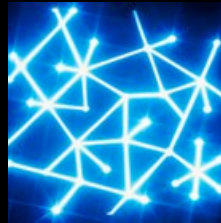


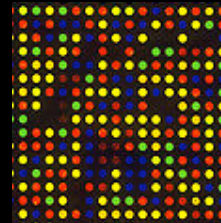


THE UNIVERSITY OF
CHICAGO



GGSB

The Committee on Genetics, Genomics & Systems Biology (GGSB) is an interdisciplinary program composed of over eighty biologists.



GGSB + IGSB

GGSB is associated with the Institute for Genomics & Systems Biology (IGSB). The IGSB translates scientific discoveries into diagnostic and therapeutic advances in molecular medicine.

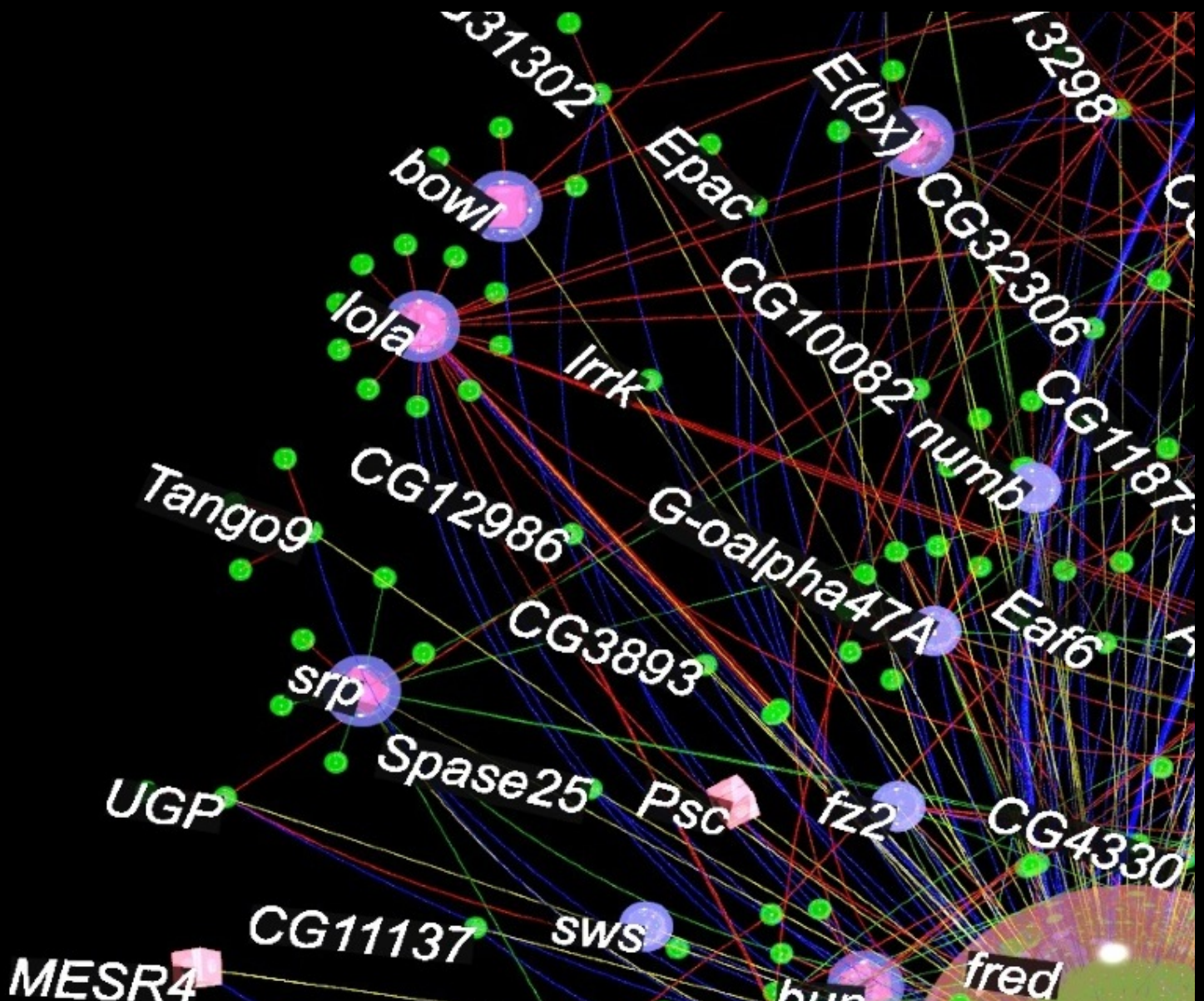


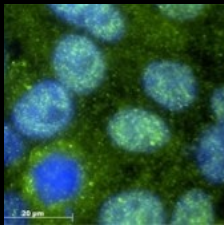
GGSB Training Program

GGSB combines a foundation in modern genetic analysis with training in methods for formulating and addressing fundamental biological questions in the context of complex systems.

2014-2015

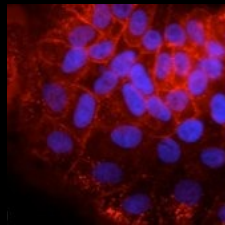
The Committee on Genetics, Genomics & Systems Biology





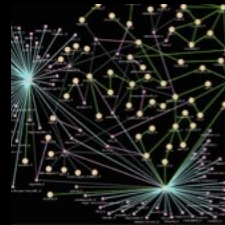
GGSB Research

Investigators, postdoctoral fellows, graduate students and undergraduates study problems within developmental, physiological, and evolutionary timescales in model organisms.



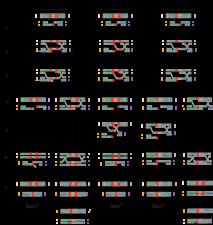
GGSB Aims & Goals

Education programs are aimed at training Ph.D. scholars to become independent scientists in biomedical research. The presence of basic and clinical sciences in the Division of Biological Sciences enhances the interdisciplinary approach to teaching and research.



GGSB Flexibility

There is an exciting environment to pursue rigorous, high-quality training with flexibility to design programs to meet individual needs, such as working in cutting-edge areas of biology. For example, systems level analysis of gene regulatory networks.



GGSB Focus & Strategy

Students train in advanced methods of genetic analysis, genomics, and systems biology for careers in basic and applied research and education. Experimental strategies are used to address problems in viruses, bacteria, blue-green algae, *Arabidopsis*, yeast, *Tetrahymena*, nematodes, *Drosophila*, mice, and humans.



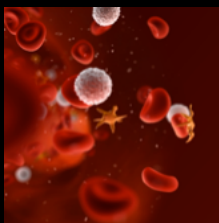
GGSB Research Topics

There are projects that range from modeling and analysis of developmental genetic systems to genomic dissection of cancer and diabetes. Other areas of research: recombination, mutation chromosome mechanics, evolution, population genetics, cancer genetics, immunogenetics, bioinformatics, statistical genetics, and synthetic biology.



