

eddielee

social physics

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languages

spanish
korean
french
german

programming

eltrompetero@github
Python
MATLAB
R
Mathematica
C++
Bash

big questions

What universal principles underlie collective human behavior across societies through time and space? I use concepts, intuition, and models from statistical physics to search for fundamental and quantitative, perhaps physical, principles that govern collective human phenomena. I explore such questions in the context of voting and conflict.

education

2018-2019(?)	PhD candidate in Theoretical Physics <i>Advisor Professor Paul Ginsparg</i>	Cornell University
2018	M.S. in Physics	Cornell University
2008-2012	A.B. in Physics, <i>cum laude</i> <i>Certificate in Biophysics</i>	Princeton University

positions held

since 2018	Graduate Research Fellow <i>Criticality in armed human conflict.</i>	Santa Fe Institute
2015-2018	Research assistant <i>Theoretical analysis of plastic deformation & built experiments in virtual reality for exploring human motion coordination.</i>	Dept. of Physics, Cornell University
2014-2015	Graduate teaching assistant <i>Intro. to electrostatics. Intro to optics, quantum mechanics.</i>	Dept. of Physics, Cornell University
2013-2014	Research associate <i>Temporal and strategic dynamics of conflict in primates.</i>	Wisconsin Institute for Discovery
2012-2013	Research associate <i>Information theoretic approaches to voting in the US Supreme Court and Congress.</i>	Princeton University
2011	Edward A. Knapp Fellow <i>Research Experience Undergraduate.</i>	Santa Fe Institute
2010-2011	Peer Tutor <i>Peer tutor in Spanish and Physics.</i>	Princeton University
2010	Laboratory intern <i>Infectivity of recombinant HIV.</i>	Instituto de Salud Carlos III, Spain
2009	Laboratory assistant <i>Topology of sphingolipids with genetic cloning methods.</i>	USUHS of Dept. of Defense, Bethesda

grants, honors, awards

2018	Shirley Chan Travel Grant <i>Award by APS DBIO.</i>	\$400
2017	Grant from Army Research Office <i>“Determining the limits of human coordination” with Professor I. Cohen.</i>	\$60,000
2016	Poster Award <i>“Learning to dance like a physicist”</i>	Active Matter, Syracuse
2015	Best Poster Prize <i>Poster on “War & peace.”</i>	Computational Social Science Summit, Northwestern University
	Dirksen Center Congressional Research Grant <i>Funding to study influential voters in Congress using machine learning.</i>	\$2,000
	NSF Graduate Research Fellowship <i>Competitive national competition to fund graduate education.</i>	
2013	Member of American Physical Society <i>National society for physicists.</i>	
	Sigma Xi Research Showcase, Divisions 1st Place <i>National competition. Presented “Statistical mechanics of the US Supreme Court.”</i>	
2012	Elected Member of Sigma Xi Society <i>National society for scientists.</i>	Dept. of Physics, Princeton University
	Kusaka Memorial Prize <i>For excellence in undergraduate research.</i>	Dept. of Physics, Princeton University
	Book Prize in German <i>For excellence in German.</i>	Dept. of German, Princeton University
2011	Kusaka Memorial Prize <i>For excellence in undergraduate research.</i>	Dept. of Physics, Princeton University
2010	Health Grand Challenges Initiative Grant <i>To fund travel to Spain to study HIV.</i>	Princeton Environmental Institute
2008	Vice President of winning team Best Male Speaker Award <i>International Space Settlement Design Competition, NASA International competition for high school students hosted by NASA for designing a future settlement orbiting Earth.</i>	
	National Merit Scholar <i>National award for high school students for academic excellence.</i>	

publications

Published

1. Lee, Edward D. “Partisan intuition belies strong, institutional consensus and wide Zipf’s law for voting blocs in US Supreme Court.” *Journal of Statistical Physics* (2018).
2. Lee, Edward D., Daniels, Bryan C., Krakauer, David C. & Flack, Jessica C. “Collective memory in primate conflict implied by temporal scaling collapse.” *Journal of the Royal Society Interface* (2017).
3. Sethna, J.P., Bierbaum, M.K., Dahmen, K.A., Goodrich, C.P., Greer, J.R., Hayden, L.X., Kent-Dobias, J.P., Lee, E.D., Liarte, D.B., Ni, X. and Quinn, K.N. “Deformation of crystals: Connections with statistical physics.” *Annual Review of Materials Research* (2017).

4. Lee, Edward D., Chase P. Broedersz, and William Bialek. "Statistical Mechanics of the US Supreme Court." *Journal of Statistical Physics* (2015).
5. Lee, E., Bryan C. Daniels, David C. Krakauer & Jessica C. Flack. "Capturing collective conflict dynamics with sparse social circuits." arXiv cs.SI, (2014).

