

Daniel Tamor Liu Citron

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EDUCATION

Cornell University	Ithaca, NY
Ph.D. Theoretical Physics; Experimental Physics Minor	2011 – Present
M.S. Physics	2014
Committee: Christopher R. Myers, Chair; Paul Ginsparg; Paul McEuen	
University of Chicago	Chicago, IL
B.A. Physics with Honors	2009
Senior Honors Thesis: “Simulating Jamming in Granular Materials”	

AWARDS & FELLOWSHIPS

NSF Graduate Research Fellowship (Cornell University)	2012
Phi Beta Kappa (University of Chicago)	2009

RESEARCH INTERESTS

- Modeling infectious disease dynamics
- Stochastic processes
- Statistical physics
- Collaboration network assembly
- Social network analysis
- Data science

DATA SCIENCE PROJECTS

Network Assembly in Scientific Collaboration Networks	Ithaca, NY
Graduate Research Assistant, Cornell University	2016
Complex Systems Summer School, Santa Fe Institute	2015
<ul style="list-style-type: none">– Used topic modeling software to detect subfields of articles in a large scientific corpus– Created Python tools for studying development of scientific collaboration networks– Measured patterns in network community formation across variety of scientific subfields	
Measuring Patterns in Text Reuse in Scholarly Corpus	Ithaca, NY
Graduate Research Assistant, Cornell University	2012
<ul style="list-style-type: none">– Converted raw data into social network dataset for easy visualization and exploration– Measured rate and distribution of text reuse in online database of scientific articles (arXiv)– Discovered negative correlation between citation count and amount of reused text	

MODELING PROJECTS

Contact Network Heterogeneity and Persistence of Disease	Ithaca, NY
Graduate Research Assistant, Cornell University	2014 – Present
<ul style="list-style-type: none">– Derived and numerically solved equations describing disease model on annealed networks– Utilized computer simulations to verify and augment the numerical results– Explored how contact network heterogeneity increases disease persistence	

Infectious Disease Dynamics

Ithaca, NY

Graduate Research Assistant, Cornell University

2013 – Present

- Programmed a variety of software tools for simulating disease dynamics in Python and Julia
- Performed mathematical analyses of stochastic models using moment closure techniques

SOFTWARE AND HARDWARE DEVELOPMENT

Synchrotron X-Ray Tomography Experiment

Argonne National Lab, Chicago IL

Research Support Staff, GSECARS

2010 – 2011

- Improved synchrotron X-ray tomography experiment at Advanced Photon Source
- Rewrote IDL software to allow for faster tomographic data collection
- Redesigned user interface for controlling tomography experiment
- Designed and built optical mount for new tomography experiment apparatus

Software Testing of Implantable Medical Device

Yehud, Israel

Biomedical Engineering Intern, Biocontrol Medical

2009

- Designed firmware test protocol for electronic wand used to communicate with the device
- Performed tests on software for programming the device

TECHNICAL SKILLS

Programming Languages and Tools

- Python, Mathematica, SQL, Julia, HTML, Git, Unix, Matlab, Octave

Methods

- Discrete- and Continuous-time Stochastic Models, Dynamical Models on Complex Networks
- Computational Network Analysis, Topic Modeling (MALLET)

PUBLICATIONS

- Daniel T. Citron, Christopher R. Myers. “Contact Network Heterogeneity and the Persistence of Endemic Disease.” In preparation
- Daniel T. Citron, Samuel F. Way. “Topological Transitions in Scientific Collaboration Networks.” In preparation
- Daniel T. Citron, Paul Ginsparg. “Patterns of Text Reuse in a Scientific Corpus.” PNAS 2014; published ahead of print December 8, 2014, DOI:10.1073/pnas.1415135111
- Mark L. Rivers, Daniel T. Citron, Yanbin Wang. “Recent Developments in Computed Tomography at GSECARS,” Proc. SPIE 7804, 780409 (2010), DOI:10.1117/12.861393
- X. Cheng, G. Varas, D. Citron, H. Jaeger, and S. Nagel. “Collective Behavior in a Granular Jet: Emergence of a Liquid with Zero Surface Tension,” Physical Review Letters, Vol. 99, Nov. 2007

CONFERENCES AND WORKSHOPS

Network Assembly in Scientific Collaboration Networks

Northwestern U.

