Harkin Named Teaching Excellence Award Recipient

Mathematics runs in the extended family for Professor Anthony "Tony" Harkin, whose father, father-in-law and brother-in-law are all mathematicians.

Harkin absorbed his father's enthusiasm for mathematics as a young boy. He saw how his father, then a professor at State University of New York at Brockport, enjoyed teaching and doing math.

"Mathematicians really love what they do, and I saw it in my father," Harkin says.

The winner of this year's Richard and Virginia Eisenhart Provost's Award for Excellence in Teaching, Harkin conveys some of that same enthusiasm and sense of curiosity to his own students.

"What I like about RIT students is that they have the same attitude as I do," says Harkin, an assistant professor in the School for Mathematical Sciences in the College of Science. "They just enjoy being immersed in science and technology, and when they take classes they know that mathematics is important."

Harkin joined RIT three years ago after completing a post-doctoral fellowship at Harvard University. He earned his doctorate in mathematics at Boston University, a master's in scientific computing at Massachusetts Institute of Technology, and bachelor's in mathematics and physics at SUNY Brockport.

"What's unique about RIT is that it's an institute of technology, and everyday we get to work on the sorts of things that we saw at the Imagine RIT Festival," Harkin says. "I try to convey to students the fun of exploring the frontiers of math and science and being able to work on the kinds of projects they're surrounded by at a place like this."

Harkin has many research interests, including applied mathematics, and directs the Center for Applied and Computational Mathematics. This branch of math tries to solve real-world problems using mathematical modeling, numerical analysis and other mathematical tools for analyzing equations and assumptions. Applied mathematics is often a collaborative effort, tapping multiple disciplines to model, for instance, meteorological phenomena, such as cyclones and tsunamis (using partial differential equations) or to solve problems in analyzing networks like electrical grids or scheduling problems of an airline (using tools of optimization theory).

The Consortium for Mathematical Methods in Counterterrorism is also one of Harkin's interests. He and colleague Bernard Brooks co-organize an annual conference with Harkin's longtime friend, Jonathan Farley, a mathematician at Caltech. Harkin created a Web site clearinghouse on mathematics and counterterrorism (www.cmmc.rit.edu). Harkin and Brooks' long-term goal is to secure funding for the consortium to bring speakers to RIT and to support student research.

"I enjoy the balance at RIT of doing high-quality teaching and high-quality research and, for me, you can't separate them. As professors we want to show by example that we're using mathematics. We're showing students that by following our curiosity they can do the same."

Harkin adds: "And there's a sense of obligation to the next generation. My professors passed along their knowledge to me, and I feel a duty to the next generation to help them reach their potential." (courtesy University News Services)

Student Nicholas Battista--Goldwater Scholar

The SMS is thrilled to announce that one of our students, Nick Battista, is the recipient of the Goldwater Scholarship. This year, 321 sophomores and juniors were selected from 1,035 nominees. Four is the maximum number that any one school can boast. Harvard, Yale, Princeton, MIT, Stanford, CalTech, and Duke each had three. Cornell and Hopkins each had two, RIT had four - one of them our Nick!! Not often can we say that we have surpassed this list of schools.

The Barry M. Goldwater Scholarship is the premier undergraduate award for students interested in pursuing a career in mathematics, the natural sciences, or engineering. The award is based on academic merit, and virtually all winners plan on pursuing a Ph.D. Many have extensive undergraduate research experience as well. The $7,500 per year scholarship covers tuition, fees, books, and room and board. Goldwater Scholars compose an elite group with 70 Rhodes Scholarships and 94 Marshall Awards being awarded to past Goldwater Scholars.

Nicholas Battista, a junior dual major in Applied Mathematics and Physics, will receive $7500 for his senior year. Nick has been conducting research with Drs. Harkin, Ross, Radin, Nakano, Campanelli, and Lousto in the School of Mathematical Sciences. His research is currently focused on Non-autonomous Difference Equations, Spectral Methods in Numerical Relativity, and Post-Newtonian Modeling. Nick plans to obtain a Ph.D. in Applied Mathematics or Theoretical Physics, and pursue an academic career in numerical relativity. Nick holds an RIT Presidential Scholarship and a Briggs Endowed Scholarship, and is an inductee of the Pi Mu Epsilon Honor Society.

Dr. Joshua Faber, New Faculty Member

Born in upstate New York, Joshua Faber spent his early years with his family in Pittsford. The first two years of his college career were spent at Simon's Rock College, a small school in Massachusetts. He then transferred to Stony Brook, from which he received his bachelor's degree in Physics and Astronomy. His doctorate in physics was earned in 2001 at MIT.

Prior to coming to RIT,

Josh was a post-doc first at Northwestern University and then at the University of Illinois. He joined the Center for Computational Relativity and Gravitation at RIT in December of last year. His research is in the evolution and mergers of binaries containing neutron stars.

