
News@Math&Stat

*Department of Mathematics and Statistics
University of Maryland, Baltimore County*

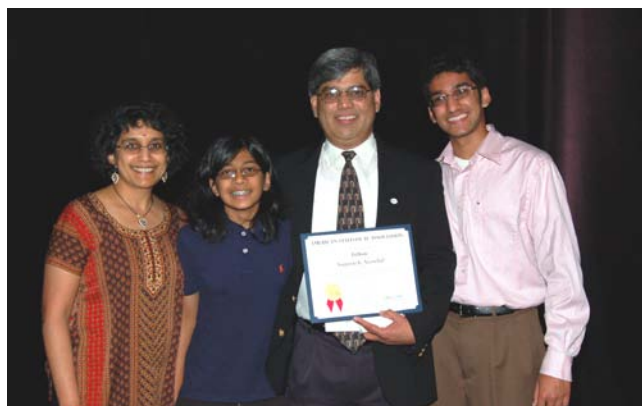
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UMBC
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Welcome by Department Chair Nagaraj K. Neerchal

It is a pleasure to bring to you the Fall 2010 issue of the department newsletter. This semester we have celebrated a number of important recognitions and achievements in our faculty's and students' careers, both at the graduate and undergraduate levels and spanning from poster competitions, to peer-reviewed articles, to the election of one of our faculty members as a Fellow of the American Statistical Association. Congratulations to all of our outstanding faculty members and students.

Dr. Nagaraj Neerchal is elected a Fellow of the American Statistical Association



Dr. Neerchal with his family, from left to right:
Wife, Chetana; daughter, Siri; Dr. Nagaraj Neerchal; and son, Harsha.

At this year's Joint Statistical Meeting, held July 31-August 5 in Vancouver, British Columbia, our very own **Dr. Nagaraj Neerchal** received the unique honor of being elected a Fellow of the American Statistical Association. It is at this yearly conference that the ASA awards a very select few this special honor, recognizing outstanding contributions to the statistical community. His award reads: "For research and service contributions to the profession, with particular emphasis on applications of statistical methods for interdisciplinary research; and for educating and mentoring graduate and undergraduate students." Elected Fellows are nominated by their peers, and account for no more than one third of 1% of ASA members. **Dr. Bimal Sinha** and **Dr. Thomas Mathew** are also elected Fellows. The American Statistical Association was founded in Boston, Massachusetts in 1839 and is the second oldest continuously operated professional association. For more information, please go to www.amstat.org.

Memorandum of Understanding developed between Soongsil University and UMBC

We are pleased to announce the department has signed a Memorandum of Understanding with Soongsil University in Seoul, South Korea that enhance our graduate recruiting. Under the MOU, two selected top students from Soongsil Mathematics Program will be invited to spend a summer bridge program at UMBC, attending English classes before matriculating as graduate assistants in the fall. Some of you may recall that our alumni and former colleague **Dr. Yoon Song** is currently an Assistant Professor of Math and Undergraduate Program Director at Soongsil University.

News from the Graduate Program by Graduate Directors Kathleen Hoffman and Anindya Roy

We welcome our new incoming graduate students to the applied math and statistics programs! We are off to a great start for the academic year. Congratulations to our May and August graduates: in applied math, **Aaron Churchill** (MS), **Kyle Stern** (MS), **Alen Alexanderian** (PhD), **Ziqiu Su** (PhD), **Neeraj Sharma** (MS), and **Noemi Petra** (PhD); and in statistics, **Gaurav Sharma** (PhD), **Xiaoyu Dong** (MS), **Chiguang Feng** (MS), **Vu Nyugen** (MS), **Sanatan Saraf** (MS), **Francis Sgambati** (MS), **James Travis** (MS), and **Airong Yu** (MS).

In other news, our MSGSA and SIAM Student Chapter have been actively organizing departmental team building exercises and professional development sessions. We look forward to an exciting and productive year!

News from the Undergraduate Program

Congratulations to the students who graduated this fall semester! Two Stat B.S. majors, four Math B.S. majors, three Math B.A. majors, and one Math minor were awarded degrees in December. Christine Sweigart, a Mathematics B.A. student, graduated with the university honors Summa Cum Laude for her perfect GPA.

New Faculty Members join the Department

We welcome the two new lecturers appointed beginning in the fall semester: Dr. Philip Gloor and Dr. Elizabeth Stanwyck. Congratulations on a successful first semester!