International Conference on Computational Social Science

June, 2016

Network Analysis of ArXiv

Santa Fe Institute

SFI Complex Systems Summer School 2015

June, 2015

Moment Closure Analysis of SIRS Disease Model on Heterogeneous Networks

APS March Meeting 2015

March, 2015

Accounting for Fluctuations in Stochastic SIRS Model on Networks

U. of Pittsburgh

International Workshop on Advances in Discrete Networks

December, 2014

GRADUATE COURSEWORK

Complex Systems Summer School

Santa Fe Institute, Summer 2015

- Computational complexity, social network modeling and analysis, agent-based modeling

Machine Learning

Coursera, Summer 2014

- Logistic regression, neural networks, clustering, principle component analysis

Introduction to Data Science

Coursera, Summer 2014

- SQL, MapReduce, decision trees and random forests, model cross-validation

Computational Physics

Cornell University, Spring 2014

- Linear algebra, numerical methods for differential equations, Monte Carlo, optimization

Applied Stochastic Processes

Cornell University, Fall 2013

- Markov Processes, branching processes, random walks, Martingales, renewal theory

Nonlinear Dynamics and Chaos

Cornell University, Spring 2013

- Bifurcations; nonlinear oscillators, iterated mappings, chaos, attractors, fractals

TEACHING EXPERIENCE

Instructor

Cornell University

Physics GRE Preparation Short Course

Spring 2013, 2014, 2015, 2016

- Designed syllabus and lecture slides for 6-week course
- Gave lectures and led discussions to review undergraduate physics material for exam

Teaching Assistant

Cornell University

Electricity and Magnetism (honors sequence)

Spring 2016

Mechanics and Special Relativity (honors sequence)

Fall 2014, 2015

Introduction to Electricity and Magnetism

Spring 2012

Mechanics and Heat

Fall 2011

EDUCATION COURSEWORK

An Introduction to Evidence-Based Undergraduate STEM Teaching

Fall 2016

CIRTL online course, administered through edX

- Participated in weekly Cornell campus discussion group
- Reviewed current research-supported trends in undergraduate STEM teaching
- Applied new knowledge of active learning to develop an annotated example lesson plan

Teaching in Higher Education

Cornell University, Spring 2016

- Developed a syllabus and example lesson plan for introductory physics courses
- Presented on and demonstrated use of peer instruction and other active learning techniques

SERVICE

Destination Imagination

Central New York

Board Member and Volunteer

Spring 2015 – Present

- Organized and supervised two large events with 50-100 K12 students
- Supervised educational team-building exercises with groups of 5-10 K12 students

Cornell Center for Materials Research Outreach

Cornell University

Volunteer

Summer 2014 – Present

- Conducted science outreach with 10-30 elementary school students
- Performed physics and chemistry demonstrations and explained basic scientific concepts
- Supervised small groups of 2-3 students to help them conduct simple experiments

Graduate & Professional Students Assembly

Cornell University

Chair, Faculty Awards Committee

Fall 2014 – Fall 2015

Physics Field Representative

Fall 2013 – Spring 2016

- Attended biweekly meetings to discuss issues and initiatives relevant to graduate students
- Communicated with peers in physics department about events and other GPSA activities
- Planned faculty awards ceremony with small group of graduate student peers

Physics Graduate Society

Cornell University

Treasurer, Event Coordinator

Summer 2012 – Spring 2013

- Organized lecture on science communication given by extra-departmental speaker
- Organized STEM graduate student summer colloquium series
- Conducted science outreach activities with community elementary school students and parents

University of Chicago Scavenger Hunt

University of Chicago

Judge (event organizer)

2009 – 2014

- Collaborated closely with group of 15-20 individuals to plan four day University-wide event
- Organized successful Guinness World Record as World's Largest Scavenger Hunt in 2011

UNDERGRADUATE RESEARCH

Two-Dimensional Jamming Transition

Chicago, IL

Undergraduate Research Assistant, University of Chicago

2008 – 2009

- Developed computer simulation in Fortran to explore jamming transition in soft discs
- Studied behavior of system's displacement field above and below jamming
- Collaborated with an experimentalist to compare simulation results to real-world phenomena

Simulating Role of Friction in Granular Physics

Santiago, Chile

Undergraduate Research Assistant Universidad de Chile

Summer 2008

- Utilized molecular dynamics software to simulate a shaken quasi-2D granular system
- Performed mathematical analysis of simulation outputs to calculate structure factor
- Investigated the role of friction in creating/destroying long-range order

Numerical Modeling of Cell Division

Chicago, IL

University of Chicago Physics REU

Summer 2007

- Modeled cell division as a viscous fluid drop pinching off
- Numerically solved differential equations of fluid motion in mathematica

Measurements of Granular Jet Behavior

Chicago, IL

University of Chicago Physics REU

Summer 2006

- Studied the rebound behavior of a granular jet striking a target at high velocity
- Collected and analyzed experimental data using high-speed video camera
- Empirically compared the granular jet's behavior to a fluid with zero surface tension