

Mathematics, Statistics and Computer Science

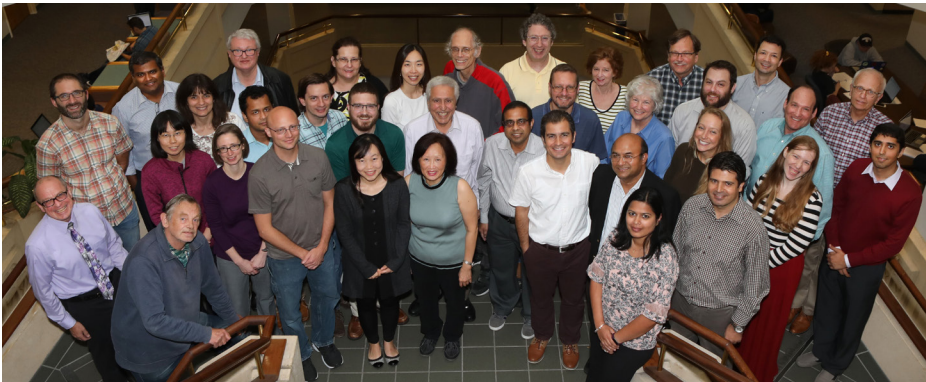
Helen Way Klingler College of Arts and Sciences



MARQUETTE
UNIVERSITY

AY 2018-2019 NEWSLETTER

MSCS Department growing into two Departments



The Department of Mathematics, Statistics and Computer Science (MSCS) is expanding into two new departments. Starting in Fall 2019, we will transition into the Department of Computer Science (COSC) and the Department of Mathematical and Statistical Sciences (MSSC).

Over the years, MSCS developed a strong focus on interdisciplinary, computational and data-driven research and teaching. A natural outgrowth of this history is a collective group of forward-thinking mathematics, statistics and computer science faculty with strong expertise in the application of state-of-the-art approaches to a wide range of contemporary problems. By forming two new departments, we are now able enhance our discipline specific educational and research agendas as well as strengthen our collective, interdepartmental goals.

With the departmental goal of creating rich educational experiences, the new Department of Computer Science will interact with three undergraduate majors (Computer Science, Interdisciplinary Data Science, and Interdisciplinary Bioinformatics) and three graduate programs (Computing, Bioinformatics and the new Ph.D. in Computer Science starting in Fall 2019). It is rare that a department gets to build a doctoral program from scratch, and so it will be an exciting time as the department molds research and graduate education together with new Computer Science doctoral program.

The term “Mathematical and Statistical Sciences” embraces the both the foundational theoretical work and the applied work of the new Department of Mathematical and Statistical Sciences. In addition to its research efforts, the department will interact with five undergraduate majors (Mathematics, Computational Mathematics, Mathematics for Elementary Teachers, Interdisciplinary Applied Mathematical Economics, and Interdisciplinary Data Science) and four graduate programs (Applied Statistics, Bioinformatics, Mathematics for Secondary School Teachers, and Computational Mathematical and Statistical Sciences, formerly Computational Sciences). Thank you to all the MSCS faculty, staff and students over years. We are proud of the outstanding department we built together. As we move forward as two new departments, we will continue to collaborate and support each other.

FACULTY FOCUS

A note on Dr. Phil Bender (1927-2018)

by Dr. Peter Jones

Phil Bender is warmly remembered for his thirty-one years as a faculty member in our department. Phil was born in Milwaukee on September 20, 1927. He served in the U.S. Navy immediately following World War II. Awarded a Master’s degree from Marquette in 1959 while he taught at the Milwaukee School of Engineering, he was appointed Instructor the following year and Assistant Professor in 1966, following a two-year leave of absence to complete his Ph.D. in Differential Equations at Iowa State University. He was promoted to the rank of Associate Professor in 1971 and retired in 1993, continuing to live in Milwaukee for some years thereafter before moving to Alameda, CA. He passed away December 9, 2018.

During his time in our department, Phil committed himself to mathematics education, involving himself in organizations such as the Mathematics Association of America, the Milwaukee Area Mathematics Council and its Wisconsin counterpart. With the advent of the Computer Science major, he began to teach a variety of introductory courses in that discipline, while continuing to teach large sections of calculus.

