

MATHEMATICS & STATISTICS



NEWSLETTER

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FIRST-YEAR MATHEMATICS AND STATISTICS MAJORS

We are privileged to have fourteen new freshmen students in our department this quarter! Eight are Computational Mathematics majors, four are in Applied Mathematics, and two are Statistics-minded. They come not only from New York but also from Pennsylvania, Maine, Maryland, Arkansas, and as far away as Oklahoma.

If you ask “Why did they chose to come to RIT?” here is what they say: “I chose math because mathematics is key to studying many interesting fields and solving many intriguing problems. I chose RIT because of its reputation and its affordability.” Another factor was “the availability of co-op.” The emphasis on the applications of mathematics was another big factor.

Perhaps you wonder what their present hopes and dreams are with regard to earning their degree. “I want to get into accounting.” “I hope to gain experience through co-op work and come out of RIT with a high paying job.” “I want to MASTER mathematics and go on to advance the field.” “I’m hoping to obtain a Ph.D. in mathematics in the education field. Eventually, I want to be able to study to become a mathematics professor.” “I would like to work in medical research.” “I hope to work in the field of A.I.”

And what so far has been their best experience here? “The teachers in the department are very friendly and they seem to know exactly what they are doing.” “The faculty are close. Like the family I’ve always wanted.” “My best experience would be the chance of meeting great, unique people and sharing options for future careers.” “Terrific – students and staff are friendly and helpful.”

We have good reason to look forward to seeing enthusiasm in this in-coming class of freshmen!

“Perhaps the greatest paradox of all is that there are paradoxes in mathematics.” - Edward Kasner and James Newman

NEW FACULTY



Dr. William Basener began his undergraduate studies in mathematics at Marist College, where he wrote a paper dealing with celestial mechanics. He then continued his studies at Boston University with special interest in topology and dynamical systems. It was

there that he earned his Ph.D. degree. His thesis involved proving a partial result on the Gottschalk conjecture, named by Steve Smale as “number twenty-two on the list of most important open-ended problems in mathematics for the next century.”

While working on his doctoral degree, Prof. Basener also taught one year at Colby Sawyer College as Assistant Professor of Mathematics. It was there that he was involved in doing some joint research with a student on population models using a system of differential equations.

Prof. Basener has been happily married for several years to his wife Amber. They have been blessed with two children: Abigail (2 years) and Wesley (2 months). There are pictures of his lovely family on his web page.

Work with fractals and mathematical art has also caught Prof. Basener’s attention. This has led him to construct a series of large fractal posters. Maybe you have already seen one of them in a hallway of our building. Or perhaps you attended the Mathematics and Statistics Club meeting this

quarter in which he presented a talk on Art and Mathematics.

Prof. Basener is excited to be a part of the new Calculus Initiative here at RIT. He is also looking forward to doing some research with undergraduates, so keep this in mind. If the topics he has worked with strike your interest, make a point of getting in contact with him.



Dr. Bernard Brooks joined the faculty of the Department of Mathematics and Statistics this year as an assistant professor. Prof. Brooks originally entered the University of Toronto with the intention of going to medical school. To ensure high grades, he took a lot of mathematics courses because

he had a facility for mathematics. During his second year he obtained a part time job with a professor working on cervical cancer research. This professor inspired him to pursue graduate school.

After Prof. Brooks earned his BS from the University of Toronto, he entered graduate school at the University of Guelph where he earned his MS and Ph.D. While a graduate student, one of the professors became ill during the first few weeks of the semester, so Prof. Brooks stepped in and taught his calculus and operations research courses. He enjoyed it immensely and decided that he wanted to teach as a career. Prof. Brooks claims that this is a great job. “Everyday we get to talk about things we love and people not only listen, they write it all down.”

Prof. Brooks taught for the past year as a lecturer at the University of Guelph. His research interests in game theory, reaction diffusion equations and simulations began by linking his biological and clinical science background with mathematics. Now his interests seem to be drifting more toward discrete dynamics. Prof. Brooks was attracted to RIT first by its reputation and then by the strong importance placed on undergraduate teaching.

The most important interests in Prof. Brooks' life are his wife Marlyne and his daughters, three-year-old Evie and one and a half year old Josie. However, when he has any spare time after family and school interests, he spends it restoring a 1975 Alfa Romeo Spider and a 1962 Ducati Monza motorcycle. These vintage vehicles are currently housed in his parents' garage. However, as Prof. Brooks and his wife scout the Rochester neighborhoods this year for a house, Prof. Brooks will have his eye on the garages. Prof. Brooks plays chess and enjoys canoeing when he gets a chance to go to North Bay, Ontario, where his parents own a toy store and bookstore. His daughters are certainly lucky to have grandparents who own a toy store!

