

# Lee M. Gunderson

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## Education

### Princeton University

Princeton, NJ, USA

#### PHD CANDIDATE IN PLASMA PHYSICS

May 2020 (expected)

- *Dissertation*: “Solar Equilibrium à la Grad-Shafranov”, *Advisor*: Amitava Bhattacharjee
- *Select courses (hyperlinked)*: Analytical techniques & differential equations, Differential geometry in plasma physics, Computational complexity, Mathematical physics, Plasma waves & instabilities, Nonlinear processes in fluids & plasmas, Irreversible processes in plasmas, Computational methods in plasma physics, Arithmetic of elliptic curves, Quantum field theory, Matroid theory

### University of Michigan

Ann Arbor, MI, USA

#### BSE IN NUCLEAR ENGINEERING AND RADIOLOGICAL SCIENCES

Spring 2012

- *GPA*: 3.99/4.00
- *Select courses*: Partial differential equations, Dynamical systems, Thermodynamics, Real analysis, Complex analysis, Abstract algebra, Music theory

## Publications

- **LM Gunderson\*** & G Bravo-Hermesdorff\*. **INTRODUCING GRAPH CUMULANTS: WHAT IS THE VARIANCE OF YOUR SOCIAL NETWORK?**
- G Bravo-Hermesdorff\* & **LM Gunderson\***. **A UNIFYING FRAMEWORK FOR SPECTRUM-PRESERVING GRAPH SPARSIFICATION AND COARSENING.** *Neural Information Processing Systems (NeurIPS)*, 2019 ([link](#))
- G Bravo-Hermesdorff, V Felso, E Ray, **LM Gunderson**, ME Helander, J Maria & Y Niv. **GENDER AND COLLABORATION PATTERNS IN A TEMPORAL SCIENTIFIC AUTHORSHIP NETWORK.** *Applied Network Science*, 2019 ([link](#))
- **LM Gunderson** & A Bhattacharjee. **A MODEL OF SOLAR EQUILIBRIUM: THE HYDRODYNAMIC LIMIT.** *The Astrophysical Journal*, 2019 ([link](#))
- D Pfefferlé, **LM Gunderson**, SR Hudson & L Noakes. **NON-PLANAR ELASTICAE AS OPTIMAL CURVES FOR THE MAGNETIC AXIS OF STELLARATORS.** *Physics of Plasmas*, 2018 ([link](#))
- SR Hudson, C Zhu, D Pfefferlé & **LM Gunderson**. **DIFFERENTIATING THE SHAPE OF STELLARATOR COILS WITH RESPECT TO THE PLASMA BOUNDARY.** *Physics Letters A*, 2018 ([link](#))
- DE Ruiz, **LM Gunderson**, MJ Hay, E Merino, EJ Valeo, SJ Zweben & NJ Fisch. **AERODYNAMIC FOCUSING OF HIGH-DENSITY AEROSOLS.** *Journal of Aerosol Science*, 2014 ([link](#))

\* denotes equal contribution

## Research

### DESIGN OF A NOVEL VACUUM TUBE DEVICE

Summer 2011

- Conducted simulations to demonstrate the feasibility of a hybrid traveling wave tube concept
- Mark Kirshner — L3 Communications, Electron Devices Division, San Carlos, CA

### SIMULATION OF RELATIVISTIC LASER-PLASMA INTERACTIONS

Fall 2010

- Conducted particle-in-cell simulations of photon interactions with relativistic electron beams
- Alexander Thomas — Center for Ultrafast Optical Sciences, University of Michigan

### CHARACTERIZATION OF GAS JETS FOR USE IN LASER WAKEFIELD ACCELERATION

Summer 2010

- Constructed an interferometer and used tomographical techniques to reconstruct the density of a supersonic gas jet
- Victor Malka — Laboratoire d'Optique Appliquée, Palaiseau, France

### ASYMPTOTIC ANALYSIS OF COARSENING/NUCLEATION DYNAMICS

Summer 2009

- Research paper: *Long Time Behavior of a Modified Becker-Döring System: Initial Conditions Without Compact Support*
- Peter Smereka — Department of Mathematics, University of Michigan