At the time of his retirement, the then Chair used the term “gentlemanly” to describe Phil in a letter he wrote to the Dean, a term everyone who knew him would find most fitting. After retirement, Phil took up tournament bridge. This reporter is proud to have been his partner when he made the rank of Life Master.

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

FROM THE CHAIR



It has been an exciting year for the students, faculty and staff of the Department of Mathematics, Statistics, and Computer Science (MSCS). The articles in this newsletter highlight a small slice of their accomplishments.

The exciting news of the year is MSCS expanding into two new departments. Starting in Fall 2019, we will become the Department of Computer Science and the Department of Mathematical and Statistical Sciences. See the feature article on the left for more details.

Dr. Stephen Merrill, who retired in Fall 2018 after 42 years of service to Marquette, was promoted to Professor Emeritus. Dr. Merrill is a dedicated researcher, an outstanding educator, and a supportive colleague. Read about his impactful career in dynamical systems and mathematical modeling, and his positive influences as a colleague and educator. In his honor, MSCS created the S.J. Merrill Best Graduate Teaching Assistant Award with Kehinde Irabor as the first recipient of the award.

The Faculty Focus article remembers the life of Dr. Phil Bender. Read about Dr. Bender’s life, career and impact on Marquette University.

In student news, our double computer science and mathematics major Nina Lasswell received a Marquette Magis Award for her leadership and dedication to Marquette’s mission. Anmol Paudel’s conference proceeding with Dr. Satish Puri won best paper at the International Conference for High Performance Computing, Networking, Storage and Analysis. Congratulations to both Nina and Anmol. To learn more about all our outstanding students, read the articles on pages 3 and 5.

Lastly, it is my pleasure to welcome our newest faculty member Dr. Jay Pantone who works in field of combinatorics. Learn more about Dr. Pantone and his accomplishments on page 2.

We are proud of the work of every member of MSCS and look forward to the adventures of next year. Have a wonderful summer.

Rebecca Sanders
MSCS Chair

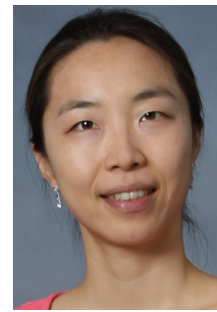
FACULTY GRANTS & ACTIVITIES



John Engbers gave an invited talk at the international Conference on Advances in Interdisciplinary Statistics and Combinatorics, on *Extremal Independent Sets and Colorings in k -Chromatic Graphs*.



Sarah Hamilton was awarded a Trailblazer R21 grant from the National Institute of Biomedical Imaging and Bioengineering for her project entitled *Direct 3D Reconstruction Methods for Electrical Impedance Tomography for Stroke Imaging*.



Hyunyi Jung received an Explorer Challenge grant titled *Mathematical Modeling Experiences for Students and Future Teachers* from the Office of Research and Innovation at Marquette.



Ahmed Kaffel gave an invited talk at InterPore 2018 On *modeling partially-saturated flow of a liquid in multilayered thin swelling porous media*.



Mehdi Maadooliat received a two-year collaboration grant from Marshfield Clinic Research Institute for a project titled *Detecting Shared Chromosomal Regions and Compound Heterozygous Effects for Diseases within PMRP*.



Jay Pantone and Robin Houston independantly verified a math proof about the first season of *The Melancholy of Haruhi Suzumiya* which is being hailed as a significant advancement on a puzzle mathematicians have been studying for 25 years.

FACULTY NEWS

Dr. Jacob Noparstak welcomed his daughter, Melody Rachel Wilde, October 2018.



**Congratulations
on your newest
family members!**

Dr. Hyunyi Jung welcomed her son, Sunjoon Ku, April 2019.



MSCS UPDATES

The Department would like to welcome our new professor, Dr. Jay Pantone, who joined our faculty Fall 2018 and our new post-doctoral researcher, Dr. Hyejin Park, who joined our department in Summer 2018.

Jay Pantone

Jay joined the MSCS department at Marquette University after earning his PhD from the University of Florida and spending three years as postdoc at Dartmouth College. His research explores the computational aspects of combinatorics and statistical mechanics, applying analytic, symbolic, and experimental techniques to problems in pure mathematics. Coming from rural New Hampshire, Jay and his wife Jen are slowly getting used to living in a real city again, and are enjoying exploring all that Milwaukee has to offer!



