

Louis Kang

Redwood Center for Theoretical Neuroscience
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POSITION

University of California, Berkeley, USA

2017–2020

Miller Postdoctoral Fellow

Host departments: Physics and Helen Wills Neuroscience Institute

Host faculty: Mike DeWeese

RESEARCH INTERESTS

Human cognition ultimately emerges from sophisticated computations performed by networks of neurons. I use and develop tools from theoretical physics to investigate how our brains make sense of and respond to our dynamic environments. Theoretical neuroscience forms one part of my overall mission to better understand human biology and pathology through quantitative analysis.

EDUCATION

University of Pennsylvania, Philadelphia, USA

MD, Perelman School of Medicine

2017

Research elective with Vijay Balasubramanian in theoretical neuroscience

PhD, Department of Physics & Astronomy

2015

Thesis advisor: Tom Lubensky

Thesis title: *Chirality and its spontaneous symmetry breaking in two liquid crystal systems*

Harvard University, Cambridge, USA

AB in Chemistry and Physics and Mathematics *summa cum laude*

2009

PUBLICATIONS

*equal contribution

6. **Kang L**, Lubensky TC. Chiral twist drives raft formation and organization in membranes composed of rod-like particles. *Proc Natl Acad Sci USA* 114, E19 (2017). arXiv:1608.07331.
5. **Kang L**, Gibaud T, Dogic Z, Lubensky TC. Entropic forces stabilize diverse emergent structures in colloidal membranes. *Soft Matter* 12, 386 (2016). arXiv:1507.00746.
4. Davidson ZS*, **Kang L***, Jeong J*, Still T, Collings PJ, Lubensky TC, Yodh AG. Chiral structures and defects of lyotropic chromonic liquid crystals induced by saddle-splay elasticity. *Phys Rev E* 91, 050501 (2015). arXiv:1504.03619.
3. Jeong J*, **Kang L***, Davidson ZS, Collings PJ, Lubensky TC, Yodh AG. Chiral structures from achiral liquid crystals in cylindrical capillaries. *Proc Natl Acad Sci USA* 112, E1837 (2015).

2. Idema T, Dubuis JO, **Kang L**, Manning ML, Nelson PC, Lubensky TC, Liu AJ. The syncytial *Drosophila* embryo as a mechanically excitable medium. *PLOS ONE* 8, e77216 (2013). arXiv:1304.4025.
1. Heo M, **Kang L**, Shakhnovich EI. Emergence of species in evolutionary “simulated annealing”. *Proc Natl Acad Sci USA* 106, 1869 (2009). arXiv:0810.1765.

AWARDS AND HONORS

Miller Research Fellowship University of California, Berkeley	2017–2020
Medical Scientist Training Program National Institutes of Health	2009–2017
Mary Ellis Bell Prize University of Pennsylvania, Perelman School of Medicine “This prize is given to a student in the School of Medicine who is engaged in noteworthy research in any field related to medicine.”	2016
Werner Teutsch Memorial Prize University of Pennsylvania, Department of Physics & Astronomy “Awarded annually to the graduate student who, by his or her performance in the first year courses, shows the most promise for outstanding achievement in research.”	2012
Phi Beta Kappa Harvard University	2009

CONFERENCE TALKS

American Physical Society March Meeting , New Orleans, USA <i>Membrane rafts stabilized by chiral liquid crystal correction to bare interfacial tension</i>	2017
Computational and Systems Neuroscience (Cosyne) , Salt Lake City, USA <i>Coupling between attractor networks naturally generates a discrete grid cell hierarchy</i>	2017
Gordon Research Conference & Seminar on Liquid Crystals , Biddeford, Maine, USA <i>Roles of entropy and chirality in depletion-induced colloidal membranes</i>	2015
American Chemical Society Colloid & Surface Science Symposium , Philadelphia, USA <i>A theory for depletion-induced colloidal membranes</i>	2014
American Physical Society March Meeting , Denver, USA <i>A theory for depletion-induced colloidal membranes</i>	2014
IAS Program on Frontiers of Soft Matter Physics , Hong Kong <i>A theory for depletion-induced colloidal membranes</i>	2014
American Physical Society March Meeting , Baltimore, USA <i>Mitotic wavefronts mediated by mechanical signaling in early Drosophila embryos</i>	2013

EXTERNAL SEMINARS

École Normale Supérieure , Paris, France	2017
Group for Neural Theory	
<i>Self-organization of entorhinal grid modules through commensurate lattice relationships</i>	
Institut Curie , Paris, France	2017
Pierre Sens Group	
<i>Chiral twist drives raft formation and organization in membranes composed of rod-like particles</i>	
University College London , UK	2016
Gatsby Computational Neuroscience Unit	
<i>Coupling between attractor networks naturally generates a discrete grid cell hierarchy</i>	
University of California, Los Angeles , USA	2016
Center for Biological Physics	
<i>Chiral twist drives raft formation and organization in membranes composed of rod-like particles</i>	

TEACHING

Teaching Assistant	2011–2015
University of Pennsylvania	
Modern physics, wave phenomena, electromagnetism, physics laboratory	
Teaching Assistant	2006–2007
Harvard University	
Organic chemistry, linear algebra	

REFERENCES

Mike DeWeese	Tom Lubensky
<i>Postdoc advisor</i>	<i>PhD advisor</i>
University of California, Berkeley	University of Pennsylvania
Redwood Center for Theoretical Neuroscience	Department of Physics & Astronomy
deweese@berkeley.edu	tom@physics.upenn.edu
Vijay Balasubramanian	Zvonimir Dogic
<i>Research mentor</i>	<i>Research collaborator</i>
University of Pennsylvania	University of California, Santa Barbara
Department of Physics & Astronomy	Department of Physics
vijay@physics.upenn.edu	zdogic@physics.ucsb.edu