“As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality.” – Albert Einstein



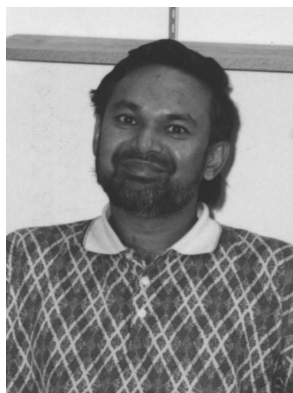
Topological neckties? Yes! Topological neckties! **Dr. Matthew Copenbarger**, who just joined our department as a visiting assistant professor, likes to and does create neckties that represent topological themes and puzzles. Space considerations do not allow for a detailed description of his creations but his collection includes box-

packing puzzles, sliding-piece puzzles, “distanglement” puzzles, and take-apart puzzles. Among them are replicas of puzzles dating back over 100 years. He finds this “extracurricular activity” entertaining, relaxing and instructive. It turns out that this is only one aspect of his fascination with a more general area of puzzles – puzzles that have, or invite an attempt to attach to them, mathematical representations.

He comes to us from the University of Rochester where he recently received his Ph.D. in the field of Spectral Theory. Prior to that, he studied at the University of Arizona where his wife studied astronomy before she, too, came to the University of Rochester to study astronomy and physics.

Prof. Copenbarger and his wife have three children between the ages of 5 years and 5 months – three very active and “demanding” youngsters who seem to occupy “every free minute” either one of their parents has. He makes it clear that the three major components of his life are family, the teaching of mathematics and puzzles, and he hopes that circumstances will allow him to continue “doing justice” to all three of them. He intends to go on with his research in his chosen field and hopes to have the opportunity “to teach mathematics to non-majors.” When asked about what attracted him to RIT, he very honestly answered, “Well, I was looking for a job and there was an opportunity.” And then, he added quickly, “But from what I have seen so far, I am happy to be here; this is a great university where the synergy of teaching and learning is the number one priority.”

He closed his comments by extending an invitation to all: “Come to my office to see and try to solve some of my handmade wooden puzzles.” Perhaps, we should all do that; for some of us it will be a new and a rather unusual experience.



Dr. Munir Mahmood joined the Department of Mathematics and Statistics this fall quarter as a visiting assistant professor. Prof. Mahmood was born and raised in Dhaka, Bangladesh. He initially came to the United States in 1983 and subsequently obtained Bachelor's degrees in mathematics and electrical engineering at Southern Illinois University in Carbondale,

Illinois. He also earned a Master of Science degree in Mathematics at this university. He then moved to Melbourne, Australia to pursue a Ph.D. in Business Statistics and Econometrics at Monash University. He received this degree in 2000 and then accepted a teaching position at University of Minnesota at Morris.

Prof. Mahmood's research interests focus on statistical inference, survey sampling, mathematical inequalities, and applications of mathematics to econometrics and management science. Currently he is interested in forecasting, distribution theory and optimization problems that arise in lightly staffed offices. He has published extensively on these topics.

Prof. Mahmood's hobbies include world travel and listening to the music of diverse cultures. He spends much of his leisure time enjoying the company of his wife Bindu and his six-year-old son Diam.

Prof. Mahmood was attracted to RIT because of the diverse interests of the faculty and the solid programs offered to students. He also was attracted to the cultural attractions of the Rochester area. He has very much enjoyed his teaching experiences here thus far.

"It may well be doubted whether, in all the range of science, there is any field so fascinating to the explorer – so rich with hidden treasures—so fruitful in delightful surprises – as Pure Mathematics." - Lewis Carroll



Dr. Michael Radin arrived as an assistant professor in the Department of Mathematics and Statistics this Fall Quarter. He was born in Moscow, Russia where he lived until he moved to the Philadelphia area at age eleven. Prof. Radin is fluent in Russian.

After receiving separate bachelor's degrees in mathematics and geography at Rowan College in Pennsylvania, Prof. Radin enrolled as a graduate student in mathematics at the University of Rhode Island, where he received his Ph.D.

this past summer. His main research interests lie in the theory of difference equations, but he is also interested in many other areas of mathematics; for example, he has studied the mathematics of photography. Prof. Radin has presented research talks at several conferences over the past few years.