Hyejin Park

Hyejin came from the University of Georgia where she completed her Ph.D in Mathematics Education and MS in Mathematics degrees. Dr. Park works as a Post-Doctoral researcher with Dr. Magiera studying pre-service teachers' models, or systems of interpretation, of mathematical argumentation, justification and proof in K-8 mathematics.



Pi Mu Epsilon
Spring 2018 Induction

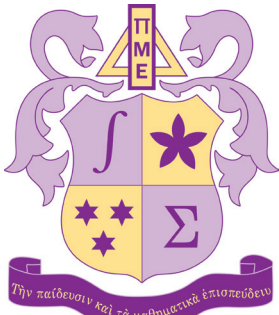
Cole Blazer
Tajah Lynch

Ryan Martin
Charlie Morley

Ben Walczak
Josephine Zucca



From left to right: Charlie Morley, Tajah Lynch, Josephine Zucca, Ryan Martin, and Bem Walczak (Cole Blazer not pictured)



Fall 2018 Induction

Grant Sheaffer
Caroline Waltman
Carly Korte
Katie Revelis
Meg Hannigan
Sarah Brand
John Hattas
Samantha Lammers
Erik Lebeau
Noah Meisner
John Rolence
Zhour Shen

Sarah Kershnik
Emma Stalder
Nicole Biskner
Hayes Wass
Francesco Fuentes
Lindsay Webster
Juan Fernández
Chaimaa Maghfour
Elli Pointner
Yuchao Chen
Sophia Cieslicki
Lauren McMullen

Tim Fair
Melissa Bichler
Amy Geraghty
Zachary Zongo
Zachary Wilcox
Ivan Roth
Taylor Evans
Matthew Kunze
Shawn Turner
Marshall Preusser
Nathan Lang
Van Mawi Tial



Front (right to left): Grant Sheaffer, Caroline Waltman, Carly Korte, Katie Revelis, Meg Hannigan
2nd row (right to left): Sarah Kershnik, Emma Stalder, Nicole Biskner, Hayes Wass, Francesco Fuentes, Lindsay Webster, Juan Fernández, Chaimaa Maghfour, Elli Pointner, Yuchao Chen
Back (right to left): Tim Fair, Melissa Bichler, Amy Geraghty, Zachary Zongo, Zachary Wilcox, Ivan Roth, Taylor Evans, Matthew Kunze, Shawn Turner, Marshall Preusser
Not pictured: Sarah Brand, Sophia Cieslicki, John Hattas, Samantha Lammers, Nathan Lang, Erik Lebeau, Lauren McMullen, Noah Meisner, John Rolence, Zhour Shen, and Van Mawi Tial

Spring 2019 Induction

Ed Liebeno
Kendall Kohlmeyer

Daniel Smith
Danyi Ying
Thomas Glisson

John Killross
Xiuyu Yang



Congratulations to all of our new members of the
Wisconsin Alpha Chapter of Pi Mu Epsilon

A large thank you goes to the officers of ΠME for their work during this year.
President: Nina Lasswell **Vice President:** Shivani Kohli **Secretary:** Ethan Corr **Treasurer:** Ben Walczak

Outstanding Undergraduate
Senior Awards

Every Spring semester the seniors of our Department are put forward to win one of three Outstanding Senior Awards in Computer Science, Mathematics, and Mathematics Education. Please congratulate our 2018 and 2019 Outstanding Senior award Winners!



Computer
Science
2018
Kathleen Baert



Mathematics
2018
Sam Scheel



Computer
Science
2019
Shivani Kohli



Mathematics
2019
Lindsay Webster



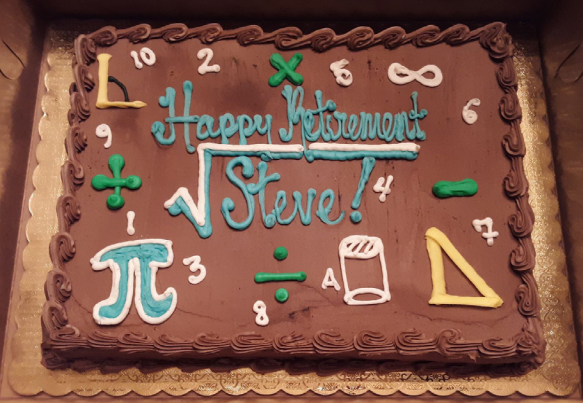
Miriam
Connellan
Mathematics
Education
2019
Sarah Baxter

Dr. Stephen Merrill Retires

by Dr. Anne Clough

After forty-two years, Dr. Stephen Merrill retired from the Department of Mathematics, Statistics and Computer Science in December 2018. He had an outstanding career as an award-winning teacher and internationally known researcher. Over the years, Steve became the face of the department to students, faculty across campus, and scientists around the country.

