Lee M. Gunderson

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Education

University College London, Gatsby Computational Neuroscience Unit *London, UK*

Postdoctoral Researcher *January 2021 – Present*

- Developing a method for recovering graph distributions from subgraph densities by extending Prony's method to higher order statistics.
- *Advisor*: Peter Orbanz

Princeton University *Princeton, NJ, USA*

PhD in Astrophysics — Plasma Physics *June 2020*

- *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*

B.S.E. in Nuclear Engineering and Radiological Sciences, Minor in Mathematics *Spring 2012*

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

Publications

- G Bravo-Hermsdorff, **LM Gunderson**, P-A Maugis, CE Priebe. A principled (and practical) test for network comparison. *(link)*
- N McGreivy, C Zhu, **LM Gunderson**, SR Hudson. Computation of the Biot-Savart line integral with higher-order convergence using straight segments. *Physics of Plasmas*, *2021 (link)*
- **LM Gunderson*** & G Bravo-Hermsdorff*. Introducing graph cumulants: What is the variance of your social network? *(link)*
- G Bravo-Hermsdorff* & **LM Gunderson***. A unifying framework for spectrum-preserving graph sparsification and coarsening. *Neural Information Processing Systems (NeurIPS)*, *2019 (link)*
- G Bravo-Hermsdorff, 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

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*
- *American Geophysical Union, Fall Meeting (New Orleans, LA)*, *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, Fall Meeting (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

- **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^{th} place) in Michigan Math Prize Competition** *2007*

Teaching

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

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)*