Jordan Kemp *Physics Ph.D Candidate, University of Chicago* mobile: 610-603-6372
B.S. in Physics, Tufts University email: jtk296@gmail.com

Research Experience

University of Chicago, Mansueto Institute/Murugan Lab *Graduate RA* August 2020-Present
Studying cooperation and inequality through the intersection of dynamical systems and information theory

- *Theory:* Independently derived closed-form expressions for various stochastic processes.
- *Programming:* Monte-Carlo simulations of stochastic agent-based models. Census data processing, curve fitting, and Bayesian optimization

University of Chicago, Bernien Lab *Graduate Research Assistant* Oct 2018-Oct 2020
Founding graduate student in an atomic physics lab simulating quantum systems using trapped atoms

- *Lab:* Implementing high-precision laser network for manipulating individual Rubidium and Cesium atoms using dynamically driven optical tweezers; CAD design/fabrication of equipment
- *Programming:* Hardware-accelerated dynamic computation of atom rearrangement RF tones, interfaced with arbitrary waveform generator (C++).
- *Theory:* Computational analysis of tight-binding Hamiltonians (Python); Metric development and analysis for computationally characterizing topological Hamiltonians.

MIT, Metric Geometry and Gerrymandering Group *Research Intern* Jun-Jul 2018
Summer research program utilizing mathematical techniques to address congressional redistricting issues

- *Programming:* Refactored Wisconsin voter data from disparate sources (Python);
- *Theory:* Application of Shannon information in studying county splitting; Developing discrete compactness methods for Gerrymandering analysis

California Institute of Technology, LIGO SURF: *Summer REU* Mar-Oct 2017
Cryogenic temperature control and error propagation modeling for LIGO Voyager R&D

- *Lab*: Conducting cryogenic measurements; Analyzing silicon disk mechanical spectrum using optical lever
- *Theory*: Designing and implementing error propagation model for coupled oscillators (Mathematica)

Tufts University, Surface Physics Lab: *Research Assistant* May 2016-May 2018
Exploring the effects of surface scatterers on the conductivity of metal nanocrystals.

- *Lab:* Assembling ultra-high vacuum chamber; interfacing spectroscopy and RGA modules; designing PID heating system and cooling fluid transportation network
- ***Senior Thesis***: Simulating the effects of surface defects on thin-metal conductivity (Python).

Teaching Experience

University of Chicago: *Teaching Assistant*

- Data Science for Energy & Environmental Research Bootcamp Sep 2020
- ENST 246: Introduction to Urban Science Oct 2020-Oct 2022

Oral and Poster Presentations

Bayesian Origins of Growth, Cooperation, and Inequality in populations of learning agents Mar 2023
Accepted Abstract, APS March Meeting

Dynamics of Inequality in Stochastic Models of Growth and Bayesian Origin of Growth Rates Jul 2022
Invited Speaker, London Mathematical Laboratory

Probing Topological Quantum Systems with Cold Atoms Nov 2019
Accepted Abstract, NSBP Annual Conference

A Cryogenic Testbed for High-Q Thin Films and Optical Coatings May 2019
Poster Session, APS DAMOP Annual Conference

Producing Behaviors of the Free Electron Model using N-Body Random Walks May 2018
Invited Speaker, Concord Consortium

Temperature Control and Coupled Oscillator Modeling for LIGO Voyager R&D Nov 2017
Invited Speaker, NSBP Annual Conference

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Selected Publications

The Bayesian Origins of Growth Rates in Stochastic Environments
JT Kemp, L Bettencourt, arXiv preprint arXiv:2209.09492. 2022

Statistical Dynamics of Wealth Inequality in Stochastic Models of Growth
JT Kemp, LMA Bettencourt, Physica A Vol 607, 128180. 2022

Dual-element, two-dimensional atom array with continuous-mode operation
K Singh, *et. al.*, Physical Review X 12 (1), 011040. 2022

Awards and Recognition

National Science Foundation Graduate Research Fellowship Apr 2020
Best Speaker in Photonics and Optical Physics Nov 2019
National Society of Black Physicists Annual Conference

Carl Rousse Fellowship Jul 2017
Caltech LIGO, National Society of Black Physicists

Leadership Experience

Equity, Diversity, and Inclusion Office, UChicago PSD: *Student Advisor* Feb 2018-Present

- Organizing events for the graduate student body focused on engendering community focused on marginalized identities.
- Spoke at diversity recruitment panels, and recruited on behalf of the division in national conferences.
- Mentoring fellow graduate students

Tufts Community Union: *Class of 2018 Senator* May 2017-May 2018

- Established senior thesis support group, and ran campaign assessing state of social, academic, and living spaces of Tufts campus culminating in end-of-year report and presentation

Society of Physics Students, Tufts University Chapter: *Vice President* May 2017 - May 2018

- Coordinated research symposiums, educational talks by Tufts and outside researchers. Planned community outreach events.

Tufts Club Basketball: *Founder/President* Sep 2016-May 2018
A club to foster community of basketball players and fans at Tufts.

- Managed competition team by coordinating games with other Boston area schools.

Skills

Technology: C++/C, Python, LaTex, Django, Mathematica, HTML/CSS, Regression fitting, ARCGIS, Photoshop, DAQ, analog circuits, communications management
Languages: Intermediate German, beginner Chinese Hebrew, and French
Interpersonal: Enthusiastically collaborates as member of group. Able to enter new space, learn skills, and promptly become a productive member. Reliably completes independent tasks on time