Education Support

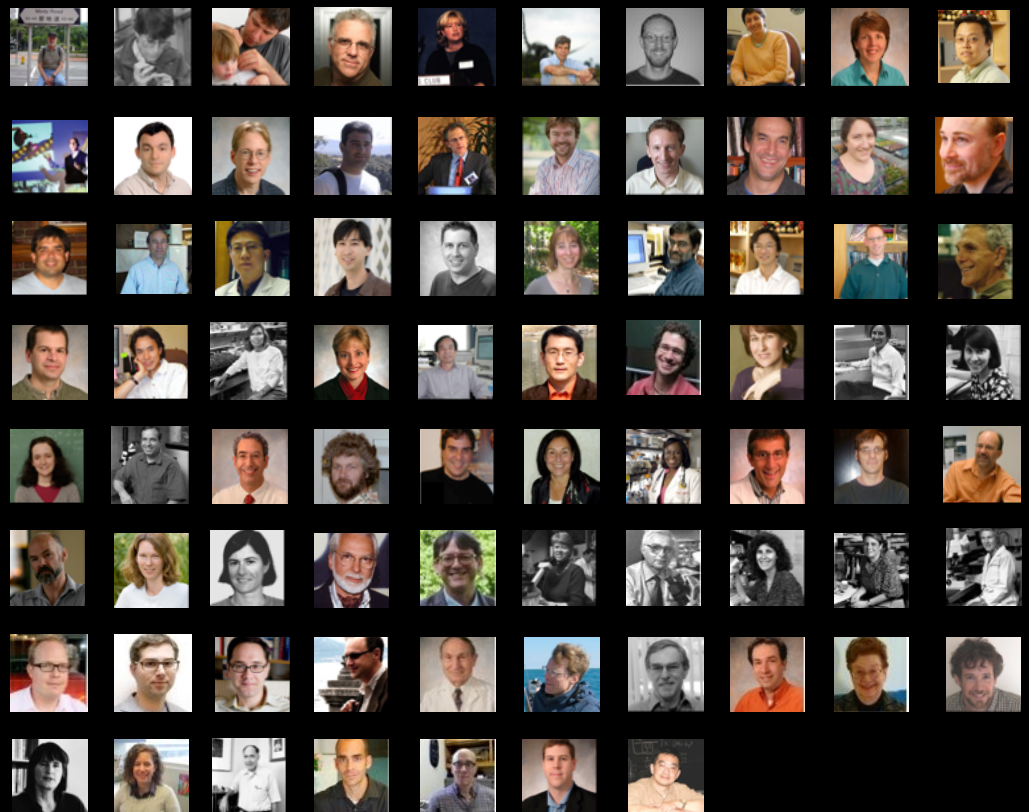
Financial support is guaranteed to all graduate students for their first four years, subject to satisfactory performance. Assistance for subsequent years is subject to positive progress, as determined by the faculty sponsor, GGSB, and the Division of Biological Sciences. The stipend increases regularly in accordance with standard of living increases. Tuition, stipends, health insurance, and fees are funded throughout training, subject to satisfactory performance.



GGSB Graduates

GGSB Ph.D. graduates are postdoctoral fellows at universities, medical schools, research institutes, and colleges. Older alumni are professors and staff scientists in academic, biomedical, biotechnology, and public sector settings. Some graduates are attorneys, teachers, editors, and writers.

Faculty



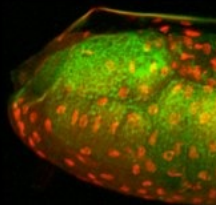
Graeme Bell
Joy Bergelson
David Biron
Douglas Bishop
Nancy Cox
Jerry Coyne
Sean Crosson
Anna Di Rienzo
Eileen Dolan
Wei Du
Martin Feder
Richard Fehon
Edwin Ferguson
Yoav Gilad, GGSB Chair
Jack Gilbert
Conrad Gilliam
Benjamin Glick
Michael Glotzer
Jean Greenberg
Robert Grossman
Mohan Gupta
Robert Haselkorn
Tong-Chuan He

Robert Ho
James Holaska
Sally Horne-Badovinac
Richard Hudson
Akira Imamoto
David Kovar
Martin Kreitman
Stephen Kron
Bruce Lahn
Gayle Lamppa
Michelle Le Beau
Wen-Hsiung Li
Manyuan Long
Vincent Lynch
Jocelyn Malamy
Rima McLeod
Elizabeth McNally
Mary Sara McPeck
Laurens Mets
Ivan Moskwitz
Ed Munro
Marcelo Nobrega

Carole Ober
Olufunmilayo Olopade
Ken Onel
Abraham Palmer
Brian Popko
Trevor Price
Victoria Prince
Ilaria Rebay
Samuel Refetoff*
John Reinitz
Carrie Rinker-Schaeffer
Bernard Roizman
Marsha Rosner
Lucia Rothman-Denes
Janet Rowley
Michael Rust
Alex Ruthenburg
Ilya Ruvinsky
Andrey Rzhetsky
Angelo Scanu*
Urs Schmidt-Ott
James Shapiro
Andrew Skol

Janice Spofford*
Jonathan Staley
Ursula Storb
Barbara Stranger
Bernard Strauss*
Joseph Thornton
Aaron Turkewitz
Kevin White
Chung-I Wu

*Emeritus



Applying to GGSB

Students are required to provide official reports of GRE General Test scores and have a minimum GPA of 3.0. International students whose native language is not English must submit an official report of a TOEFL score that is no more than five years old. Students should include an application fee.