Dr. Merrill joined the department upon completion of his graduate studies at the University of Iowa. His training, and much of his subsequent research, was in the development of complex dynamical systems, equations that describe changing real-world phenomena used to predict future behavior. But Steve’s unique contribution was his application of these model systems to real-world data designed to address compelling questions arising in the treatment of human diseases. A glance at the titles of his publications (comprising at least 64 articles) includes the following phrases: “tumor growth and cytotoxic blocking activity,” “interaction of HIV with cells of the immune system,” “AIDS and complementary and alternative medicine,” “gene encoding nonstructural protein of hepatitis C,” and “autodissemination of pyriproxyfen by malaria vectors.” He was particularly interested in bringing his quantitative



analytic toolbox to understudied and underfunded conditions such as HIV during the 1990s and 2000s, as well as malaria and autism more recently.

Dr. Merrill’s interest in these problems took him all over the country to work with more than fifty different collaborators. He gave more than one hundred invited talks presenting his research and did longer stints at Brown University, Los Alamos National Laboratory, and most recently at the headquarters of the Food and Drug Administration in Silver Spring, Maryland. He is an entertaining yet informative speaker, who knows how to make even the most abstract mathematical constructs accessible to students and investigators from the biological and health sciences. His accomplishments were further recognized by invitations to serve on NIH grant-awarding panels and in a senior editor position for the Journal of Immunological Methods.

Dr. Merrill’s role on campus was far more than an accomplished researcher. He frequently reported to colleagues that his mission was to facilitate and support students in the understanding of mathematics and the relevance of it to their careers and lives. He was a stalwart advisor to undergraduate and graduate students, frequently offering special courses in areas of interest to the students or in topics relevant to their career advancement. He was a popular teacher, having won Marquette’s highest teaching award. He was the dissertation advisor to nine PhD students and served on the committee of many other master’s and doctoral students. He was genuinely interested in the scientific and technical aspects of their work.

Finally, as noted at his exuberant retirement party filled with colleagues, Steve was the quintessential colleague to all of us in the department. He was generous with his time, never saying no to a challenging task. He was calm cool and collected even during stressful faculty meetings. He thought deeply and out-of-the-box before offering his opinion, always taking the high road. He could always find a way forward that yielded a positive resolution. This is surely what all of those students and collaborators found in him that led to such a productive and fulfilling career.

Steve Merrill can now be found in the historic downtown of Racine, WI running *Sheepish*, a store that he and his wife Anne Huber co-own. The store focuses on providing information and products that promote health, healing and well-being. Stop in for a visit someday.



OSCT Workshop

The office of Statistical Consulting and Training (OSCT) organized a two-day workshop entitled, “Deep Learning Foundation and Application with a Special Focus on Medical Informatics,” on April 5-6, 2019 at Northwestern Mutual Cream City Labs. The workshop was sponsored by OSCT at Marquette University, as well as the Mayo Clinic, Direct Supply, Milwaukee School of Engineering, Northwestern Mutual, and the American Statistical Association (Wisconsin Chapter).

Topics covered in this workshop included: Deep Learning Foundation, Deep Learning in R and Python, and CNN/RNN/ LSTM architectures and their application in medical image and text analysis. The workshop was open to the public and quickly filled to the 150 person capacity.



Updates on the Applied Statistics Master’s Program

by Dr. Dan Rowe, APST-MS Program Director

The Applied Statistics Master’s (APST-MS) program began in Fall 2017 and is concluding its second successful academic year. The APST-MS program has a thirty-three credit non-thesis option including a three credit practicum as well as a thirty credit option including six thesis credits. Both options have seven required core courses (twenty-one credits) with the remaining credits coming from approved within and outside department electives.