Although he just arrived in Rochester in August, Prof. Radin has managed to become very active in the Rochester community and he is already very familiar with the area. He belongs to the Rochester Bicycling Club and the Adirondack Mountain Club. He recently completed a seventy-five mile one day bike trip in the Finger Lakes area and he has also managed to find time to enjoy his other hobbies, which include hiking, sailing, windsurfing, and traveling.

Prof. Radin was attracted to RIT because of the diverse background of the faculty, the wide variety of courses and seminars offered by the department, and the different concentrations available to students in our department. He has already had many positive experiences with our students and he has very much enjoyed the courses he has taught so far.



Dr. David Ross chose mathematics as his field of study largely because of his love for technology, science, and logic. After attending Columbia University, he took a job with AT & T, where he was trained as a computer programmer. Following that he studied fluid dynamics, numerical analysis, and PDE's at the Courant Institute. He

wrote a doctoral dissertation on a numerical method for solving mixed-type PDE's, a problem with applications in transonic aerodynamics.

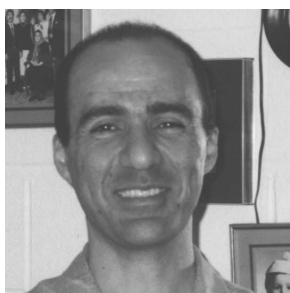
Prof. Ross then took a job at Eastman Kodak, where he worked on a wide variety of mathematical problems. The bulk of his work was on nonlinear evolution equations, primarily hyperbolic PDE's arising in continuum mechanics applications and reaction-diffusion equations arising in chemistry.

Kodak expected Prof. Ross to be a jack-of-all-trades. This led him to work on problems in blood chemistry, optics, microelectronic device fabrication, electrophotography, ink jet printing and crystallization, to name just a few! He also worked on traditional photographic systems at Kodak; some of that work is summarized in a book he has written and due to be published soon.

Philosophical issues related to mathematics are of particular interest to Prof. Ross. He has already presented conference talks on this topic and some day hopes to publish papers on it as well. He also has a keen interest in mathematics education that grows out of his philosophical interests. He has spent some time and effort thinking about the nature of mathematical knowledge and about how we acquire it and about the implications of these things for the way that mathematics should be taught.

For ten years now Prof. Ross has run a program of mathematics demonstrations for local schools with a colleague of his from Kodak. They cloak mathematical problems and puzzles as magic tricks, mind reading demos, and flagrant scams. They have done demos at local museums and once were on local TV.

Prof. Ross' wife runs a computer consulting business out of an office attached to the back of their house. They have two daughters, Madison, who is two years old, and Ella, who is four months old.



Dr. Hossein Shahmohamad was born in Tehran, Iran. He earned his undergraduate degree in Computer Science and his Master in Mathematics from California State University at Long Beach. After a few years of teaching in California and at the

University of Missouri-Columbia, he earned his Ph.D. in Graph Theory at the University of Pittsburgh under Earl Glen Whitehead, Jr.

Prof. Shahmohamad is an associate fellow of the Institute of Combinatorics and its Applications, a member of AMS, MAA and the Iranian Mathematical Society. He won the 1997 Culver-Teplitz award for excellence in teaching and research and made the 2000 faculty honor roll at the University of Pittsburgh.

Last year Prof. Shahmohamad was a visiting assistant professor at Minnesota State University. He has published five papers in Graph Theory and is currently continuing his study of "chromatic and flow equivalence of graphs." He will be presenting some new research work at a combinatorics conference at UNLV this year and at the national meeting of AMS in San Diego next year.

Prof. Shahmohamad is happy to be a part of these exciting times of growth at RIT, being surrounded by great colleagues and working with a promising student population at RIT. After experiencing wind chill factors of 55 below zero in Minnesota, Prof. Shahmohamad is looking forward to Rochester's mild winters.

NEW DEPARTMENT ADMINISTRATION

The Department of Mathematics and Statistics is beginning the new academic year with a new administrative team. **Dr. Sophia Maggelakis** is the new Department Head, **Dr. Douglas Meadows** is Associate Department Head and **Dr. James Halavin** is Director of Undergraduate Programs.

Prof. Meadows is in charge of scheduling, hiring adjuncts, and managing the travel budget. He also fills in for the department head during her absence. Prof. Halavin's responsibilities include transcript evaluations for transfer students, probation and suspension decisions, assignment of advisors and tracking of our undergraduate majors.