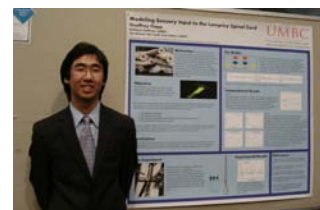
Student Kudos

Statistics Graduate student, **Michelle Danaher**, was awarded the Student Poster Prize at the annual Society of Epidemiologic Research Conference, 2010. Her poster was based on the manuscript “Gene-Environment Interaction by Pooling Biospecimens,” by Michelle Danaher, Enrique Scheisterman, Anindya Roy, and Paul Albert. Congratulations for the outstanding student poster.



Statistics Graduate student, **Joshua Betz**, has received the Radiological Society of North America (RSNA) Trainee Research Prize. The prize was awarded for the project “Whole Brain White Matter DTI Measures Predict Outcome in Patients Admitted with Severe Traumatic Brain Injury” by Joshua Betz, Jiachen Zhio, Anindya Roy, Kathirkamanthan Shanmuganathan, and Rao P. Gullapalli. Joshua received the award at the annual RSNA conference in Chicago, 2010.

Undergraduate Mathematics student, **Geoffrey Clapp**, tied for first place in the Undergraduate Poster Competition at SIAM’s Annual Meeting held July 12-16 in Pittsburgh, Pennsylvania. Clapp, a mathematics and computer science double major, has been conducting research under the guidance of Dr. Kathleen Hoffman since 2008. This research project involves developing and evaluating a model of the lamprey’s central pattern generator, used to study the role of edge cells in its swimming behavior. In addition to his placing first for his poster on this research, Clapp has also received two Undergraduate Research Awards from UMBC, a Goldwater Scholarship, and he has presented at URCAD, a SIAM conference held at UMBC.



A unique student: Sergey Erenburg

Sergey Erenburg, a first year Applied Mathematics graduate student, also has an impressive talent for the classic game of chess. Since becoming Captain of UMBC’s Chess Team in December 2008, Erenburg has assisted the team in winning the Pan-American Intercollegiate Chess Championship two years in a row, December 2008 and 2009, as well as two President’s Cup Championships in April 2009 and 2010. Other achievements include placing 2nd in the European Team Championship in 2005, 9th in the World Blitz Chess Championship in 2006, and was named the Absolute Chess Champion of Israel from 2004-2006.



Phi Beta Kappa Fall 2010 Induction Ceremony

Phi Beta Kappa, the oldest and most prestigious scholarly honor society in the United States, held its Fall Induction Ceremony of the ETA Chapter of Maryland at UMBC on November 11, 2010. Prospective inductees must be recommended by faculty and then interviewed to be considered for one of the few available positions in the honor society. This year, only seven students were inducted, including three mathematics or statistics students: **Gregory Handy**, **Anthony Simms**, and **Christine Sweigart**. **Dr. Arthur Pittenger**, Professor Emeritus, was this year’s invited lecturer for the ceremony.

News from the SIAM Student Chapter by Vice President David Trott



This semester marked the third year of the SIAM Student Chapter at UMBC. During the summer, the chapter provided support for students to attend the SIAM Annual Meeting in Pittsburgh. In October, our officers were proud to represent the chapter and department by assisting with the staffing of the SIAM booth at the USA Science and Engineering Festival on the National Mall in Washington, D.C. It was estimated that more than one million people attended the festival, which was aimed at inspiring young people in the pursuits of science. Building on past successes, the chapter is continuing with the practice of hosting professional development sessions. In November, the chapter hosted a session on the topic of comprehensive exam preparation and featured discussions led by **Dr. Zweck**, **Dr. Gowda**, and **Dr. Roy**. Two additional professional development sessions are planned for next semester.

A number of exciting events are scheduled for the spring semester. At the end of February, a group of students will be attending the SIAM Computational Science and Engineering Conference in Reno, Nevada, which will be host to the SIAM Student Days. The chapter also plans to help co-sponsor the Mid-Atlantic conference with Shippensburg University, as well as a number of other local universities. While the main focus of this Mid-Atlantic conference will be the presentation of research, it will also provide a forum for the different chapters to share their experiences and ideas for activities.

The chapter officers for 2010-2011 are **Jyoti Saraswat** (President), **David Trott** (Vice President), **Jonathan McHenry** (Secretary), **Kyle Stern** (Treasurer), and **Zana Coulibaly** (Webmaster). The chapter faculty advisor is **Dr. Susan Minkoff**.

