Matthew Hin

Curriculum Vitae

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DOCTORAL RESEARCH

"Analysis of Multi-time Scale Frameworks of Electric Power Grid"

My research develops a formal framework with which to analyze models of electric power grids that feature multiple time scales. Specifically, the framework is applied to interfacing transient stability models and electromagnetic transient models for transmission grids. Using geometric singular perturbation theory, we generate a hierarchy of small parameterized, constrained subsystems. A numerical integrator is developed in order to forecast power grid responses to perturbations and is used to assess the framework's ability to approximate trajectories of the full system by candidate orbits of the subsystems. GPU acceleration of the integrator is also employed to scale these computations from small toy grids to full-scale power grids.

EDUCATION

2013 – PRESENT **Doctor of Philosophy**
Center for Applied Mathematics, *Cornell University*

2017 **Master of Science**
Center for Applied Mathematics, *Cornell University*

2009 – 2013 **Bachelor of Science**
Department of Mathematics, *Harvey Mudd College*

TEACHING EXPERIENCE

STARTING SUMMER 2018

Department of Mathematics, Cornell University
ALI Graduate Teaching Assistant

I will be a significant contributor to the design of active learning activities for future introductory calculus courses at Cornell University. I will also work with the department to craft a best practices manual for the administrative and logistical side of a large-scale calculus course. I will also help lead a professional development seminar for instructors focused on teaching large-scale introductory calculus courses.

2013 – PRESENT

Department of Mathematics, Cornell University
Graduate Teaching Assistant

Led recitations for 30-student sections for Calculus I and II, Multivariate Calculus, Differential Equations, and Linear Algebra. Led 30-student sections of Calculus I and II as an instructor. As administrative aide to the head professor, handled coordinated with Student Disability Services to ensure proper accommodations for all students.

SUMMER 2017

College of Engineering, Cornell University
ESMI Facilitator & Academic Excellence Tutor

Created and led workshops on various mathematical modeling frameworks to a class of engineering undergraduates from minority demographics. Advised and mentored small research groups of engineering undergraduates. Led active learning workshops in Linear Algebra.

OUTREACH EXPERIENCE

JANUARY 2018 - JULY 2018

Ithaca High School Math Seminar Leader

Created and led workshops on Python and various numerical methods to a class of high school students. Advised and mentored small groups of high school students on extensions of numerical methods.

OCTOBER 2016

JHU CTY Seminar Leader

Created and led workshops on introducing the mathematical concept of chaos to teenagers and their guardians.

AWARDS

2017 **Graduate Teaching Assistant Award**
Cornell University

2013 **Stavros Busenberg Prize**
Harvey Mudd College

COMPUTER SKILLS

BEGINNER	Mathematica, R, C/C++
INTERMEDIATE	Python, HTML, CSS, Microsoft Windows, Unix Computer Hardware & Support
EXPERT	MatLab, LaTeX

SKILLS

Goal Oriented

I believe in action tempered by meaningful discussion. I listen to everyone's viewpoints and use my judgement to act based on consensus to achieve goals quickly and efficiently.

Communicator

I believe that communication is key inside and outside of academia. I have spent significant time producing content intended for audiences from the general public to academic circles.

Service Oriented

I believe that academics owe a debt to society for enabling their lifestyle. I greatly enjoy volunteering at schools and empowering under-represented communities through science and mathematics.

PUBLICATIONS

Strickland, S. L., **Hin, M.**, Sayanagi, M. R., Gaebler, C., Daniels, K. E., and Levy, R. (2014). Self-healing dynamics of surfactant coatings on thin viscous films, *Phys. Fluids 26:* 042109 (2014).