Prof. Maggelakis is, of course, in charge of all aspects of managing and running our department. This includes everything from the minute details of budgeting to the more far-reaching aspects of designing a new long-range plan for our department. She brings to the position energy, enthusiasm and a conscientious attention to details. The department will certainly move forward under her direction.

"Mathematics is not a careful march down a well-cleared highway, but a journey into a strange wilderness, where the explorers often get lost. Rigour should be a signal to the historian that the maps have been made, and the real explorers have gone elsewhere." -W.S. Anglin

NEW STAFF



Mr. Timothy Goodwill comes to us from Morehead State University in Kentucky, where he worked as a full-time faculty member for the last three years. His main responsibility there involved working with students who had a serious weakness in their mathematics skills. Daily on-line testing was the tool he found helpful for getting them

"up to speed."

Mr. Goodwill was heavily involved in the coordination of placement examinations this past summer. During the fall quarter he has been building an academic tracking database that coincides with the early warning system presently being designed for use throughout RIT.

Fencing has been a favorite sport enjoyed by Mr. Goodwill. He hopes to join Prof. Carl Lutzer (also of our department) in setting up a club for fencing enthusiasts.

And what is Mr. Goodwill's outlook? On-line placement testing certainly is one area in which he plans to have a part, but there remains a great deal more that can be done to harness the technologies for tomorrow's teaching and learning. He is hoping to play a significant part in bringing this to pass.



Ms. Anna Fiorucci is the department's new Office Assistant and provides student services in the office of the Academic Program Facilitator, Mr. Goodwill. Ms. Fiorucci's main interests away from RIT are her three children, a son, Adrien, 30, and 2 daughters, Leah, 20, and Shanna, 17, her daughter-in-law, Shelly, and her almost two year old grandson, Sage.

Before joining the RIT staff, Ms. Fiorucci owned a coffeehouse and bookstore, "Blue Sunday," where she met a lot of RIT students and personnel. She still stays busy selling books on the internet. When she has any spare time, she spends it gardening and reading. She loves nature and all that goes with it, such as animals and taking long walks. She has many pets. Ms. Fiorucci also enjoys socializing. She calls herself a "lover of life."

Ms. Fiorucci has always enjoyed working among young people and regrets not pursuing a teaching career. A friend suggested that she look into job openings at RIT. She decided that the position with our department was a perfect fit. She says that she is "thrilled to be here at RIT" because everyone has been so friendly and helpful and the energy and spirit of the young people is contagious. She enjoys being surrounded by the harmonious diversity of cultures and ideas on the campus. We are certainly glad that Ms. Fiorucci decided to pursue a job at RIT and is now part of our department.



Ms. Shelly Cicero came to RIT in 1994, and, after working for almost one year in the Office of Communications, she transferred to the Dean's Office of the College of Science, where she impressed everybody who met her with her outstanding professionalism and engaging personality. Three years later, in 1998, she was "stolen" from us by the RIT Development

Division but we finally prevailed. Ms. Cicero joined our Department in July of this year as our Senior Staff Assistant.

A native Rochesterian, Ms. Cicero lives with her family in Hemlock, NY and while on the RIT campus she lives a busy double life: she is an employee and a student. In 1996, Ms. Cicero enrolled in the Flex Program of the College of Applied Science and Technology with a very challenging major in Business Communications and Human Resources Administration.

When the discussion turns to the Department of Mathematics and Statistics, Ms. Cicero can barely hold back her enthusiasm as she speaks about the "strong forward movement that is taking place in the department." As she continues, she speaks about the intense but warm atmosphere and the commitment and determination on the part of everyone to contribute to the teaching-learning enterprise, to the transmission of knowledge and to the maturation process of the students. It is obvious that her dual role as a student and staff member enables her to appreciate what is happening in our department these days, probably better than most anyone else. In the end, her enthusiasm shows quite clearly in her closing remark: "I'm thrilled to be here!!"

And we're thrilled she's here!!

JASON HILLS' CO-OP AT LOCKHEED

Who said that mathematicians did only mathematics?

This past spring and summer I practiced software design, validation, and programming for Lockheed Martin at their Owego, NY site. I co-oped in the Information and Electronic Warfare Department of their aerospace division.

I worked as part of a team of software, systems, and electrical engineers to create Lockheed's first Object-Oriented software designs for an electromagnetic emitter location system. For example, this system could locate someone who dialed 911 on their cell phone and didn't know where that person was. While mathematics was not the focus of the job, understanding the digital signal processing algorithms was crucial to the software design.

