Where in the World is Dr. Jones?

Congratulations to Tom Chelius, M.S. MSCS (MATH) ’91, who guessed the correct answer to the Fall 2007 quiz, “Where is the World is Dr. Jones?” as Monument Valley at John Ford Point. In providing the correct answer, Tom also added, that John Ford Point was “the place where the famous director liked to sit and enjoy the view.”

Rather than “too much information,” I’m sure this issue’s picture is a case of “too little information,” so I’ll answer the question right here: I’m on top of Mt. Koroya in Fiji, overlooking Lautoka and the blue Pacific Ocean, beneath the clouds. Any association of my bedraggled look with the end of my term as Chair will be emphatically denied, at least if I have the energy to do so.

We would like to know where you are and what you are doing. Please e-mail us at: newslet@mscs.mu.edu
Starting Off 2008 in India

By Dr. Craig Struble

New Years is normally a time of celebration and time spent with family and friends. For me, it was a time to take a trip to India. The trip was the culmination of many years of work with Drs. George Corliss (EECE), Kate Kaiser (MANA), Monica Adya (MANA), and Iqbal Ahmed (MSCS) on “Offshore Outsourcing: An Educational Response” funded by 3M and Marquette University. Over 5 years, our team has studied the impact of outsourcing on IT and computer science related careers and incorporated curricular changes to better prepare students to work in an environment where teams are not only spread across floors, buildings, and cities, but across the world.

Dr. Adya and I accompanied 10 students, which included undergraduates in business, MBA’s, and graduate students in Computing, to see the impact outsourcing has had on Indian culture, education, and the IT industry. We traveled to four cities—Delhi, Jaipur, Agra and Hyderabad—from January 2 to 13. India is a country undergoing tremendous change. There was poverty and issues with basic infrastructure such as transportation, availability of clean water, electricity, and sanitation. Amidst all of this, however, there were brand new malls, hotels, restaurants, mass transit and companies. The people we met from all walks of life seemed to benefit directly or indirectly from the economic transformation that is happening.

Although the Indian IT industry has been portrayed in the U.S. press as stealing jobs, India views their role as partners and so should we. There is currently a shortage of trained IT workers in the U.S., so much so that businesses here can only survive by leveraging talent overseas. Job opportunities are still abundant in the U.S., but they increasingly require employees to manage projects and interact with different cultures, especially India. As I was corrected during the lectures leading up to the trip, “Students should be trained to cooperate, not compete for jobs.”

To this end, Dr. Adya and Dr. Ahamed have made changes in the courses they routinely teach. In Dr. Ahamed’s project management course, students at Marquette partner with students in India to develop a software project. In Dr. Ahamed’s courses, students have worked with local companies to practice software engineering techniques necessary for work with outsourcing companies. In addition, the computer science major now requires a senior design project, which is allowing students to collaborate with engineering and business majors to work on substantial projects. In time, I believe units on outsourcing will become part of the material taught in senior design.

The best way to address fears is to face them directly. I have been afraid for computer scientists in the U.S. for a number of years, because of the press and declining numbers of majors. I now know firsthand that these fears are not well founded. Some aspects of a career in computer science have changed, but that is the nature of the discipline. In many ways, computer science has enabled the global workplace, and computer scientists can reap the biggest benefits from the technology we’ve created. Look for every chance to collaborate on projects with remote teams. Learn about every culture you can. Take a trip to India, China, or another country you never thought to see. Your eyes will be opened.

Craig Struble (left) in India, absorbing its sights and sounds.

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FROM THE CHAIR

“May you live in interesting times”, Confucius cursed his enemies. Our Department has certainly been living in such times. In the Fall newsletter, I informed you that in response to a plan to close our Ph.D. in Mathematics, we proposed to modify it into a Ph.D. in Computational Sciences. We have spent this semester fleshing out the proposal, and it is to go to the Provost in June, with the hope that it will be approved in Fall and that the first students will start in Fall 2009. The signals from the Administration are very encouraging for success, and we owe a debt of gratitude to the Interim Provost, David Shrock, and the Interim Dean, John Pustejovsky, for their support. The next newsletter will include a spread devoted to this exciting development. Meanwhile, you can find out more about our proposal at www.mscs.mu.edu.

Success with this venture will cap an eventful year. Wim Ruitenbergh was promoted to Professor. Iqbal Ahmed, Kim Factor and Craig Struble were promoted to Associate Professor, with tenure. The last three represent the first such promotions for well over a decade, the first of many to come, we hope, over the next few years.

The three faculty searches that we conducted were all very successful. Rong Ge is a computer scientist who specializes in high-performance computing. She received her Ph.D. from Virginia Tech. Marta Margiara is a mathematics educator who will receive her Ph.D. from Illinois Institute of Technology this summer and is currently teaching in Chicago Public Schools. Elaine Spiller is an applied mathematician who received her Ph.D. from Northwestern University and is currently on a postdoctoral fellowship at a research institute affiliated with Duke University. All three will begin in Fall, and the next newsletter will include further information about them.

