

eddielee

social physics

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languages

spanish
korean
french
german

programming

MATLAB, Python
R, Mathematica
C++, Bash
Javascript, HTML5

big questions

How do collections of people reach decisions? How might concepts, intuitions, and models from statistical physics help us find fundamental and quantitative, perhaps physical, principles that govern these phenomena? I study these questions in the context of political voting in the US Supreme Court and Congress, in synchronization of motion in groups, and in the conflict behavior of primates and humans.

education

- | | | |
|------------|--|----------------------|
| since 2018 | PhD candidate in Physics
<i>Advisor Professor Paul Ginsparg</i> | Cornell University |
| 2018 | M.A. in Physics
<i>Advisor Professor Itai Cohen</i> | Cornell University |
| 2008-2012 | A.B. in Physics, <i>cum laude</i>
<i>Certificate in Biophysics</i> | Princeton University |

positions held

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|------------|--|--------------------------------------|
| since 2015 | Research assistant
<i>Criticality in plastic deformation of materials under load with J. Sethna. Synchronization of human motion in dance with I. Cohen.</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
2016	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>	
	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

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).

Sethna, James P., Matthew K. Bierbaum, Karin A. Dahmen, Carl P. Goodrich, Julia R. Greer, Lorien X. Hayden, Jaron P. Kent-Dobias et al. “Deformation of crystals: Connections with statistical physics.” *arXiv preprint arXiv:1609.05838* (2016).

Lee, Edward D., Chase P. Broedersz, and William Bialek. “Statistical Mechanics of the US Supreme Court.” *Journal of Statistical Physics*, April 10, 2015, 1-27. doi:10.1007/s10955-015-1253-6 (2015).

Lee, E., Bryan C. Daniels, David C. Krakauer & Jessica C. Flack. Capturing collective con-

flict dynamics with sparse social circuits. arXiv cs.SI, (2014).

Under review

Lee, E. D. Strong consensus on US Supreme Court spans a century.

In preparation

Lee, E. D., Daniels, B. C., Krakauer, D. C. & Flack, J. C. Collective memory in pigtailed macaque society conflict.

Lee, E. D., Cohen, I. Combining virtual reality, motion capture, and machine learning to map and manipulate the transition from coordinated to uncoordinated behavior.

Lee, E. D., Daniels, B. C., Krakauer, D. C. & Flack, J. C. Predicting human conflict.

Lee, E. D., Liarte, D., Raju, A., & Sethna, J. Bethe lattice model for the deformation of amorphous solids.

posters, presentations, workshops & lectures

Invited

2016	"Voting in the Supreme Court, conflict in pigtailed macaques, & statistical physics"	Santa Fe Institute
	"Scaling in the conflict dynamics of pigtailed macaques"	Cornell University
2015	"It takes two to tango"	Cornell University
2014	"Statistical mechanics of the US Supreme Court"	Cornell University
	"Partitioning social circuits"	Santa Fe Institute
	Workshop on collective cognition	Santa Fe Institute
2013	"Sound arguments with sonic eloquence"	Humanities Hackathon Discovery
	"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
	"Conflict and macaques: A statistical mechanics view on asymmetries in social interactions"	Integrated Behavioral Research Group, Princeton

Abstract submitted

2018	"Keeping it together: How humans coordinate motion with low information"	March APS, LA
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
2015	"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	"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

media & outreach

2018	Cornell Center for Material Research outreach volunteer	
2014	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>
	"Criticality in biological systems"	Featured essay http://wid.wisc.edu/wid-picks/criticality-in-biological-systems/
2013	Volunteer at Wisconsin Science Festival	<i>Science festival drawing parents and students from around the state.</i>
	Discovery Journal Club Coordinator	Wisconsin Institute for Discovery
	"Dwarf Fortress: Just another computer game?"	Featured essay https://wid.wisc.edu/wid-culture/
	Lecturer at the Humanities Hackathon Summer School	<i>Taught humanists how to use R to further their research.</i>
	"The physics of magnets can model how Supreme Court judges vote"	Aatish Bhatia on <i>Wired</i> online
	"Statistical mechanics of SCOTUS"	Youtube video http://www.youtube.com/watch?v=ZlWmoT_PmRo
2012	Volunteer physics tutor	Princeton High School <i>After school help sessions with students struggling in physics at a local high school.</i>