Married and the father of an eight-month-old daughter, Josh finds that parenting and being a first time home-

owner take up much of his time. When he has the opportunity he enjoys investigating parts of Rochester previously unknown to him and traveling in the northeast. He is also an aficianado of rock music.

Interestingly, Josh knew RIT long before joining our faculty—in the summer between high school and college he took a calculus course from Kumar! We suspect he got an A.

The Center for Computational Relativity and Gravitation

CCRG faculty and post docs in the WOW Center in the Gordon Fieldhouse at ImagineRIT, May 3, 2008, where they received the Alumni Relations Award for their display.

Drs. Campanelli, Lousto and Zlochower announced a breakthrough simulation of the merger two black holes causing a time triplet black hole. In following Einstein's theory of general relativity this new simulation confirmed a timely and robust computer code especially in light of the recent discovery of a triple quasar. The May issue of "Physical Review Letters" (2007) will publish CCRG findings in "Close Encounters Three Black Holes".

CCRG has continuing grants from the NSF as well as a recent grant awarded from NASA and has provided several contributed talks for Physics and Astronomy colloquia.

Dr. Campanelli has also been elected as a member of the Executive Committee of the Computational Physics Division of the American Physical Society, (APS).

Prof. Carrie Koneski, New Staff Member

The School of Mathematical Sciences recently welcomed new staff member Carrie Koneski. Carrie is the School's new Student Support Services Manager, replacing Tiffany Pritt-Schwanger who relocated to Pennsylvania.

Ms. Koneski earned her Bachelor of Science in Mathematics and her Masters of Arts in Mathematics

from the State University of New York College at Brockport. Carrie brings to our team her experience as an Instructor and Undergraduate Admissions Advisor. She has worked in academic advising offices and has several years of experience tutoring mathematics. Carrie has some background in sign language, as well.

Carrie and her husband live in Rochester with their two children.

When asked what attracted her to this unique position, Carrie replied that it was the blend of teaching and student service. We are pleased to welcome Carrie, who possesses the combination of academic credentials, experience and enthusiasm, to the SMS team.

Fundraising Corner

In the last edition of the newsletter, we began this ongoing series, giving a broad overview of support opportunities available within our evolving School. This installment will feature two of those opportunities in more detail.

Student Resource Opportunity:
Following is an excerpt from a February 22, 2008 Letter to the Editor of the Reporter, RIT's student produced weekly publication.
"Dear Reporter,
Retention rates are always an issue, and this is the time of year when students decide not to come back...First of all, I love RIT. I love the faculty and staff. I love the students. I love that I can let my geek flag fly and nobody gives me a hard time about it...The biggest reason I'm leaving is that I just can't afford to stay…"

Every year, students face the difficult decision whether or not they can afford to continue their education. And the decision is especially difficult for fourth and fifth year undergrads who may have exhausted their financial aid allotments. This is only one of our many reasons for wanting to establish the Student Resource Fund. Not only do we wish to aid our majors who, through no fault of their own, are experiencing financial difficulties that could prevent the completion of their degrees but we also wish to retain our best and brightest majors and to provide the means to enhance our students out-of-the-classroom experiences. Whether it is tuition support, textbook aid or academic experience fees, the SMS would like to generate approximately $25,000 annually in funding to serve as a financial resource to our students.
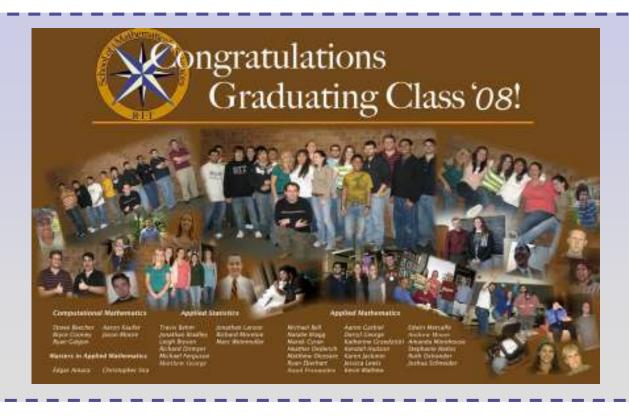
K-12 Outreach:
Current articles proclaim, "College students graduating with a math– or science-related degree are likely to earn significantly higher starting pay than their peers in liberal arts disciplines, according to the winter 2007 salary survey by the National Association of Colleges and Employers (NACE)…[which adds that] eight of the top 10 degrees in demand are quantitatively based." (http://www.careerbuilders.com, "Why it pays to be a Math Geek," 3/24/2008) While at the same time, other articles and governmental agencies declare, "22% of college freshmen took remedial mathematics courses in 2000," (http://web.ebscohost.com, Talk of US Crisis in Math, Science is Largely Misplaced, Skeptics Say, Education Week, 3/22/2006, accessed 5/20/08) , "…by the time they reach their senior year, even the most advanced US students perform at or near the bottom on international assessments," (A Companion to Science and Engineering Indicators 2006, http://www.nsf.gov/statistics/nsb0602, accessed 5/21/08) and "Long-term trends in degree taking also show decline in US student completion of natural science and engineering (NS&E) degrees relative to other countries, dropping from 3rd to 14th of 19 economies on the rate of baccalaureate attainment." (National Science Board, The Science and Engineering Workforce—Realizing America's Potential, NSF, NSB 03-69, 2003, http://www.nsf.gov/statistics/nsb0602, accessed 5/21/08)