The opportunities to hire arose through the departure of some of our colleagues. In addition to some retirements that have already been noted, Ruta Bajgaruaithe has taken a position at the Medical College of Wisconsin and Jim Factor has taken a position at Alverno College, here in Milwaukee. We wish them all well.

This will be my last letter to you as Chair of the Department. For the last six years, I have enjoyed these opportunities to tell you about our faculty, our students, our alumni, and our continual efforts to keep our department at the cutting edge in both research and teaching; and I have enjoyed hearing back from you, the living legacy of our efforts. I leave the post with the greatest confidence that Dr. Anne Clough, next year’s Acting Chair, will lead the Department toward an even brighter future.

Peter Jones, Chair

E-mail address: newslet@mscs.mu.edu

This newsletter is a publication written by students and MSCS faculty for alumni of the Department of Mathematics, Statistics, and Computer Science, Marquette University.
Focus on the Faculty From a Student Perspective

This was written by Pi Mu Epsilon President, Matthew Westphal. He interviewed two faculty members about their research interests.

Dr. Paul Bankston

Dr. Paul Bankston is a logician at Marquette University. He received his B.S. degree from Michigan State University in 1969. Dr. Bankston received his Ph.D. at the University of Wisconsin, Madison in 1974. His thesis was entitled, “Topological Ultraproducts.” His primary focus of research has been on the application of logic, especially pertaining to Topology and to the Philosophy of Language.

Currently Dr. Bankston is working towards describing topological spaces through the use of Formal Language and first order logic. He is working to better categorize topological spaces using descriptive languages. Formal language defines specific statements to be talked about. That is, first order logic is used to identify graphs amidst locally connected, closed, and bounded Euclidean spaces. Through the involvement of basic algebraic unions and intersections of closed sets to limit the search space to compact and locally connected sets, Dr. Bankston is able to use first order logic to completely describe a given topological shape sitting in the Euclidean plane. By using Formal Language, any topological graph can be identified amidst a select group of locally connected spaces.

With the use of this model-theoretic categorization, Dr. Bankston is working towards a theory for what it means for a topological space to really "stand out in a crowd."

Dr. Anne Clough

Dr. Anne Clough is a mathematician at Marquette focusing on biomathematics. She also works with Research Service at the Zablocki Medical Center and in the Division of Pulmonary and Critical Care Medicine at the Medical College of Wisconsin. Dr. Clough's primary focus of research is in the field of foundational medical imaging systems, working with reconstruction techniques to give an improved projected image.

Currently, Dr. Clough is working towards the reconstruction of projections of single-photon emission computed tomography (SPECT). The SPECT imaging is used to create an image of a substance in the human body that is not visible through x-rays and to quantify the shape of the substance. It is often used in the case of tumor patients, to determine the size and shape of the tumor. The SPECT image is a projection of what the tumor appears like in two dimensions. To obtain a three-dimensional projection, the SPECT camera is rotated around an area. After obtaining these new projections, integral equations are used to help discern the three-dimensional shape. Next, this SPECT image is fused with an x-ray of the area to get better information on the exact location of the infected area.

Much of this research is done through the collaboration of investigators in biochemistry, pharmacology, pulmonary medicine and physiology, and biomedical engineering in addition to mathematicians. This allows for the unique perspectives of many different professionals to be drawn into the solution. Through their combined expertise in SPECT and through the use of medical imaging, the answers to human physiological questions are able to be ascertained.

Who Counts?

By Dr. Christine Krueger

Written for a three-year grant of more than $600,000 from the U.S. Department of Education Fund for the Improvement of Post-Secondary Education to fund a mathematical literacy project across the undergraduate curriculum at Marquette.

The Marquette project, titled “Who Counts? Math across the Curriculum for Global Mission,” will emphasize the retention and enhancement of practical math skills in all disciplines to prepare students to become global citizens and leaders. “The global challenges which our graduates will encounter, such as climate changes, immigration, genocide and healthcare, all require mathematical reasoning skills, an understanding of statistics, economics, resource distribution and demographic data,” said Dr. Christine Krueger, author of the grant application and Director of the University Core of Common Studies.

Dr. Peggy Bloom, Vice Provost for Undergraduate Programs and Teaching, said that student learning assessment data have identified mathematical literacy as an area for improvement. Seniors who completed the 2007 Senior Survey indicated they were “less confident about their abilities to use and produce mathematical information.”

