School of Mathematical Sciences newsletter

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Math workshop puts high school and college teachers together

SOPHIA MAGGELAKIS AND DAVID ROSS
GUEST ESSAYISTS
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Natalie Bragg, Nathan Cahill and Abbie Stokes-Riner are trying to save your life. They're smart, they're ambitious, they're dedicated.

And they have a secret weapon.

Natalie is protecting you from terrorists. A recent RIT graduate, she's a young analyst at the Institute for Defense Analyses.

Abbie is a young researcher at the University of Rochester. She fights a different kind of killer: cancer.

Nathan is a scientist at Carestream in downtown Rochester. He devises new ways for physicians to see inside you, to glean information about your innards without having to harm you to get it.

Mathematics, that's the secret weapon.

Unfortunately, math's power and beauty are secrets kept from too many of us by dull curricula. That is why math teachers from across Monroe County will join all of these professionals and many more this summer at RIT for the second annual Summer Mathematics Institute Teachers' Workshop from June 29 through July 2.

The workshop — supported by Bausch & Lomb and RIT — was designed by RIT's School of Mathematical Sciences in collaboration with teachers across Monroe County.

Teachers want to know how college professors use high school math as a foundation for advanced subjects, and they want to keep abreast of applied mathematics. Professors and mathematical professionals want to understand how high school teachers prepare students for college and careers.

That's what the Teachers' Workshop is about. This is the second year of this pioneering program, the first of its kind in the United States.

The other mathematicians at RIT hope that it becomes a model for engineering programs around the country.

Maggelakis is interim dean of RIT's College of Science and Ross is a professor in RIT's School of Mathematical Sciences.

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SMS Newsletter

Contributors: Shelly Cicero, Matthew Coppenbarger, Patricia Diute, Akhtar Khan, Harry Schey, Paul Wilson; guest writers: Mao Batista, Sophia Maggelakis, David Ross
Designer: Shelly Cicero
Editor: Paul Wilson
Editor-in-Chief: Sophia Maggelakis

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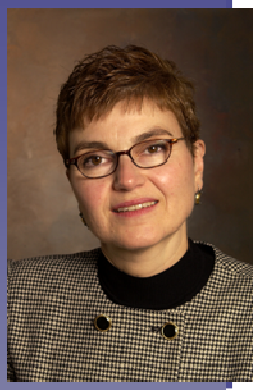
News in the COS and SMS



Interim Dean of COS Dr. Sophia Maggelakis

Dr. Sophia Maggelakis, after eight years as Head of the Department of Mathematics and Statistics and then as Head of the School of Mathematical Sciences, has accepted the position Interim Dean of the College of Science. Dr. Maggelakis received her Ph.D. from Old Dominion University before joining the faculty at RIT in 1990. She became head of the Department in 2001 and founded the School in 2006. We wish her the best of luck in her new assignment!

Interim Head of SMS Dr. Douglas Meadows

Dr. Douglas Meadows has accepted the position Interim Head of the School of Mathematical Sciences. Dr. Meadows received his Master's Degree at the Courant Institute, his Ph.D. at Stanford University and taught at the University of Rochester before joining the faculty at RIT in 1983. His area of specialization is topology and he is a co-author with John Paliouras of a textbook on Complex Variables. Our congratulations to Professor Meadows!

Director, Center for Student Innovation

Dr. Ian Gatley, Dean of the College of Science since 2000, has accepted the position of Director of the Center for Student Innovation at RIT. After receiving his Ph.D. from Cal Tech Dr. Gatley was an Astronomer at the National Optical Astronomy Observatories, served as Chair of the NOAO Infrared Steering Committee, and was Director of the Chester F. Carlson Center for Imaging Science at RIT. We congratulate him on his new assignment!

Dr. Narayan Returns from Sabbatical

Dr. Darren Narayan has returned from a rewarding sabbatical during the 2007-2008 academic year at the University of South Carolina in Columbia, South Carolina. The location proved to be a good choice for him and for his family since his wife Tamara has relatives in the vicinity and received her Ph.D. in Mathematics there.