University of Chicago

- 5,369 undergraduates
- 9,850 graduate students
- 2,188 faculty & staff
- 89 Nobel Prize winners
- \$466M in sponsored research awards
- 3,847 patents filed since 1975
- Manager of Argonne National Laboratory & Fermi National Accelerator Laboratory
- Affiliated with the Marine Biological Laboratory

uchicago.edu



Internet Sources

<http://cg.uchospitals.edu/index.php>

www.uchicago.edu

www.bsd.uchicago.edu/index.html

<http://gradprograms.bsd.uchicago.edu>



GGSB Seminars: 2014-15

Reed Wickner, NIH
Nels Elde, University of Utah
Five Other Seminars TBA

IGSB Seminars: 2014-15

Julia Zeitlinger, Stowers Institute
Gary Stormo, Washington Univ.
Jeff Gore, MIT
Danny Forger, U. of Michigan
Jennifer Grady, U. of British C.
Manolis Kellis, MIT
Farren Isaacs, Yale
William Bialek, Princeton



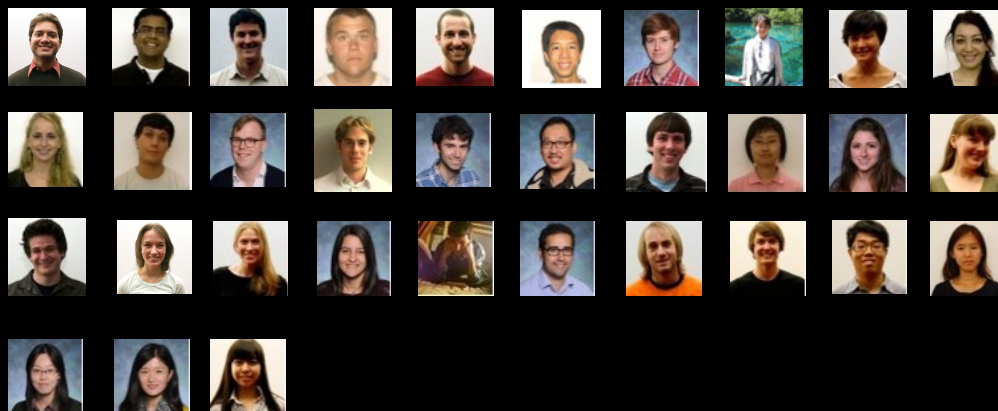
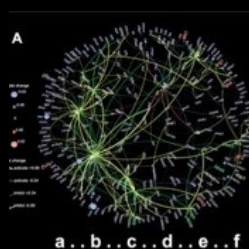
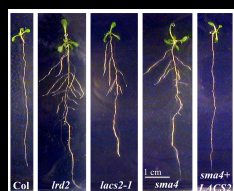
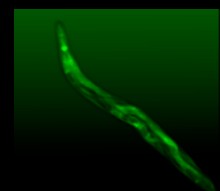
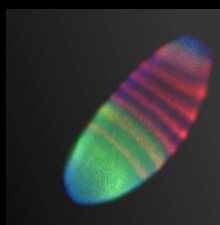
More Information:

GGSB Grad Program

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Students



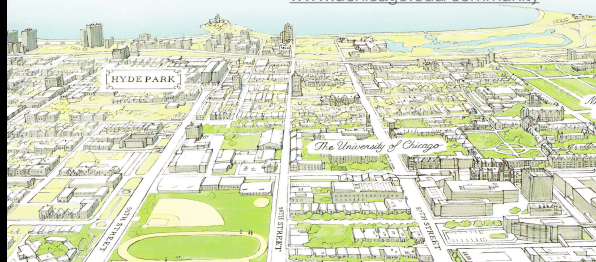
Alexander Advani
Chaitanya Bandlamudi
Kenneth Barr
David Blair
John Blischak
Justin Chew
Charles Cysz
Ziyue Gao
Charlene Hoi
Imge Hulus
Talia Karasov
Adam Koch
Nickolas Knoblauch
Patrick Landback
Charlie Lang
UnJin Lee
Bryan Lenneman
Yujie Li