Dr. Krueger said implementation of the grant will be modeled after Marquette’s Writing Across the Curriculum initiative, based on the premise that quantitative reasoning skills must be broadly applied in many disciplinary contexts, just as oral and written communication skills must be. She said Marquette faculty participants in the Shared Futures program, a learning initiative with the American Association of Colleges and Universities have already created sample graphing assignment courses in courses in Latin/English Literature and Global English Literatures.

E-mail Christine Krueger: christine.krueger@marquette.edu for more information.

This is a brief overview of some of the research currently being done by faculty members at Marquette University.
Sheik Iqbal Ahamed
Awarded: The Weir-Klinger Young Scholars Award for 2008. (One-quarter sabbatical for doing research and additional funding for travel.) Award amount: $32,000.


Presented: Perceptive Computing and Communications (PerCom 2008) and chaired a session at the Sixth Annual IEEE International Conference on Instrumetry and Control, China, March 2008.


Paul Bankston
Presented: A talk on Two Mapping Classes at the Continuum Theory Session and organizing committee member of the 2008 Spring Topology and Dynamics Conference in Milwaukee, Wisconsin, March 2008.

Naveen Bansal

Dennis Byrlow


Awarded: Next Generation Embedded Operating System Course and an Innovative Support Environment, National Science Foundation, in collaboration with Bina Ramamurthy, SUNY-Buffalo, $75,000, Funding Agency: NSF, 2008.

Karl Byline

Anne Clough

Attended: Chaired session and meeting at the SPIE Medical Imaging Conference in San Diego, California, February 2008.


Kim Factor
Presented: Digraphs with Isomorphic Underlying and Domination Graphs, Pairs of Paths, and chaired a session at the 40th Southeastern International Conference on Combinatorics, Graph Theory & Computing in Boca Raton, Florida, March 2009.

G.G. Hamedani

Gary Krenz
Presented: Mathematical Modeling of Redox Enzyme Kinetics in Pulmonary Endothelial Cells at the Ohio State University Medical School – Columbus, Ohio, January 2008.

Presented: Poster, Probing Endogenous Coenzyme Q (CoQ) Redox Status in Intact Pulmonary Arterial Endothelial Cells Using the CoQ_10, but not CoQ_9, as a Redox Indicator at the Experimental Biology Conference 2008 in San Diego, California, April 2008.

Connie Laughlin

John Moyer


Sherry Scott
Presented: A Diagnostic Tool for Ergodicity at the AMS Special Session on Dynamics and Stability of Coherent Structures – San Diego, California, January 2008.

Michael Slattery
Attended: The groups and Computation Conference at Ohio State University in Columbus, Ohio, March 2008.

Craig Stubble
Presented: Learning about Indian IT and Software Development Companies at the International Joint Conference on Natural Language Processing – Hyderabad, India, January 2008.


The First Conference is the Toughest
Picture the Audience....

Ph.D. student Zac Buelow accompanied Dr. Kim Factor to the 39th Southeastern International Conference on Combinatorics, Graph Theory and Computing in Boca Raton, FL, March 3-8, 2008. While there, he presented his first talk, “Local Out-Tournaments with Upset Tournament Strong Components: Real and Nonnegative Integer Ranks of Adjacency Matrices”. Zac was able to attend a variety of other talks, and get lots of new ideas. He is shown in the photo with Dr. Factor.

GRADUATIONS

December 2007

B.S. in INAM
Kathleen Wakefield

B.S. in Computer Science
Brian Reed**

B.S. in Mathematics
Joeli Anderson Marguerite Ulbert

B.S. in Teaching Mathematics
Frank Edgeworth Vanessa Graan**

B.A. in Mathematics for Elementary Teachers
Margaret Melan

M.S. in MSCS (Computer Science)
Anahita Vyas

M.S. in Computing
Sheena Driver Mohammad Molla
Rebecca Nault Vaibhav Tyagi

May 2008

B.S. in Mathematics
Daniel Absalon James Burrows**
Lara Hawkins*** Dusanka Vesic**
Aaron Plufer Elizabeth Niemant
Mathew Westphal*

B.S. in Computer Science
Paul Hinze*** Shawn Kasel
Adam Koehler* Aaron Morey
Matthew Thomson* Nichoila McMillan*
Christopher Swiderski

B.S. in INAM
David Bartosiai Erica Eaton*
Aubrey O’Neill

B.S. in Teaching Mathematics
Stephanie Brescia Andrew Elberts
Alice Huber Peter Woods*

M.S. in Bioinformatics
Jennifer Bills Scott Bolt

M.S. in Computing
Michael Fimmel Donghyun Kim
Bina Reha William Smith
Khaled Abukhammareh

M.S. in MSCS (Mathematics)
Sankha Basu

* summa cum laude
**magna cum laude
***cum laude

ACTIVITIES & AWARDS

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Awarded: The Weir-Klinger Young Scholars Award for 2008. (One-quarter sabbatical for doing research and additional funding for travel.) Award amount: $32,000.


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