Initial enrollment began modestly with three students and has steadily increased each semester to a total of eleven students for Spring 2019, which is expected to reach a total of twenty for Fall 2019. Interest in both the statistics courses and APST-MS program have been increasing among the other student populations. Undergraduates have been enrolling in more upper division courses and graduate students have been enrolling in non-required statistics courses with doctoral students choosing to earn the APST-MS.

In addition, approval was just received for a five-year BA/BS and APST-MS accelerated degree program (APD) for Fall 2019. With the ADP, students can earn their bachelor’s degree after four years with any major containing sufficient mathematical preparation, double count twelve credits, and complete the APST-MS after their fifth year. It is anticipated that the program will continue to grow steadily and complement the revised doctoral program in the Department of Mathematical and Statistical Sciences.

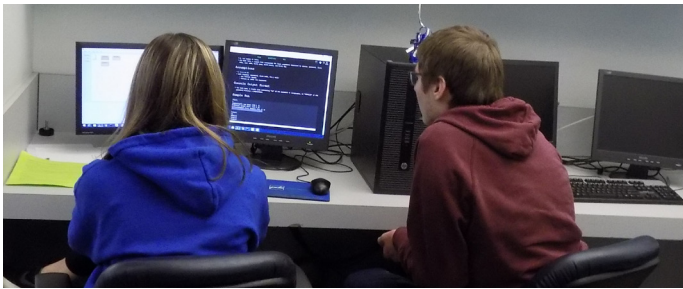


STUDENT NEWS CONT.



Programming Competitions

The Wisconsin-Dairyland chapter of the Computer Science Teachers Association, in conjunction with the Marquette University chapters of the Association for Computing Machinery and Upsilon Pi Epsilon, welcomed high school students with Java or Scratch programming experience to participate in a morning of computer science problem solving and storytelling on April 18th, 2018 and again on April 10th, 2019.



Banabithi Bose received Research Fellowships from the Northwestern Mutual data Science Institute for Spring 2019 and Summer 2019 along with receiving a travel grant from the National Science Foundation to attend the Great Lakes Bioinformatiocs Conference.

Christopher Duncun was named the 2019 Wisconsin State Student Employee of the Year by the Midwest association of Student Employment Administrators. He also is the winner of the Marquette Student Employee of the Year for the 2018-2019 academic year.

Dr. Serdar Bozdag and **Ziynet Nesibe Kesimoglu** won an award at the 2018 Forward Thining Poster Session here at Marquette for their project *Inferring disease-specific competing endogenous RNA*.

Ryan Weber and **Dr. Engbers** published a paper in *Involve: A journal of Mathematics*, titled *Merging peg solitaire on graphs*.

Cagatay Dursun was accepted for an oral presentation at the Great Lakes Bioinformatics Conference and gave a talk on his network propagation-based algorithm to priortize disease associated genes.

Abbie Papka received one of the four Klinger College of Arts and Sciences 2019 Undergraduate Summer Research Fellowship and is working on a bioinformatics project that aims to integrate cancer biological datasets to predict patient-specific drug respose for cance patients. She also recieved a National Science Foundation travel fellowship to attend the Great Lakes Bioinformatics Conference.

Louis Nass presented *Dynamic sequential filtering with joint state parameter estimation* at the SIAM Conference on Uncertainty Quantification on April 17, 2018.



MSCS Student Receives Magis Award

Nina Lasswell, one of our Mathematics and Computer Sciences students, has recently been one of the students choosen to receive the prestigious Magis Award; an award given to students who exemplify the university’s mission in a significant way. Below Nina has described what she has done to have received this honor.

“I won the Magis Award, which is a Student Leadership Award through the Division of Student Affairs. I was selected by Campus Ministry for demonstrating leadership in the following areas: Faith that Does Justice and Social Justice Advocacy/Education, based on the criteria of being a student who dynamically demonstrates this area and Marquette’s mission through my involvements on campus.



Throughout my four years at Marquette, I have been very active and involved with Midnight Run, a service organization through Campus Ministry. Midnight Run’s Mission focuses on the movement of compassion towards our community on the margins of society, by serving the particular needs of the hungry and homeless in our Milwaukee community. I currently serve as the Co-Coordinator of the organization, and therefore coordinate the 19 sites across the city and over 300 students who participate each semester, help plan educational events to spread awareness on campus, and lead multiple groups of students a week to sites.