Sahar Mozaffari
Meagan Palmer
Jason Pitt
Diedre Reitz
Mary Rogers
Leila Reyes Ruiz
Jarred Sanders
Marcus Solai
Bryce van de Geijn
Nicholas Vankuren
Kanix Wang
Yi-Wen Wang
Chudong Wu
Grace Yu
Xinzhu Zhou

Growing. Changing. And deeply rooted in tradition. Ever-evolving. Expanding. And alive with history. Transitioning. Kinetic. And home to lifelong residents. This is Hyde Park, where different people, perceptions, and pursuits coexist and thrive in a unique Chicago neighborhood on the southwest shore of Lake Michigan.

THIS IS OUR NEIGHBORHOOD

www.uchicago.edu/community



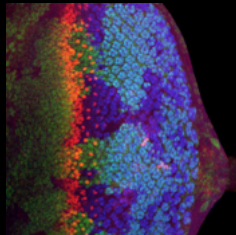


GGSB Teachers & Scholars

GGSB graduate faculty and students are outstanding teachers and scholars who rigorously pursue new knowledge. They represent multiple departments, committees, and academic divisions. There is strong focus on designing and implementing experiments that use modern genetic analyses, quantitative methods, predictive modeling, and statistical tests to characterize biological states and decipher complex regulatory and signaling networks.

Modern biology is increasingly becoming an information science, in which acquisition, integration, and analysis of vast amounts of data are allowing scientists to tackle important biological questions. This is especially true in the fields of genomics and systems biology where new results are transforming understandings about genetic controls that regulate biological organization and function.

Quantitative projects in the GGSB program enhance knowledge about the role of genetic variation, molecular signaling, genetic and epigenetic states, transcriptional robustness, gene regulatory network architecture, and environmental variation in contributing to modulations in biological systems. Predictable mechanisms producing these conditions are deciphered quantitatively to demonstrate how molecular and cellular properties and behaviors emerge and operate at different levels of spatial and temporal organization. Components within these integrated spaces influence dynamic conditions of development, aging, sickness, and health.



GGSB Research, Training & Quantitative Projects

GGSB scientists regularly confront great quantities of heterogeneous data in databases from different experiments. The challenge is to develop computational models to organize, integrate, and manage multiple forms of information. Modeling helps investigators predict biological mechanisms and processes in hierarchical systems that buffer against infectious agents, mutations, genetic dosage changes, and stress. Insights can be provided about how networks regulate self-maintenance of complexity, developmental canalization, metabolic homeostasis, adaptation, and evolution. GGSB students with training in computer science, statistics or mathematics will have a great opportunity to make scientific contributions in these areas in the coming years.

Productive quantitative partnerships include projects with scientists and students in the Computation Institute (CI), Department of Statistics, and Argonne National Laboratory. CI provides cutting-edge data-intensive computing and software systems, research about deep supercomputing, large-scale computing algorithms, numerical simulations, and next-generation computational platforms to model biological processes. The Department of Statistics has quantitative biology experts who use computation tools to model how enhancer sequences specify biological forms during development. Argonne provides expertise and techniques for investigating problems about molecular dynamics and bioinformatics with grid technologies and supercomputers.



IGSB & IGSB

The University of Chicago has fostered a productive community of scientists and students. For example, there is a collaborative partnership with the Institute for Genomics and Systems Biology (IGSB). IGSB uses high-throughput screening, bioinformatics, and computational technologies to discover mechanisms that modulate human health and disease, discover biological networks, predict patient outcomes, and improve therapeutic tools for molecular medicine. IGSB resources, along with the research and training of GGSB scientists, provide the synergy to help answer basic questions about the development, regulation, and evolution of complex living systems. These investigations use next-generation sequencing, RNA interference, and Chip-Seq along with other leading-edge tools. Mentors encourage students to be curious, creative, and successful problem solvers. Some interdisciplinary projects include partners from the physical sciences, including experts in mathematics, physics, computer science, and engineering. GGSB scientists place strong emphasis on fostering collaborative trans-disciplinary initiatives. Project leaders communicate scientific outcomes in courses, seminars, workshops, journals, national meetings, and international conferences.

