Amaresh Sahu

Ph.D. Candidate in Chemical Engineering
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Education

Ph.D. in Chemical Engineering — Aug. 2016–May 2021
University of California, Berkeley — GPA: 4.0/4.0
Research Advisor: Prof. Kranthi Mandadapu
Thesis: Irreversible thermodynamics and hydrodynamics of biological membranes

B.S.E. in Chemical Engineering, *Summa cum laude* — Sept. 2009–June 2013
Princeton University — GPA: 3.9/4.0
Research Advisor: Prof. Howard Stone
Thesis: Co-flow microfluidic microbial fuel cells

Awards and Honors

Poster Prize — Jan. 2020
U.C. Berkeley Statistical Mechanics Meeting

Computational Science Graduate Fellowship — Aug. 2016
U.S. Dept. of Energy

Berkeley Fellowship for Graduate Study — Aug. 2016
University of California, Berkeley

Jeffrey O. Kephart '80 Prize in Engineering Physics — June 2013
Princeton University School of Engineering and Applied Science

Phi Beta Kappa — June 2013
Princeton University

ExxonMobil Award for Outstanding Design Project — June 2013
Princeton University Chemical Engineering Dept.

Sigma Xi Book Award — June 2013
Princeton University Chemical Engineering Dept.

Tau Beta Pi — Apr. 2012
Princeton University School of Engineering and Applied Science

Manfred Pyka Memorial Prize in Physics — June 2010
Princeton University Physics Dept.

Publications

[1] J. Tchoufag, A. Sahu, and K. K. Mandadapu. "Absolute/Convective Instabilities and Front Propagation in Lipid Membrane Tubes" (2020). arXiv: 2008.13780

[2] A. Sahu, A. Glisman, J. Tchoufag, and K. K. Mandadapu. "Geometry and dynamics of lipid membranes: The Scriven–Love number". *Phys. Rev. E* **101** (2020), 052401. DOI: 10.1103/PhysRevE.101.052401. arXiv: 1910.10693

[3] S. C. Takatori and A. Sahu. "Active contact forces drive non-equilibrium fluctuations in membrane vesicles". *Phys. Rev. Lett.* **124** (2020), 158102. DOI: 10.1103/PhysRevLett.124.158102. arXiv: 1911.01337

[4] Y. A. D. Omar, A. Sahu, R. A. Sauer, and K. K. Mandadapu. "Non-axisymmetric shapes of biological membranes from locally induced curvature". *Biophys. J.* **119** (2020), 1065–1077. DOI: 10.1016/j.bpj.2020.07.021

[5] A. Sahu, Y. A. D. Omar, R. A. Sauer, and K. K. Mandadapu. "Arbitrary Lagrangian–Eulerian finite element formulation for curved and deforming surfaces: I. General theory and application to fluid interfaces". *J. Comp. Phys.* **407** (2020), 109253. DOI: 10.1016/j.jcp.2020.109253. arXiv: 1812.05086

[6] A. Sahu, R. A. Sauer, and K. K. Mandadapu. "Irreversible thermodynamics of curved lipid membranes". *Phys. Rev. E* **96** (2017), 042409. DOI: 10.1103/PhysRevE.96.042409. arXiv: 1701.06495

[7] D. Vigolo, T. T. Al-Housseiny, Y. Shen, F. O. Akinlawon, S. T. Al-Housseiny, R. K. Hobson, A. Sahu, K. I. Bedkowski, T. J. DiChristina, and H. A. Stone. "Flow dependent performance of microfluidic microbial fuel cells". *Phys. Chem. Chem. Phys.* **16** (2014), 12535–12543. DOI: 10.1039/C4CP01086H

Contributed Talks

Non-equilibrium thermodynamics and hydrodynamics of lipid membranes — Mar. 2020
Harvard Condensed Matter Theory Seminar, Cambridge, MA

Non-equilibrium thermodynamics and hydrodynamics of lipid membranes — Feb. 2020
Biophysical Society Annual Meeting, San Diego, CA

Geometry and dynamics of lipid membranes — Nov. 2019
AIChE Annual Meeting, Orlando, FL

Irreversible thermodynamics of lipid membranes: Theory & computation — Nov. 2019
AIChE Annual Meeting, Orlando, FL

Theoretical and computational modeling of biological lipid membranes — Jul. 2019
Workshop on Soft and Complex Fluids, Lawrence Berkeley Lab, CA

Theoretical and computational modeling of biological lipid membranes — Mar. 2019
APS March Meeting, Boston, MA

Irreversible thermodynamics of lipid membranes: Theory & computation — Dec. 2018
UC Berkeley Pitzer Center Theoretical Chemistry Seminar, Berkeley, CA

Irreversible thermodynamics of lipid membranes: Theory & computation — Nov. 2018
UC Berkeley Fluids Seminar, Berkeley, CA

Arbitrary Lagrangian–Eulerian finite element formulation for lipid membranes — Jul. 2018
13^{th} World Congress in Computational Mechanics, New York, NY

Towards a finite element formulation for lipid membranes — May 2018
UC Berkeley Chemical Engineering Student Symposium, Berkeley, CA

Theoretical and computational modeling of lipid membranes — Jul. 2017
14^{th} U.S. National Congress on Computational Mechanics, Montreal, Can.

The irreversible thermodynamics of curved lipid membranes — Apr. 2017
UC Berkeley Chemical Engineering Student Symposium, Berkeley, CA

The irreversible thermodynamics of curved lipid membranes — Apr. 2017
Berkeley/Stanford Computational Mechanics Festival, Berkeley, CA

Poster Presentations

Active contact forces drive non-equilibrium fluctuations in membrane vesicles — Jan. 2020
UC Berkeley Stat Mech Meeting, Berkeley, CA **[Poster Prize]**

Irreversible thermodynamics of lipid membranes: Theory & simulation — Aug. 2019
Soft Condensed Matter Physics GRC, New London, NH

Manipulating soft membrane vesicles with non-equilibrium active forces — Jan. 2019
Complex Active Material Systems GRC, Ventura, CA

Irreversible thermodynamics of lipid membranes: Theory & applications — Jan. 2018
UC Berkeley Stat Mech Meeting, Berkeley, CA

Teaching Experience

Teaching Assistant, CBE 150A: Undergraduate Transport (Fluids & Heat) — Fall 2019
UC Berkeley Chemical Engineering Dept.

Teaching Assistant, CBE 240: Graduate Thermodynamics — Fall 2017
UC Berkeley Chemical Engineering Dept.

Peer Tutor, MAT 201: Undergraduate Multivariable Calculus — Fall 2011
Princeton University Mathematics Dept.

Service

2021 Gordon Research Seminar Soft Matter Co-Chair — Aug. 2021
Gordon Research Conference

Member; Diversity, Equity, and Inclusion Working Group — Feb. 2020–
UC Berkeley Chemical Engineering Dept.

Advised Mr. Alec Glisman, an undergraduate student — Aug. 2017–Aug. 2019
Currently pursuing PhD at Caltech

Chemical Engineering Student Symposium organizer (yearly) — Apr. 2017–Apr. 2018
UC Berkeley Chemical Engineering Dept.

Statistical Mechanics Seminar Series organizer (weekly) — Dec. 2016–May 2017
UC Berkeley Chemistry Dept.

Computing Experience

C/C++, Java, Python, Julia, Matlab, Git, LaTeX, Bash

Professional Experience

Software Engineer, Redfin Real Estate — Oct. 2014–Aug. 2016
San Francisco, CA

Equity Derivatives Trader, SIG — Aug. 2013–June 2014
Philadelphia, PA