News from the MSGSA by Pavan Potharaju



This year the association hosted two student meetings, two departmental parties, and ushered in the new committee. The student meetings invited faculty guest speakers as part of the “Path towards a successful PHD” theme. **Dr. Dowhan Park** (Statistics) and **Dr. Kathleen Hoffman** (Mathematics) shared their academic experiences and actively participated in Q&A session with students. The Spring departmental party was hosted outdoors at the Patapsco State Park, and the Fall party was hosted in the game room on campus. Faculty, students and staff attended these events in large with their families. The elections for the 2011 committee were conducted in November and the following are the new officers of MSGSA: **Paula Borrego** (President), **April Albertine** (Vice President), **Nicole Massarelli** (Secretary), **Elande Baro** (Treasurer) and **Amanda Peterson** (Senator).

News from the Council of Majors and Pi Mu Epsilon by President Victoria Kohl

The Council of Majors and Pi Mu Epsilon have been holding weekly gatherings for Mathematics and Statistics undergraduate students where students may study together and socialize from 12:30-1:30 on Wednesdays in MP 012A. PME and the Math Council of Majors also hosted a vibrant discussion with **Dr. Reed** from the Department of Defense on Thursday, November 18. Dr. Reed’s talk focused on the relationships between math and other disciplines as well as the importance of looking at the many variables that go into solving real-world problems. The Council and PME are actively planning events for the rest of the semester, including a social event to be held on Study Day in the Math Lounge, as well as many more events for next semester.

Projects Lead to Two Publications in Peer-Reviewed Journals for CIRC Students



The Center for Interdisciplinary Research and Consulting (CIRC) in the Department of Mathematics and Statistics makes the expertise of the department's faculty and students available to the community both on- and off-campus. CIRC projects in Spring 2010 led to two professional publications this semester. One article, published in "The Journal of Gastrointestinal Surgery," (www.springerlink.com/content/1091-255x/) arose from a joint project with long-time collaborator **Dr. M. Didolkar** of Sinai Hospital. CIRC affiliated co-authors were **Airong Yu**, **Nagaraj Neerchal**, and **Liz Stanwyck**. The second article, published in "Bipolymers," arose from a collaboration with **S. Ganguly** (a student in the Chemistry and Biochemistry department at UMBC), and was co-authored by **Liz Stanwyck**.

The CIRC Social Hour continues to attract VIPs



From left to right: Dr. Matthias Gobbert, Dr. Nagaraj Neerchal, Dr. Garikai Campbell, and Dr. Rafael Angel Zapata.

The photo shows **Dr. Garikai Campbell**, Associate Vice President for Strategic Planning, Associate Professor of Mathematics, and **Dr. Rafael Angel Zapata**, Assistant Dean and Director of the Intercultural Center, both from Swarthmore College in Pennsylvania. These gentlemen stopped by the Social Hour during their tour of UMBC. Research assistants for CIRC are **Kyle Stern** (Mathematics) and **Xiao-Song Zhong** (Statistics). Other students affiliated with CIRC this semester include **Elias Al-Najjar** and **Paula Borrego**.

Software Workshops led by students involved with CIRC continue to be popular

UMBC's High Performance Computing Facility (HPCF) and CIRC maintained its synergistic collaboration this semester through interactive user training sessions led by students such as graduate research assistant **Andrew Raim**, and graduate student **David Trott**. These training sessions are built on CIRC experience with hands-on training. CIRC also supported the NSF funded REU Site: Interdisciplinary Program in High-Performance Computing over the summer. CIRC directors **Dr. Nagaraj Neerchal** and **Dr. Matthias Gobbert** led this summer program. For more information on UMBC's High Performance Computing Facility, please see www.umbc.edu/hpcf. For more information on the REU Site, please refer to www.umbc.edu/hpreu.



Graduate Research Assistant, Andrew Raim, assists HPCF users during an interactive training session.

REU SITE: Interdisciplinary Program in High Performance Computing



Led by Program Directors **Dr. Nagaraj Neerchal** and **Dr. Mathias Gobbert**, with assistance from Program Coordinator **Kristel Ehrhardt**, this past summer marked the beginning of the REU Site: Interdisciplinary Program in High Performance Computing in the Department of Mathematics and Statistics at UMBC. Out of over 100 applicants, eight students were selected from across the country for National Science Foundation funding, and one UMBC student was funded by a grant

from the National Security Agency to the Meyerhoff Program. The eight-week program provided a rich exposure to both mathematical and statistical areas of computing by including material from scientific, parallel, and statistical computing.