IGSB & Outreach For TA Credit

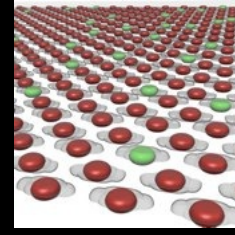
IGSB works with graduate students and the Associate Dean and Director of Graduate Affairs to organize 10-week outreach teaching opportunities for TA-credit in local high school biology classrooms and the Museum of Science and Industry's **Genetics: Decoding Life** exhibition. Students participating in outreach must also take a regular University of Chicago course.



GGSB Students & Chicago

New GGSB students are assigned academic advisors. Grad students have an opportunity to attend seminars, journal clubs, *Genetics of Model Organisms* presentations, and faculty seminars to learn about available research opportunities. Weekly lunch meetings and an annual *Molecular Biosciences Retreat* give students opportunities to meet in informal settings and learn about various lab projects. Students have a wide degree of flexibility in selecting courses, electives, advisors, and eventual theses.

The University of Chicago is located just south of downtown Chicago, Illinois, in the Hyde Park community. The University's proximity to this bustling metropolis has allowed the academic community both to contribute to and draw from the strength and diversity of the city, engaging with the community and larger world. The University of Chicago provides the city with targeted programs, while the city in turn serves as a living laboratory for addressing social, economic, and education issues on a local, national, and global scale.



Courses

GGSB students are required to take MGCB 31400 **Genetic Analysis of Model Organisms** and HGEN 47300 **Genomics & Systems Biology**. Plus they must take one of the following three courses: MGCB 31000 **Fundamentals in Molecular Biology** or MGCB 31200 **Molecular Biology I** or MGCB 31300 **Molecular Biology II**. Finally, they must take one of the following 4 courses: ECEV 4400 **Fundamentals in Molecular Evolution** or ECEV 35600 **Principles of Population Genetics I** or ECEV 35901 **Evolutionary Genomics** or HGEN **Human Variation and Disease**. Lab rotations are taken in the Winter, Spring and Summer Quarters. Additional requirements are: GENE 31900 **Introduction to Research and BSDG 55000 Scientific Ethics Seminar**. Supplementary training courses may be taken with permission. **Four electives** are chosen from the list below: BIOS 26210 **Mathematical Methods for Biological Sciences** BIOS 28401 **Introduction to Systems Biology II** HGEN 47100 **Introductory Statistical Genetics** HGEN 47400 **Introduction to Probability and Statistics for Geneticists** CMSC 37701A & B **Topics in Bioinformatics** CMSC 37720 **Computational Systems Biology** STAT 2200 **Statistical Methods and Applications** STAT 23400 **Statistical Models/Method** STAT 22600 **Analysis of Qualitative Data** STAT 24400 **Statistical Theory and Methods I** STAT 24500 **Statistical Theory and Methods II** STAT 35500 **Statistical Genetics** CPNS 31000 **Mathematical Methods for Biological Sciences I** CPHY 3500 **Systems Biology, Self-Assembly & Complexity** CMSC 32100 **Programming Languages** CMSC 32200 **Computer Architecture** CMSC 33710 **Scientific Visualization** CMSC 34000 **Scientific Parallel Computing** CMSC 34900 **Topics: Data-Intensive Computing/Big Data** CMSC 37110 **Discrete Mathematics** CMSC 37810 **Mathematical Computation I: Matrix Computation Course** Math 19520 **Mathematical Methods for Social Sciences** Math 19620 **Linear Algebra** Math 19900 **Introduction to Analysis and Linear Algebra** Math 20000 **Mathematical Methods for Physical Sciences I**