

# CHRISTOPHER J. MILES

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## EDUCATION

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

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

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

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

### *Mass Open Online Course:*

Introduction to Complexity – Santa Fe Institute (earned certificate of completion) 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

## 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)
- Organizing *Evolutionary Game Theory* short course (July 2017)

## TEACHING AND GRADING EXPERIENCE

Introduction to Mechanics: Lab. Course - <i>Graduate Student Instructor</i>	Ann Arbor, MI	Fall 2013-Fall 2014
Electromagnetism II - <i>Grader</i>	Ann Arbor, MI,	Spring 2015
Evolutionary Game Theory - <i>Grader</i>	Ann Arbor, MI,	Fall 2016
Electromagnetism (Honors) – <i>Graduate Student Instructor</i>	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
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. Current lead optimization of cryogenic operation at intermediate temperature, L. Bromberg, P. C. Michael, J. V. Minervini, C. J. Miles, in *Transactions of the cryogenic engineering conference*, AIP Conference Proceedings **1218**, 577, 2010
2. Coolant topology options for high temperature superconducting transmission and distribution systems, L. Bromberg, P. C. Michael, J. V. Minervini, C. J. Miles, in *Transactions of the cryogenic engineering conference*, AIP Conference Proceedings **1218**, 871, 2010
3. Nucleation pressure threshold in acoustic droplet vaporization, C. J. Miles, C. R. Doering, O. D. Kripfgans, *Journal of Applied Physics* **120**, 034903, 2016
4. A shell model for optimal mixing, C. J. Miles, C. R. Doering, *Journal of Nonlinear Science*, 2017
5. Unstable invasion of active matter into a fluid, C. J. Miles, Michael J. Shelley, and Saverio E. Spagnolie. To appear in *WHOI GFD 2016 Proceedings* and in preparation for submission to *Soft Matter*