CHRISTOPHER J. MILES

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EDUCATION

Massachusetts Institute of Technology — Cambridge, MA
Bachelor of Science in Physics with a minor in Mechanical Engineering — Sept 2006 - June 2010

University of Michigan — Ann Arbor, MI
Ph.D. Candidate in Physics — Sept. 2012 – Present
Masters in Applied and Interdisciplinary Mathematics — Sept. 2012 – December 2014
Graduate Certificate in Complex Systems — Jan 2016 – Present

Advisor: Charles Doering (Prof. of Complex Systems, Mathematics, and Physics)

Highlighted Graduate Coursework: Machine Learning, Computer Modeling in Complex Systems, Numerical Methods for Differential Equations, Numerical Linear Algebra, Stochastic Processes, Dynamical Systems and Chaos, Functional Analysis, Complex Analysis, Asymptotic Analysis, Statistical Mechanics, Complex Adaptive Systems, Fractals and Percolation, Mathematical Fluid Mechanics, Quantum Field Theory, Measure Theory, Quantum Mechanics I/II, Electromagnetism

Certificates from online education:
Santa Fe Institute's Introduction to Complexity MOOC — Summer 2015

ACADEMIC RESEARCH EXPERIENCE

MIT Plasma Science and Fusion Center — Cambridge, MA
Undergraduate Researcher — Spring, Summer 2008

General Atomics – Fusion Group — San Diego, CA
Princeton Plasma Physics Laboratory's National Undergraduate Fellowship in Plasma Fusion — Summer 2009
Experimental Research Intern

Nucleation in acoustic droplet vaporization — Ann Arbor, MI
Graduate Student Research Assistant — Spring 2013-July 2016
Principal Investigators: Charles Doering, Oliver Kripfgans (Radiology)

Clusters, confinement, and collisions in active soft matter — Woods Hole, MA
Woods Hole Oceanographic Institution – Geophysical Fluid Dynamics Summer Program — Summer 2016
Research Fellow
Principal Investigators: Michael J. Shelley (NYU, Courant) and Saverio E. Spagnolie (UW-Madison)

Optimal control of fluid mixing (Thesis Project) — Ann Arbor, MI
Graduate Student Research Assistant — Summer 2013-Present
Principal Investigators: Charles Doering

INDUSTRY RESEARCH EXPERIENCE

Continental Tires R&D – Pattern, Contour, and Layout — Hanover, Germany
Mechanical Engineer / Intern — Fall 2010 – Winter 2011

On-Ramp Wireless — San Diego, CA
Communications Physical Layer Systems Engineer / Intern — Summer 2011-Fall 2011

DATA SCIENCE AND MACHINE LEARNING EXPERIENCE

Michigan Datathon hosted by Citadel and Correlation One - *Participant* November 2017

- Selected to participate based on a challenging selective assessment test
- Competed in intensive 7-hour competition with 22 four-person teams.

Santa Fe Institute's Complexity Challenge (pilot) - *Participant* September 2017

- Used a multi-agent reinforcement learning approach to address the research challenge problem

UNIVERSITY SERVICE

Complex Systems Advanced Academic Workshop – Co-organizer 2015-2017
Faculty Advisor: Rick Riolo

- Organize biweekly meetings for graduate student talks, journal discussions, and tutorials
- Organized *Introduction to Agent-Based Modeling* short course taught by Bill Rand (July 2015)
- Organized *Complex Systems Research Hackathon* (September 2016)
- Organized *Evolutionary Game Theory short course* (July 2017)

TEACHING AND GRADING EXPERIENCE

Introduction to Mechanics: Lab. Course - *Graduate Student Instructor* Ann Arbor, MI Fall 2013-Fall 2014
Electromagnetism II - *Grader* Ann Arbor, MI, Spring 2015
Evolutionary Game Theory - *Grader* Ann Arbor, MI, Fall 2016
Electromagnetism (Honors) – *Graduate Student Instructor* Ann Arbor, MI, Winter 2017

AWARDS AND FELLOWSHIPS

National Undergraduate Fellowship in Plasma Science and Fusion Technology Summer 2009
University of Michigan's Rackham Merit Fellowship June 2012-Present
Woods Hole Oceanographic Institute's Geophysical Fluid Dynamics Fellowship Summer 2016

WORKSHOPS AND CONFERENCES

Control theory short course – University of Minnesota, Twin Cities Minneapolis, MN, June 2014
Turbulent transport and mixing workshop - IPAM, UCLA Los Angeles, CA, October 2014
APS Meeting – Division of Fluid Dynamics Boston, MA, November 2015
Extreme events and criticality in fluid mechanics - The Fields Institute, U. of Toronto Toronto, ON, January 2016
Challenges in non-equilibrium statistical physics and fluid dynamics - BYU Provo, UT, May 2016
Genetic programming: theory and practice Ann Arbor, MI, May 2016
APS Meeting – Division of Fluid Dynamics Portland, OR, November 2016
Turbulent dissipation, mixing, and predictability workshop - IPAM, UCLA Los Angeles, CA, January 2017
Santa Fe Institute's Complex Systems Summer School Santa Fe, NM, June 2017

PRESENTATIONS

Optimal fluid mixing (Complex Systems Adv. Academic Workshop (CSAAW), Ann Arbor, MI) 2014
Optimization tutorial and fluid mixing (CSAAW, Ann Arbor, MI) 2015
A shell model for optimal fluid mixing (Applied Math Student Seminar, Ann Arbor, MI) 2015
Optimal control of a shell model for mixing (APS Meeting – Division of Fluid Dynamics, Boston, MA) 2015
A shell model for optimal fluid mixing (IOE Student Seminar, Ann Arbor, MI) 2015
Clusters, confinement, and collisions in active soft matter (CSAAW, Ann Arbor, MI) 2016
Clusters, confinement, and collisions in active soft matter (Applied Math Student Seminar, Ann Arbor, MI) 2016
Nucleation pressure threshold in acoustic droplet vaporization (APS–Div. of Fluid Dynamics, Portland, OR) 2016

PUBLICATIONS

1. L. Bromberg, P. C. Michael, J. V. Minervini, C. J. Miles, Current lead optimization of cryogenic operation at intermediate temperature in *Transactions of the cryogenic engineering conference,* AIP Conference Proceedings **1218**, 577, 2010

2. L. Bromberg, P. C. Michael, J. V. Minervini, C. J. Miles, Coolant topology options for high temperature superconducting transmission and distribution systems, in *Transactions of the cryogenic engineering conference,* AIP Conference Proceedings **1218**, 871, 2010
3. C. J. Miles, C. R. Doering, O. D. Kripfgans, Nucleation pressure threshold in acoustic droplet vaporization, *Journal of Applied Physics* **120**, 034903, 2016
4. C. J. Miles, C. R. Doering, A shell model for optimal mixing, *Journal of Nonlinear Science*, 2017
5. C. J. Miles, C. R. Doering, Diffusion-limited mixing by incompressible flows, (submitted to *Nonlinearity*)
6. C. J. Miles, Michael J. Shelley, and Saverio E. Spagnolie, Unstable invasion of active matter into a fluid, To appear in *WHOI GFD 2016 Proceedings* and in preparation for submission to *Physical Review Fluids*