the students would not have come to an office to discuss what they really wanted to talk about: not mathematics, but other things, like living and studying in the U.S. The first day, no student came. After that, there was always at least one, usually several. One student, a junior, who came on the second day, came every day except one after that – and he apologized, telling me that he had had to finish a paper that was due the following day. I grew to know some of my students and learned much from them. How many credits for a bachelor’s degree at BSC? 120. How many at BJTU? 195. More for a math major. Yes, the degree is completed in four years. My freshmen were carrying between 30 and 35 credits that semester. Another interesting contrast between BSC and BJTU: the cost of textbooks. On the BSC bookstore web site there is the statement “Plan on spending from \$400 to \$500 per semester for textbooks.” On the BJTU site you find “Books: about ¥400 per year.” That’s less than \$60 per year.

One day a student asked what candidate I would vote for in the upcoming elections. He said he had recently heard, on the internet, a speech by Obama before the New Hampshire primaries and thought it was a wonderful speech. Another student said he had read the Declaration of Independence and was quite moved by it.

I don’t know why, but I had come to believe that all Chinese university students like and do well in mathematics. When I mentioned this, my students immediately shattered my stereotype. Several mentioned that they really didn’t like mathematics that much. (Don’t forget, these students are math majors.) When I asked them why they were studying math, they said they knew that they had an ability in mathematics and graduating as a math major would give them a much better opportunity for getting a good job than if they had majored in something else. One student told me that he would have loved to have majored in Chinese literature, especially studying ancient poetry.



Now my story comes to an end. The connection to BJTU still remains. I exchange occasional emails with a few friends that I made while in Beijing, as well as four of my BJTU students. Last spring, five exchange students from BJTU studied at BSC. We had met the girls while we were in Beijing and met several times with them here.

I had a unique opportunity and an amazing experience. I hope my students learned a little from me – I certainly learned from them.

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## Student News

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The newly formed math club, *The x Factor*, will host a game night on Thursday, December 10 at 6 PM in the Burnell open area. The event is open to all students and faculty. There will be refreshments and fun, challenging games!

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## Publications, Grants, & Awards

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John Santore and Toby Lorenzen will publish the article "A Software Engineering Class Builds a GUI for Subversion" in the SIGCSE Bulletin's December 2009 issue. The article is co-authored by three BSC students: Robert Creed, David Murphy, and Roger Orcutt.

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Abdul Sattar and Toby Lorenzen will publish the paper "Mentoring Junior Authors" accepted for publication in the December 2009 issue of the SIGCSE Bulletin.

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Uma Shama received two grants for her research conducted through the GeoGraphics Lab. The first project entitled "Intermodal passenger Transportation Web Mapping Prototype Project" is funded by the University of Maryland, College Park, Maryland. The second project is funded by the Cape Cod Regional Transit Authority, Massachusetts. It is entitled "Mobility Management Technology under Federal Transit Administration's new economic stimulus program for transit capital investment under the American Recovery and Reinvestment Act (ARRA) of 2009".

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Uma Shama received the Martha D. Jones Outstanding Dedication to Students Award for her dedication and commitment to the development of the students at BSC.

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## Events

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### Faculty Seminars

Tuesday, October 6, 2 PM  
Laura Gross, “A unit on Linear Analysis:  
Some thoughts on teaching vector spaces”

Friday, October 30, 10 AM  
Physics Research Seminar  
Chandrika Narayan, “Metrology and its Application to  
Semiconductor Processing”

Thursday, November 12, 3 PM  
Heidi Burgiel, “Studying the Permutahedron – Child’s Play”

Wednesday, November 18, 2 PM  
Matthew Salomone, “Of Beach Balls and Planets”

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### Events On and Off Campus

Monday, October 19  
Stonehill/Wheaton/Bridgewater State College Colloquium Series  
Wheaton College, Norton, MA

Friday, October 30  
Marshall Conant Science & Math Building Groundbreaking Ceremony  
Rondileau Campus Center

November 20-21  
Annual Fall Meeting of the Northeastern Section of the MAA/NES  
Western New England College, Springfield, MA

January 13-16  
Joint Mathematics Meetings of the AMS and MAA  
San Francisco, CA  
[http://www.ams.org/amsmtgs/2124\\_intro.html](http://www.ams.org/amsmtgs/2124_intro.html)

January 19-21  
Uma Shama, Panelist, “Using Geographic Flow Analysis to Re-Invent Paratransit  
Service in a Metropolitan Area”  
13<sup>th</sup> Annual International Conference: Map India  
Epicentre, Gurgaon, India



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## Problems

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How many different ways are there to arrange the numbers 1, 1, 2, 2, 3, 3, ..., n, n in a circle? Two arrangements are considered different if there is no rotation that takes one to the other.

Classes began at BSC (then Bridgewater Normal) on September 9, 1840, in the basement of the old town hall. Nicholas Tillinghast was the sole teacher and there were seven men and twenty-one women in that initial class. (Thanks to Dave Wilson for this.) To honor that occasion, we challenge you to create a 4 by 4 magic square whose top row will appear as indicated here and whose only repeated value is 9, occurring twice. The magic sum must be 76 across every row, column and both diagonals. Email your solution to the editor. The first to succeed wins a great math book from Tom Moore's bookcase!

9	9	18	40

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## Congratulations to the May 2009 Graduates!

### Computer Science Majors

Edwin E. Clare  
Matthew R. Glynn  
George R. Jameson III  
Adam T. Miller  
Alex B. Myers  
Robert E. Piskule  
Alan L. Vuong  
Logan K. Wante

### Mathematics Majors

Jeremy P. Adelman  
Sarah E. Amaral  
Elsa Apostoli  
Ashley M. Clarke  
Scott E. Donnelly  
Scott R. Dumas  
Jaclyn B. Feeney  
Edson S. Lelan  
Myles J. Mueller  
Kathleen F. Mullins  
Caitlyn E. Peters  
Sabrina K. Schillberg  
Richard J. Scott  
Scott J. Simonetti  
David V. Zauner

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## Call for Information

If you are an alumnus or alumna of the math and computer science department at BSC, we want to know how you're doing! Send us some information about what you're doing now, we may publish it here! Please send any information about events, alumni, and faculty to Shannon Lockard ([slockard@bridgew.edu](mailto:slockard@bridgew.edu)). We look forward to hearing from you.