Algebraic Thinking for Elementary Education Teachers

by Victoria Robison

Last fall we caught up with Dr. Moyer and her latest research in mathematics education. We now shift our focus to two of Dr. Moyer’s colleagues, Drs. Marta Magiera (MSCS) and Leigh van den Kieboom (College of Education). Dr. Magiera came to the Department in the fall of 2008 with a Ph.D. from the Illinois Institute of Technology and since then has taught mathematics courses for future elementary and secondary mathematics teachers. Her research interests include mathematical thinking, metacognition, mathematical problem solving, and mathematics teacher development. Dr. van den Kieboom obtained her Ph.D. at Marquette and teaches field experience courses for future teachers, among other classes. Her research focuses on the knowledge practicing prospective teachers need for teaching. Drs. Magiera, Moyer and van den Kieboom share an interest in teacher preparation and issues related to early algebra instruction. Over the last three years the group has investigated prospective K-8 mathematics teachers’ understanding of algebraic thinking, including how that understanding transfers to their work with elementary and middle school students. The results from this work provide important directions for mathematics teacher preparation programs about how to improve preparation of future teachers so they can effectively meet the challenges of early algebra instruction. This July, the trio will present their findings at the 35th International Conference for the Psychology of Mathematics Education in Ankara, Turkey. When asked about her excitement for the trip, Dr. Magiera said “I’m not going to sleep! I’m going to see as much as possible both inside and outside of the conference.” She is especially looking forward to meeting those conducting similar research in other countries. Dr. Magiera also works with practicing middle and secondary school teachers in the West Allis-West Milwaukee (WAWM) School District. Funded by a two year grant from the U.S. Department of Education, the Marquette and WAWM Mathematics Partnership supports 27 middle and secondary mathematics teachers in their study of teaching and learning algebra concepts at the level of grades six to ten. When she’s not hard at work, exploring Turkey, or working with REU students, Dr. Magiera plans to find some time to just wind down and “enjoy being outside” this summer. She also plans to re-read as many Victor Hugo novels as she can.
MSCS Faculty Members Promoted

The Klingler College of Arts and Sciences has formally recognized the exceptional scholarship and teaching expertise of two MSCS faculty members. Rebecca Sanders and Praveen Madiraju have been promoted from Assistant to Associate Professor effective Fall 2011.

Rebecca’s research interests are in functional analysis, operator theory, hypercyclic and supercyclic operators in separable banach spaces and dynamical systems. She is currently teaching courses in real and complex analysis and the calculus sequence. As a computer scientist, Praveen’s research focus is XML and databases. In addition he has investigated mobile computing, artificial intelligence and neutrosophic sets. He teaches courses in object-oriented design software and advanced database systems.

MSCS Faculty Featured in Marquette Publications

Craig Struble, Associate Professor, was featured in 2011 Discover: Marquette University Research and Scholarship Spring 2011: Marquette Magazine for his work in developing cellular phone application to help breast cancer patients maintain contact with their doctors. For the complete articles, go to: http://www.marquette.edu/research/documents/discover-2011-mobile-md.pdf and http://www.marquette.edu/magazine/recent.php?subaction=showfull&id=1302183255&archive=

ACTIVITIES AND AWARDS

This is a partial listing of faculty activities and awards. For a complete listing, please go to: http://www.marquette.edu/research

Sheik Iqbal Ahamed
Awarded: Inertial Navigation Systems, a sub award grant through the University of Wisconsin-Milwaukee from the U. S. Department of Education and the National Institute on Disability and Rehabilitation Research to create prototypes of smart phone data collection applications. Total award: $16,000.

Naveen Bansal

Paul Bankston
Presented: Characterizing the Arc, at a special session talk at The 45th Spring Topology and Dynamical Systems Conference at the University of Texas in Tyler, Texas, March 2011.

Dennis Brylow and Kim Factor
Awarded: REU Site: Computation Across the Disciplines, a three year grant from the National Science Foundation that will provide an intensive, faculty-mentored, summer research experience for United States undergraduates. Total award: $289,936.

Anne Clough

George Corliss
Presented: Propagating Uncertainties in Modeling Nonlinear Dynamic Systems, at the Canadian Applied and Industrial Mathematics Society Annual Meeting (CAIMS-2010), Memorial University of Newfoundland in St. John’s, Newfoundland, Canada, July 2010.

Rong Ge

Gholamhossein Hamedani

Peter Jones

Kate Kaiser

Gary Krenz
Attended: The 2011 Joint Mathematics Meetings and Department Chair pre-meeting in New Orleans, Louisiana, January 2011.

Praveen Madiraju

Marta Magiera and John Moyer
Presented: Pre-service Elementary Teachers’ Understanding of Relational Thinking, with Leigh van den Kieboom, and Pre-service Teacher Responses to Children’s Relational Thinking during Clinical Interviews, with Leigh van den Kieboom, at the American Educational Research Association (AERA) Annual Meeting in New Orleans, Louisiana, April 2011.

Stephen Merrill

Daniel Rowe

Wim Ruitenburg

Sherry Scott
Presented: Ergodic theory and Harmonic Analysis in Applications Across the Mathematical Sciences, at the 2010 Compact for Faculty Diversity Institute on Teaching and Mentoring in Tampa, Florida, October 2010.