What this information means to us is that, at a time when people with mathematical and statistical knowledge and proficiency are needed and the incoming talent pool of students is lacking those same proficiencies, we adapt what we do and how we deliver our mission to provide the best mathematics education and

research to RIT students and the community at large. In the recent past, we have implemented our math placement exam to offer all incoming RIT students the opportunity to be placed in a mathematics courses based on their individual preparedness. We have customized our calculus course sequences to meet the needs of students and RIT STEM programs, alike, offering remedial, engineering technology and advanced scientific/engineering forms of calculus. And this year, we are offering area high school mathematics teachers the opportunity for professional development through our Summer Math Institute (SMI). Since high school mathematics is the foundation for science and engineering student success in college, the SMI presents a forum where college professors, industry mathematics professionals and high school teachers will learn from one another how to build upon and strengthen this foundation for student success.

While this is our inaugural year and we currently plan to host 50 area teachers at the SMI, we envision this form of outreach will grow and expand in future years. Our goal is to offer summer professional development to educators as well as preparedness skill enhancement to students. As such, we would like to generate approximately $50,000 to fund year two of our SMI initiative.

If you would like additional information about these or any of our other support opportunities, please contact COS Sr. Development Director Mark Gaul at mark.gaul@rit.edu or SMS Sr. Staff Assistant Shelly Cicero at msc1511@rit.edu.

Lifelines

Together, we grow and learn. Students and faculty in MathCrash! study session before calculus finals.

Calling all Co-ops

Does your company need additional employees during the summer months or for special projects that may take 10 to 20 weeks to complete? That is exactly what our majors can do for you and your company. Whether it is a single or double block co-op (10 or 20 weeks respectively), hiring a mathematics or statistics major can be a win-win situation. Your company's work will be accomplished by a qualified, skilled employee and our majors will receive real-world experience—something for their resumes as well as to assist in paying for their education. If you would like additional information, e-mail Student Support Services Manager Carrie Koneski at caksma@rit.edu.

What's News in the SMS

SMS Faculty Publications

Dr. Michael Radin: co-authored a paper on "Unbounded Solutions of a Max – Type Difference Equation", Central European Journal of Mathematics

Dr. Chris Wahle: co-authored "A Study of Detonation Evolution and Structure for a Model of Compressible Two-Phase Reactive Flow", Combustion Theory and Modelling, 2008, Vol. 12, No. 1, pp. 159-204

Dr. Joel Zablow: "Relations and Homology in the Dehn Twist Quandle" published in Algebraic and Geometric Topology in February, volume 8, 2008

Drs. Manuela Campanelli, Carlos Lousto and Yosef Zlochower: "Comparisons of Binary Black-hole Merger Waveforms", Baker et al, Class.Quant.Grav. 24:S25-S31, 2007

"Large Merger Recoils and Spin Flips from Generic Black-hole Binaries." Campanelli, et al. Astrophysics J. 659:L5-L8, 2007
"Maximum Gravitational Recoil", Campanelli, et al. Physical Review Letters 98:231102, 2007
"A Practical Formula for the Radiated Angular Momentum", Lousto and Zlochower, Physical Review D76:041502, 2007
"Quasi-local Linear Momentum in Black-hole Binaries.", Krishnan, et al. Physical Review D76:081501, 2007
"Further Insight into Gravitational Recoil", Lousto and Zlochower, Physical Review D77:044028, 2008
"Foundations of Multiple Black-hole Evolutions", Lousto and Zlochower, Physical Review D77:024034, 2008

SMS Faculty Presentations

Dr. Bernard Brooks: "Spreading Rumours on Facebook", (Princeton Plasma Physics Laboratory)

Dr. Michael Radin: Unbounded Solutions of a Max –Type Difference Equation, (University of Guelph and University of Rhode Island)

Dr. David Ross:
"Numerical Inversion of Light Scattering Data" (Rhodes College)
"Mathematical Models of Rumor Propagation". (Rhodes College)
"Domains of Dependence and Free Energy Perturbations" (Syracuse University)
Dr. Ross has also accepted an invitation to serve as one of the experts on math modeling at the Field's Institute.

Dr. Joel Zablow: "Relations and Homology in the Dehn Twist Quandle" (AMS sectional meeting)

CCRG team: several talks at Physics and Astronomy colloquia including, "Astrophysical Black Hole Binaries and Gravitational Waves"