Math 447 (Introduction to Parallel Computing), a 3-credit summer course, was integrated into the program and included lectures and hands-on computer lab sessions with support from graduate teaching assistants **Kyle Stern** and **Navy Sushon**. The photo to the right shows a hands-on lab led by Kyle Stern. Students participating in the program attended a GRE preparation course, as well as various professional development dinners with speakers on presentation skills, skills for graduate school, and career development tips from faculty and non-faculty researchers. The program also included visits by VIPs including President **Dr. Freeman Hrabowski** (see above photograph), Provost **Dr. Elliot Hirshman**, Dean **Dr. Philip Rous**, **Dr. Janet Rutledge** and **Dr. Renetta Tull** from the Graduate School, **Kathy Sutphin** from the CNMS Dean's Office, **Casey Miller** from the Shriver Center, **Cassie Bichy** from the Learning Resource Center, **Dr. Ken Baron** from the Academic Advising Office, and **Atheeth Hiremath** from the *UMBC Review*. Furthermore, the students enjoyed scientific/career field trips to places such as the National Security Agency and NASA Goddard Space Flight Center, which were graciously organized by **Dr. Mel Currie** and **Dr. Robert Lebair**, respectively. We appreciate all of the help we received to make this program such a success: the mentioned colleagues at UMBC; the many UMBC offices involved in scheduling classes and reserving housing; and of course, the tireless efforts of our departmental staff **Deneen Blair**, **Tarsha Randolph**, and **Boris Alemi**.



One goal of the REU Site program was to provide students with exposure to conducting research with applications



researchers, or clients. The projects in this program were interdisciplinary with clients from fields outside of mathematics and statistics. The two teams of students selected one project with client **Dr. Robert Bell** from AT&T Labs (New Jersey), and one with **Dr. Arthur Sherman** from the National Institutes of Health in collaboration with local faculty **Dr. Bradford Percy**. The photograph to the left shows Dr. Percy presenting the project background on the pancreatic beta cell. The project work was supported by graduate research assistants **David Trott** and

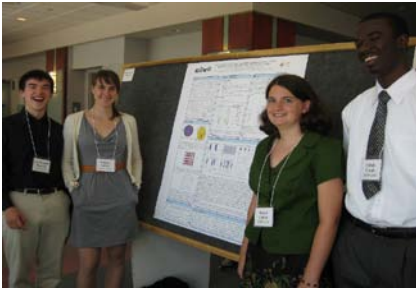
Andrew Raim.

The students concluded the program by giving poster presentations at the Summer Undergraduate Research Fest (SURF). **Terry Lebair**, shown in the photograph to the right, and **Chris Raastad** (not pictured) were two of four oral presentations in the plenary session of SURF.

Please visit the program webpage www.umbc.edu/hpreu for information on all involved, special events, and a photo gallery. Check back soon for a link to video about the program!



REU SITE: Interdisciplinary Program in High Performance Computing



Team 1

Enabling Physiologically Representative Simulations of Pancreatic Beta Cells

Team Members: **Sidafa Conde, Teresa Lehair, Christopher Raastad, and Virginia Smith**

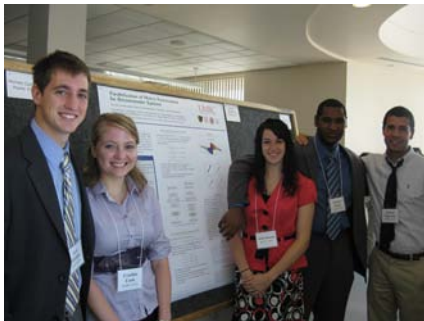
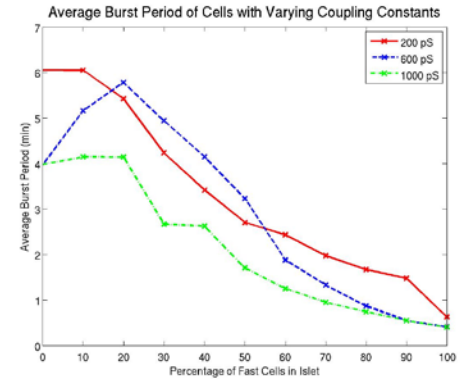
Graduate Assistants: **Kyle Stern and David Trott**

Faculty Mentor: **Matthias K. Gobbert**

Clients: **Bradford Percy and Arthur Sherman**

Diabetes is one of the most common diseases today in the United States, currently affecting over 23 million Americans. The condition results either from defects in insulin production within the pancreas or from defects in functionality as the insulin interacts with cells throughout the body. The pancreas is composed of several types of cells, the most prevalent being the beta cell. Working as part of the 2010 HPC REU at UMBC, Team 1 improved upon MATLAB code developed by the clients. The code, which solves a problem with millions of degrees of freedom, was executed on the cluster tara in the UMBC High Performance Computing Facility. The team also implemented new features into the code, such as random coupling strengths between beta cells. This feature produced a crucial discovery: for intermediate values of the coupling strength, a small increase in the number of fast cells acts by first increasing the burst period, actually slowing down the oscillations before falling into the pattern of reducing the burst period with larger proportions of fast cells again. This counter-intuitive discovery is potentially transformative and could lead to more exciting research in the area.