Michael Slattery
Presented: Commutator Structure in Maximal Class, at the DeBrun Workshop on Group, Combinatorics, Computing in Galway, Ireland, April 2011.

Elaine Spiller
Presented: A New Methodology for Probabilistic Hazard Mapping: Accounting for the Extreme Event Tail (Part III) at the Soufriere Hills Volcano, 15 Years. On Scientific Conference in Montserrat, British West Indies, April 2011.

Craig Struble
**2011 Spring Undergraduate Party**

MSCS Confers Undergraduate Awards

The MSCS department 2011 Spring Undergraduate Party was the scene of celebration for the academic achievements of our students. Dr. Gary Krenz, MSCS department chair, proudly presented the Outstanding Undergraduate Mathematics Award; the Outstanding Undergraduate Computer Science Award; and the Miriam Connellan Mathematics Education Award to Anna Mohr, Casey O’Brien and Bridget St. Peter, respectively.

Anna Mohr, the recipient of the Outstanding Undergraduate Mathematics Award, considers herself very fortunate to have found her passion, mathematics. She has served two years as an officer for the Mathematics honorary society, Pi Mu Epsilon. She has also worked on campus as a tutor (a job she really enjoyed) with the Office of Student Educational Services helping students with their calculus and statistics courses. Anna received a Research Experience Undergraduate (REU) award in the summer of 2009 and 2010 to conduct research under the mentoring and guidance of MSCS faculty.

Anna has been accepted and will begin work on a Ph.D. in statistics at Ohio State University in the Fall of 2011. She looks forward to living closer to her family in her home state and pursuing what she loves for many years to come.

Casey O’Brien, the recipient of the Outstanding Undergraduate Computer Science Award, previously received a Research Experience Undergraduate (REU) award during the summer of 2009 and 2010 to pursue research in the areas of pervasive/ubiquitous computing. He earned an Honorable Mention in the Computing Research Association (CRA) 2011 Outstanding Undergraduate Researcher competition. As a member of Dr. Sheikh Iqbal Ahamed’s Ubiquitous Computing Lab (UbIComp Lab), Casey has diligently pursued the goal of making the use of technology a seamless, invisible and very accessible process. He will be pursuing a graduate degree at Marquette in the Fall of 2011 in the interdisciplinary computational sciences program.

Bridge St. Peter, received the Miriam Connellan Education Award. This is an award presented in memory of Dr. Miriam Connellan, a former MSCS faculty member, to the mathematics major who has demonstrated the greatest potential for success in the field of mathematics education. Bridge’s career at Marquette certainly personifies the award description both in terms of her commitment to community service and academic achievement. She has worked as a tutor and counselor on campus in Educational Opportunities Program-Upward Bound Division, assisting first-generation low-income high school students achieve a college degree. She also served as a member of the Midnight Run’s coordinating team, a student service group that connects MU students to Milwaukee’s homeless community. Bridge also participated in the summer 2009 Research Experience for Undergraduates (REU), mentored by MSCS faculty member, Kim Factor. Currently she is completing her student teaching semester at Messmer High School and has plans to live in a Catholic Worker Community in Oakland, California, serving the needs of Latin American immigrants and refugees.

**Klingler College of Arts and Sciences Spring 2011 Commencement Award**

The Gold Medal Award was presented to graduating senior, Alexander Heaton, a major in Mathematics and a minor in Philosophy, in recognition of not only the highest cumulative grade point average in the college, but also his intelligence, commitment to studies, academic discipline and demonstrated passion to learn.

A Wauwatosa native, (and grandson of former MSCS faculty member Dr. Clem Hanneken) Alex has actively participated in campus social justice issues and worked with Dr. Anne Clough on medical imaging research in lung disease diagnosis. His post-graduation plans include a year of volunteer activities prior to pursuing a career in Mathematics Education.

**Pi Mu Epsilon Spring Initiation**

Dr. Jay Miller was the featured speaker at the Spring 2011 initiation ceremony of the honorary mathematics society, Pi Mu Epsilon. His presentation, “What It Means to Think Like a Mathematician,” was very informative.

Congratulations to the new initiates!

**Upsilon Pi Epsilon**

The Marquette Chapter of Upsilon Pi Epsilon, honoring Computer Science and Computer Engineering Majors, recently held its Spring 2011 initiation ceremony. Ten new initiates were inducted for Spring 2011. Congratulations!

**Graduate Student News**

Students Receive Computational Science Summer Research Program (CSSRP) Award

Through the generosity of the Wehr Foundation and the Swokowski Endowment, six CSSRP proposals were approved for funding for 2011. The top proposals [of eight submitted] were:

- Meryem Karaman: Incorporating MR Relaxivities into Pervasive Computing, UMBC
- Alexander Heaton: Counterfeiting Prevention Using Batch Authentication for RFID Tags, UMBC
- Christopher Everson: Automatic Recognition of Human Physical Activity Using Cell Phone-Accelerometers, UMBC
- Farzana Rahman: Adaptive Pain Level Detection from Speech Data with Integration of Facial Expression, UMBC
- Jen Brue: Investigating the Statistical Implication of the SENSE and GRAPPA parallel Image Reconstruction Models, UMBC
- Jahnavi Acharya: Adaptive Pain Level Detection from Speech Data with Integration of Facial Expression, UMBC

**Travel Grant**

Computational Sciences graduate student Farzana Rahman was selected as one of the PerCom 2011 student travel grant recipients, sponsored by the National Science Foundation.