Under review

1. Lee, Edward D., Esposito, Edward, Cohen, Itai. "Audio cues enhance coordination of motion when visual cues are scarce" (2018). Submitted.
2. Lee, Edward D., Daniels, Bryan C. "Convenient Interface to Inverse Ising (ConIII): A Python package for solving maximum entropy models." arXiv.org q-bio.QM, (2018). Under review.

In preparation

1. Lee, E. D., Daniels, B. C., Krakauer, D. C. & Flack, J. C. Coarse graining armed conflict.
2. Lee, E. D., Liarte, D., Raju, A., & Sethna, J. Bethe lattice model for the deformation of amorphous solids.

posters, presentations, workshops & lectures

Invited

2018	"Renormalization group & armed human conflict"	Santa Fe Institute
	"Statistical physics of collective behavior"	Santa Fe Institute
2016	"Voting in the Supreme Court, conflict in pigtailed macaques, & statistical physics"	Santa Fe Institute
	"Partitioning social circuits"	Santa Fe Institute
	Workshop on collective cognition	Santa Fe Institute
2013	"Sound arguments with sonic eloquence"	Humanities Hackathon
	"Simplifying the complex"	Complex Systems & Systems Biology Group, Northwestern University
	"From complex to simple: A principled approach to social behavior"	Computational Social Workshop, University of Chicago
2012	"Speculating on human behavior: A physicist's perspective"	VIS Seminar Series of the Center for Complexity & Collective Computation

Abstract submitted

2018	"Keeping it together: How humans coordinate motion with low information"	March APS, LA
	"Collective memory in primate conflict implied by temporal scaling collapse"	Bifi, Zaragoza
2016	"A Bethe-lattice-like mean-field model for the plastic deformation of amorphous solids"	Statphys, Lyon
	"Learning to dance like a physicist"	Active Matter, Syracuse
	"A Bethe-lattice-like mean-field model for the plastic deformation of amorphous solids"	APS, Baltimore
	"Scaling in the conflict dynamics of pigtailed macaques"	Cornell University

2015	"It takes two to tango"	Cornell University
	"War & peace"	Computational Social Science Summit, Northwestern University
	"Statistical mechanics of the US Supreme Court"	First US-China Young Physicists Forum, American Physical Society
2014	"Statistical mechanics of the US Supreme Court"	Cornell University
	"War & peace in an animal society"	Collective Intelligence
	"War & peace in an animal society"	NetSci
	"Statistical mechanics of the US Supreme Court"	American Physical Society
	"War & peace in an animal society"	Dynamics Days
2013	"Statistical mechanics of SCOTUS"	109th Statistical Mechanics Conference
	"Inductive games on a sparse strategic lattice"	NetSci
2012	"Conflict and macaques: A statistical mechanics view on asymmetries in social interactions"	Integrated Behavioral Research Group, Princeton

media & outreach

2018	<p>Supreme Court paper in the Cornell Chronicle http://news.cornell.edu/stories/2018/10/doctoral-student-applies-physics-modeling-voting-scotus-super-court</p> <p>Supreme Court paper in Ars Technica https://arstechnica.com/science/2018/10/study-magnetism-model-reveals-long-term-non-partisan-nature-of-scotus/</p> <p>Cornell Center for Material Research outreach volunteer</p>	
2014	<p>Co-director of Educational Outreach Initiative by the Center for Complexity & Collective Computation Wisconsin Institute for Discovery <i>Developed and taught curricula on complex systems for middle and high school students in coordination with the Outreach Center.</i></p> <p>"Criticality in biological systems" http://wid.wisc.edu/wid-picks/criticality-in-biological-systems/ Featured essay</p>	
2013	<p>Volunteer at Wisconsin Science Festival <i>Science festival drawing parents and students from around the state.</i></p> <p>Discovery Journal Club Coordinator Wisconsin Institute for Discovery</p> <p>"Dwarf Fortress: Just another computer game?" https://wid.wisc.edu/wid-culture/ Featured essay</p> <p>Lecturer at the Humanities Hackathon Summer School <i>Taught humanists how to use R to further their research.</i></p> <p>"The physics of magnets can model how Supreme Court judges vote" Aatish Bhatia on <i>Wired</i> online</p> <p>"Statistical mechanics of SCOTUS" http://www.youtube.com/watch?v=ZlWmoT_PmRo Youtube video</p>	
2012	<p>Volunteer physics tutor Princeton High School <i>After school help sessions with students struggling in physics at a local high school.</i></p>	