"Mathematics is the gate and key to the sciences." - Roger Bacon

FACULTY NEWS

Prof. Rebecca Hill was the co-organizer for a contributed paper session entitled "Technology Based Modeling in Mathematics Courses" at MathFest, the summer meeting of the Mathematical Association of America, held in August in Madison, Wisconsin. **Prof. Carl Lutzer** presented a paper at this session entitled "Directed Discovery Learning in Differential Equations." Prof. Lutzer and **Prof. Darren Narayan** also participated in the Project NExT Workshop.

In June, **Prof. Carol Marchetti**, along with two other members of RIT's Institute Effective Teaching Committee - Susan Donovan (LDC), and Vinnie Gupta (COE) - attended the Lilly Summer Institute in Ashford, OR.

In July, Prof. Marchetti gave an invited talk at the Statistics Canada Conference held at Concordia University in Montreal, entitled "Testing the Adequacy of the Gamma Models." Her work is the result of collaboration with Govind Mudholkar and Gregory Wilding of the University of Rochester.

In August, Prof. Marchetti attended "Beyond the Formula V", at Monroe Community College, a conference dedicated to teaching introductory statistics.

Prof. Marvin Gruber attended the American Statistical Association Meeting in Atlanta, Georgia during August. He presented a contributed paper entitled "The Efficiency of Shrinkage Estimators with Respect to Zellner's Balanced Loss Function."

Prof. Darren Narayan gave an invited presentation "Calculators, Interactive Web-Based Learning Tools for Calculus" at the 2001 NSF Mathematical Java Conference, held June 22-23 at Emporia State University, Emporia, KS.

In July, Prof. Narayan gave an invited talk entitled "Reversing Numbers and a Min/Max Relation for Tournaments" at the 2001 Center for Discrete Mathematics and Computer Science (DIMACS) Connect Institute at Rutgers University.

In August, Prof. Narayan made a third conference presentation entitled "Mathematical Java Applets and Virtual Office Hours." His talk was part of an MAA / Project NExT session, "Using the Web Effectively in Teaching," which was held at the University of Wisconsin.

SPRING AND SUMMER DEAN'S LIST

Jennifer Baldwin	Stacy Krokowski
Brett Billings *	William Kronholm
Mark Breitenbach *	Sarah McCormick *
Svetlana Bukharina*	Patricia Miller
Tonya Campbell	Joanne Mule *
Ronia Chaar *	Amy Novotny
Darryl Cooney *	Thomas Prevendoski *
Brianna Decker *	Jennifer Richter *
Shawn Dwyer *	Marissa Robertson
Jennifer Goodenow	Rachel Robinson
David Hagen	Robert St. Pierre *
Thomas Henthorn	Benjamin Stabley
Mathew Hribar	Michael Short
Victoria Shults	Tiffany Swasta *
Kathryn Webb	

Congratulations! (*) Perfect 4.0 GPA

"One of the endlessly alluring aspects of mathematics is that its thorniest paradoxes have a way of blooming into beautiful theories." - Philip Davis

SEMINAR SERIES

Curiosity Seminars

- 9/18 Prof. David Ross – Mathematics and Photography
- 9/25 Prof. Michael Radin – On the Riccati Difference Equation $x_{n+1} = a \cdot x_n / (1 + x_n)$
- 10/4 Prof. William Basener – Dynamical Systems, Minimal Cantor Sets, and Antoine's Necklace
- 10/8 Dr. John Hamilton (Kodak) – Color Interpolation for Digital Imaging
- 10/23 Prof. James Marengo – A Probabilistic Proof of Stirling's Formula

Colloquium Series

- 10/9 Prof. Gabriela Popa – Special Group Symmetries Invoked in the Description of Nuclear Phenomena
- 10/30 Dr. Brian Price (Kodak) – The Breakup of Free Jets of Dilute Polymer Solutions

Pedagogy Series

- 10/18 Prof. Alejandro Engel – Java Applets in Calculus and Differential Equations

DINI'S SURFACE

The graphic on the first page is called Dini's Surface, a surface of constant negative curvature obtained by twisting a pseudosphere and given by the parametric equations

$$\begin{aligned}x &= a \cos(u) \sin(v) \\y &= a \sin(u) \sin(v) \\z &= \cos(v) + \ln[\tan[v/2]] + bu\end{aligned}$$

The surface on the front page was produced using *Mathematica* with $a = 1.5$ and $b = 0.2$.

Mathematics and Statistics Newsletter

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