See <http://www.umbc.edu/hpcreu/2010/projects/team1.html> for more information.



Team 2

Parallelization of Matrix Factorization for Recommender Systems

Team Members: **Julia Baum, Cynthia Cook, Michael Curtis, Joshua Edgerton, and Scott Rabidoux**

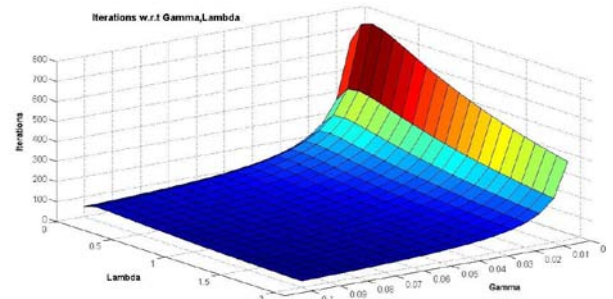
Graduate Assistant: **Andrew Raim**

Faculty Mentor: **Nagaraj Neerchal**

Client: **Robert Bell**

Suppose you're given a large collection of movie ratings consisting of triplets (viewer, movie, rating). What's the best way to understand viewers' preferences using only this data, and to predict which other movies they might like? This was the question posed recently in the famous Netflix Prize competition, which featured a one million dollar grand prize. The contest concluded in September 2009; among the winning team was Dr. Robert Bell from AT&T Research. Working with Dr. Bell as a client and mentor, Team 2 explored the Collaborative Filtering approach used to win the contest. This approach involves fitting non-linear regression models, with parameters representing latent (unobserved) factors that attempt to explain the (observed) ratings. The team of REU participants implemented two model fitting algorithms on the tara cluster – alternating least squares (ALS) and stochastic gradient descent (SGD) – and investigated the use of parallel computing to improve their performance.

See <http://www.umbc.edu/hpcreu/2010/projects/team2.html> for more information.



American Mathematics Competition 8 is a success

On Tuesday, November 16, the Math and Stat department hosted the Mathematical Association of America's American Mathematics Competition 8. Middle school students in the eighth grade and below, as well as accelerated fourth and fifth grade students, competed against others in the same age range. The test demonstrates a broad range of topics available for junior high school math curriculums and aims to both increase interest in math and develop problem solving through competition. The AMC 8 is a 40 minute, 25 multiple choice question test that is held in schools around the country every year.



Kudos

- Congratulations to **Dr. Matthias Gobbert** (left) and **Dr. Anindya Roy** (right) for their promotion to Full Professor!



- The following grants have been awarded to our faculty:

Dr. Yi Huang was awarded a grant from the Food and Drug Agency for her research on the “Average Treatment Effect Estimation Accounting for Covariate Measurement Error New Causal Model Technique with a Medical Device Application: The Impact of Breast Pump Use on Mother’s Breast-Feeding Practice and Infant’s Health.”

Dr. Andrei Draganescu was awarded two grants, one from the National Science Foundation called “Multilevel Methods in PDE Constrained Optimization,” and one from the Department of Energy called “Multilevel Techniques for Large-Scale Inverse Problems.”

Dr. Thomas Mathew has been awarded a grant from the National Institutes of Health for his research on “Statistical methodology for industrial hygiene: detection, limits, reference limits and measurement accuracy.”

Drs. Junyong Park and Bimal Sinha have been awarded a contract with MERCK Pharmaceutical Company.

- In celebration of **Dr. Florian Potra’s** 60th birthday, *Optimization Methods and Software* has invited the submission of articles for their special issue in his honor. Dr. Potra has made several significant contributions to these areas of research, including interior point methods for various optimization problems and applications of optimization methods in multibody dynamics.



- **Dr. Osman Guler** has published his book, [Foundations of Optimization](#), this year as part of the Springer Verlag Premier Series. This graduate level text looks at the theory of optimization in finite-dimensional spaces and offers over two hundred exercises, in depth looks at theories, and both basic and advanced topics.

- Over the summer, **Dr. Thomas Seidman** gave a talk as part of the Naval Postgraduate School Department of Engineering and Applied Sciences’ Distinguished Lecture Series. His lecture, entitled “Evolving Consensus in a Distributed Sensor Network,” discusses modeling issues in both “developing and propagating consensus decisions when costs are associated both with delayed response and with false alarms.” This particular talk also goes in conjunction with talks presented by Dr. Seidman in the colloquium series here in the department. (Information provided by event poster).