I have had the opportunity to build relationships over the past four years at Midnight Run sites which have turned into friendships, while walking with my neighbors to honor the dignity and worth of every single person. It challenges me to integrate my experiences with my faith and it has taught me what it means to live out the Jesuit value of service and be a woman for others.”



Anmol Paudel won the best paper award for his and Dr. Satish Puri’s paper *OpenACC Based GPU Parallelization of Plane Sweep Algorithm for Geometric Intersection* at the International Conference for High Performance Computing, Networking, Storage and Analysis in Dallas, Texas on November 11th, 2018.



Kehinde Irabor won the first ever S.J. Merrill Best Graduate Teaching Asistant Award.



RECENT GRADS

Spring 2018

B.S. in Computer Science
Justin Furst Thomas Hicks Chandan Reddy Rene Mercado
Samuel Norris Colin Quinn

B.S. in COMA
Samuel Scheel

B.S. in MELT
Jordan Burda

B.S. in INAM
Lucas Benson Thomas Dietz Dennis Flynn
John Kavula Camille Lang Max Mattappilli
Patricia McHugh Evan Resuali

B.S. in Mathematics
Mary Lynch Louis Nass Phuc Nguyen Stephen Peterson
Rosie Rains Thomas Retzloff Samuel Scheel

Ph.D. in Computational Sciences
Duc Do

Summer 2018

B.S. in Mathematics
Marques Friend Ryan Schumm

Fall 2018

B.S. in Bioinformatics
Matthew Leiser

B.S. in COMA
Zaynab Hassan

B.S. in Computer Science
Vashti Marin

B.S. in Data Science
Joseph Marotta

B.S. in INAM
Zaynab Hassan Matthew Sebok

B.S. in Mathematics
Melissa Bichler Kevin Resier

B.S. in Secondary Education and Math
Zachary Longo Kendall Nepote

Masters in Computational Sciences
Jiblal Upadhyya Daniel Passe Wenliang Hu Zhi Du

Masters in Computing
Amit Kumar Saha Mi Li Dawn Turzinski Chad Kohler
Idah Karonga Ana Grieco Tyler Dicks Yihan Cao

Ph.D. in Computational Sciences
Drew Williams Kehinde Irabor

Spring 2019

B.S. in Bioinformatics
Lindsay Hopson Mathew Peter
Tina Senftle

B.S. in COMA
Caroline Waltman

B.S. in Computer Science
Shoun Abraham Parker Berry Connor Boos Jack Doyle
Liam Fruzyrna Alexander Gattone Taylor Gutzmann Tyler Hackel
Hannah Kari Shivani Kohli Nina Lasswell Zenious Liubinskas
Patrick McGee Patrick Myers Zachary Palmer Brian Weithers
Kamil Mieczkowski Shivam Thakrar Benjamin Walczak Thomas Ryan

B.S. in Data Science
John Kearns Bria Powell Katy Weathington Connor Booz
Liam Fruzyrna Benjamin Walczak

B.S. in INAM
Alyssa Catarozoli Colin O'Donnell Andrew Postol Cierra Ramusack
Juan Sarabia Sydney Stein Erik Walinder

B.S. in Mathematics
Christopher Duncan Xiao Jiasheng Dea Ago Thomas Glisson
Margaret Hannigan Aaron Grube Kendall Kohlmeier Tajah Lynch
Richard Muench Ivan Roth Andrea Thiltgen Lindsay webster
Shivani Kohil Nina Lasswell Katy Weathington

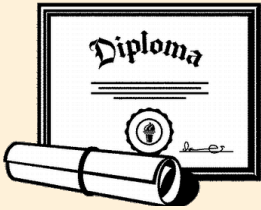
Masters in Applied Statistics
Sunil Mathew

Masters in Bioinformatics
Shikan Zheng

Masters in Computing
Christopher Supinger Tao Yen Omar Waller Misti Stevens
Subhash Rajapaksha Ashley Ksioszk Michael Kemp Abigail Fair
Hong Ding Kelsey Diachun Lori Callaghan John Awebwa
Alfredo Antolinez Rivas

Masters in Computational Sciences
Andrew Tran Anmol Paudel

Ph.D. in Computational Sciences
Md Kamrul Hasan Xuyong Yu



Congratulations to our recent Graduates!



We would like to know where you are and what you are doing.
Please send news and current address updates to:
mcsnews@mcs.mu.edu