### RECONSTRUCTION OF CAPACITOR BANKS FOR PULSED POWER EXPERIMENTS

2009 — 2010

- Rebuilt Marx generator for relativistic magnetron, rebuilt Linear Transformer Driver, assembled vacuum chamber, drafted parts in SolidWorks
- Ronald Gilgenbach — Plasma, Pulsed Power, and Microwave Lab, University of Michigan

# Presentations

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## Talks

- **GRAPH REDUCTION BY EDGE DELETION AND EDGE CONTRACTION.** *Ninth International Conference on Complex Systems, 2018* ([link](#))
- **GRAPH REDUCTION BY EDGE DELETION AND EDGE CONTRACTION.** *Society for Industrial and Applied Mathematics Annual Meeting, 2018*
- **A GRAD-SHAFRANOV MODEL OF SOLAR EQUILIBRIUM.** *Waves, Turbulence, and Large-Scale Structures in Rotating Magnetic Fluids, 2018*
- **A GRAD-SHAFRANOV MODEL OF EQUILIBRIUM SOLAR BEHAVIOR.** *Max Planck Princeton Center (MPPC) Workshop on Plasma Processes in Astrophysics and Fusion Energy, 2018*

## Posters

- *International Conference on Mathematical Neuroscience (Boulder, CO), 2017*
- *APS Division of Plasma Physics, 59th Meeting (Milwaukee, WI), 2017*
- *APS Division of Plasma Physics, 58th Meeting (San Jose, CA), 2016*
- *American Geophysical Union (San Francisco, CA), 2015*
- *APS Division of Plasma Physics, 57th Meeting (Savannah, GA), 2015*
- *NASA LWS Workshop on Solar Dynamo Frontiers (Boulder, CO), 2015*
- *APS Division of Plasma Physics, 56th Meeting (New Orleans, LA), 2014*
- *APS Division of Plasma Physics, 55th Meeting (Denver, CO), 2013*

# Awards

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- **HENRY FORD II PRIZE:** College-wide award to a third-year engineering student (\$10,000) 2011
- **UNDERGRADUATE AMERICAN NUCLEAR SOCIETY (ANS) SCHOLARSHIP** 2010 & 2011
- **NUCLEAR ENERGY UNIVERSITY PROGRAMS (NEUP) SCHOLARSHIP** 2009 & 2010
- **KIKUCHI SCHOLARSHIP:** Award to a second-year nuclear engineering student (\$3,000) 2009
- **ARTHUR B. SINGLETON PRIZE:** College-wide award to a first-year engineering student (\$3,500) 2009
- **MANDLEBAUM SIMON SCHOLAR:** Scholarship from the University of Michigan (\$11,000/yr) 2008
- **GENERAL MOTORS COMMUNITY RELATIONS SCHOLARSHIP AND INTERNSHIP** 2008
- **SILVER AWARD (7<sup>th</sup> PLACE) IN MICHIGAN MATH PRIZE COMPETITION** 2007

# Teaching

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### INSTRUCTIONAL ASSISTANT

Fall 2011

- First-year nuclear engineering course, "Understanding Radiation"
- Ran weekly lab session, helped students with material, and graded homework and presentations
- Alexander Thomas — Nuclear Engineering and Radiological Sciences, University of Michigan

### TUTOR

2009 — 2012

- Private tutor for nuclear engineering, mathematics, and physics, primarily for junior and senior level courses required for Nuclear Engineering
- Pamela Derry — Nuclear Engineering and Radiological Sciences, University of Michigan

### OUTREACH (DAPCEP)

2010 — 2011

- In 2010, volunteered for DAPCEP (Detroit Area Pre-College Engineering Program)
- In 2011, planned and ran the 6 weekend sessions of math and physics lessons ([link](#))

# Extracurricular

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### EAGLE SCOUT

Spring 2008

- Organized construction of reinforcing steps on an eroding path in Nichols Arboretum (Ann Arbor, MI)

### A CAPPELLA

2006 — 2019

- Member of *Jersey Transit* (2013 — 2019) ([link](#))
- Member of *Compulsive Lyres* at the University of Michigan (2009 — 2012) ([link](#))
- Member of *The Pioneers* at Pioneer High School (2007 — 2008)
- Member of *Desperate Measures* at Pioneer High School (2006 — 2007)