**Presentation**


**Division of Student Affairs Student Leadership Award**

Outstanding Class Member Award was presented to Erin Galvin, a sophomore majoring in Mathematics Education for Elementary School Teachers.
**Colloquia - Spring 2011**

January 21 – G. G. Hamedani, Department of Mathematics, Statistics and Computer Science, Marquette University: Concept of Sub-independence.


February 18 – Thomas Wintz, Director – Dental Informatics, School of Dentistry, Marquette University: Opportunities of Improving MapReduce Energy Efficiency for Computation Intensive Workloads.


March 4 – Selwyn Ng, Mathematics Department, University of Wisconsin-Madison, Madison, Wisconsin: Computability Theory and Effective Randomness.

March 11 – George Corliss, Department of Electrical and Computer Engineering, Marquette University: Wanted: Nails to be Hit with ODE Hammers.

March 25 – Ozgur Martin, Mathematics Department, Miami University, Oxford, Ohio: Disjoint Hyperscyclic Linear Fractional Composition Operators.

April 1 – Laura Ellwein, Department of Biomedical Engineering, Marquette University: Optical Coherence Tomography for Patient-specific 3D Artery Reconstruction and Evaluation of Wall Shear Stress in a Left Circumflex Coronary Artery.

April 29 – Adam Witek, Adobe Advanced Technology Lab, San Francisco, California: Parallel Programming for Internet Clients.

**Where in the World is Dr. Jones Now?**

I doubt any hints were needed for last issue’s photo by Tower Bridge in London. If this picture looks like an observatory, well it is! But where is it?

We would like to know where you are and what you are doing.

Please send news and current address updates to:

**ALUMNI NEWS**

**RABBI BARRY LEDERMAN**

**M.S. MSCS ’88**

I was a Marquette graduate student and concurrently a rabbinical student at Wisconsin Institute for Torah Study, also located in Milwaukee.

I thoroughly enjoyed my time at Marquette and gained a tremendous amount of knowledge. I fondly remember my professors, most notably scholarly expertise of Paul Bankston, Karl Byleen, Stephen Merrill and Wim Ruitenburg. I now live in San Diego, California where I serve as Rabbi of Congregation Kehillas Torah (www.kehillasTorah.org).

Previous to my rabbinic position in San Diego, I taught math at Bernard Baruch College, Touro College in New York as adjunct faculty. I also served as adjunct faculty in the mathematics departments of Palomar College, CSU-San Marcos, Miracosta College and Southwestern College here in California.

I send my warmest regards to all.

P.S. The volume of a round pizza of thickness ‘a’ and radius ‘r’ is given by \( \pi r^2 + \pi r^2a \)

**GRADUATIONS**

May 2011

**B.S. Computational Mathematics**

Anna Mohr

**B.S. Computer Science**

Logan Brigman Justin Carroll

Matthias Kohler Casey O’Brien

Robert Ore Isaiah Thompson

Kyle Throuw Kyle Neuschaefer

**B.S. Elementary/Middle Education and B.A. Mathematics for Elementary School Teachers**

Marie K. Browne Amanda Boekeloo

Bridget McElroy Jordan Thornquist

**B.S. Middle/Secondary Education and Mathematics**

Bridget St. Peter Anthony Rosati

Colin Dillon Renee Carpenter

Kaitlyn Hill Nicole Ward

Elizabeth Siebenlist

**B.S. Mathematics**

Laurie Osman Megan Fitzgerald

Merri Horng Owen De La Cruz

Anne Stutzman Alexander Heaton

Matthew Dorvinen

**M.S. MSCS - Mathematics**

Christopher Alvin

**M.S. MSCS - Computational Sciences**

Iain Bruce Jiping Hu

Wutao Wei Sunil Kumar

Meryem Karaman

**M.S. Bioinformatics**

Praful Aggarwal

**M.S. Computing**

David Stern

**MSCS UPDATES**

MSCS recently hired Ross Oldenburg as our new UNIX System Administrator. Ross served the last two years as system administrator for the UWM’s LIGO Scientific Collaboration, administrating Debian, Solaris, and CentOS servers. Ross has degrees in mathematics and computer science, and over seven years of system administration, programming, and support experience in academic settings, including one year with the Condor Project at Madison before joining LIGO.

Mary Pat Utzerath, (pictured on right) an instructor with the MSCS department for 30 years, has completed and defended her Ph.D. dissertation, “Full, Conscious, and Active Participation: The Laity as Ecclesial Subjects in an Ecclesiology informed by Bernard Lonergan.” She received a doctorate in Religious Studies from Dr. Susan Wood, Theology department chair, at commencement May 22, 2011.