Darren spent the year at USC as a Visiting Associate Professor and, in addition to doing research, taught one calculus course each term. The calculus course was lecture based and met 3 hours a week. Additional Recitation time and calculus labs using Maple were the responsibility of the Teaching Assistant. Although the system allows less professor-student contact time than RIT's, Narayan feels the USC workshop experience is effective for students. There is time to go into depth and provide students with a great variety of problems. He says the experience gave him an opportunity to contrast the semester system with RIT's quarter system.

During his sabbatical Professor Narayan gave several talks in graph theory for the USC Math Department lecture series and continued research in graph theory in collaboration with colleagues at Clemson University and the University of South Carolina at Sumter. He says having an experience in a department with a Ph.D. program was beneficial and encourages other faculty members to take a sabbatical as a way of expanding research, building productive professional contacts, and providing the balance of an outside perspective.

During 2008-9 Professor Narayan served as a co-organizer, with Drs. Tamas Wiandt and Carl Lutzer, of the AMS-AMA-SIAM Special session on Research in Mathematics by Undergraduates at the Joint Mathematics Meetings held January 5-8, 2009 in Washington, DC. SMS students James Wratten, Greg Puleo, Ryan Lewis, and Nick Battista participated in the competition. This marked the seventh consecutive year in which RIT helped to organize the session.

During the year Professor Narayan also worked jointly with Drs. Tamas Wiandt, Bill Basener, and Stanislaw Radziszowski (CS) to run the NSF REU Program for the second time. He says running this highly competitive undergraduate research is a rewarding experience and he looks forward to continued successes in coming years.

Teachers' Corner

1. One hundred students enter a locker room containing 100 closed lockers. The first student opens all the lockers. The second student changes the status (from closed to open, or vice versa) of every other locker, starting with the second locker. The third student then changes the status of every third locker, starting at the third locker. In general, for $1 < k \leq 100$, the k-th student changes the status of every k-th locker, starting with the k-th locker. After the one hundredth student has gone through the lockers, which lockers are left open?

2. A driver and a passenger set out on a journey. For the first half of the distance they drive at the leisurely pace of 30 mi/h; they drive the second half at 60 mi/h. What is their average speed on this trip?

3. If the equation $x^4 + ax^2 + bx + c = 0$ has roots 1, 2, and 3, find c.

Teachers' Corner (continued)

4. Use any means at your disposal (e.g. calculator, computer, or your brain) to find the x and y coordinates of the local minimum of the function

$$f(x) = \frac{x^5 - x^4}{(x^3 - 4x + 2)(x - \frac{19}{10})^2}$$

Note: A calculator graph won't easily reveal the local minimum. The calculator becomes useful *after* the derivative is simplified by algebra. Problems like this can teach impatient calculus students that algebra and the analytic techniques presented in class are worth learning.

(If you have questions about the problem, contact Professor Bautista at mpbsma@rit.edu)

5. A census taker asked a woman for the ages of her three children.
Mother: "Their ages multiplied together give 36."
Census Taker "I need more info."
Mother "The sum of their ages is my house number."
Census Taker "I need more info."
Mother "My oldest is sick, I have to go."

She slammed the door.
The census taker wrote the ages.
How old were the children and what was the house number?

6. Without a calculator evaluate

$$\frac{\sqrt{2}+\sqrt{6}}{\sqrt{2+\sqrt{3}}}$$

7. A bug in one corner of a room 5 meters wide, 3 meters high, and 12 meters long crawls to the opposite corner by the shortest possible path. How far did the bug travel?

8. An amoeba propagates by simple division; each split takes three minutes to complete. When such an amoeba is put into a glass container with a nutrient fluid, the container fills with amoebas in one hour. How long would it take for the container to be filled if we started with not one amoeba, but two?

9. Using 1,2,7,8 and ordinary operations we can write 24 = 8 * (7-1)/2.
Use the numbers 1,5,5,5 to write 24.

answers 1-5
1. Squares: 1, 4,…,100;
2. 40mph ;
3. $c = -36$;
4. -5.42675…;
5. ages 9, 2, 2, house number 13; 6. 2;