

JINGHUI LIU

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EMPLOYMENT

Max Planck Institute for Physics of Complex Systems (PKS) | Cell Biology and Genetics (CBG) Dresden SN, DE
ELBE Postdoctoral Fellow, Center for Systems Biology Dresden (CSBD) 2022 – 2025

EDUCATION

Massachusetts Institute of Technology Cambridge MA, US
Doctor of Philosophy in Physics Sep. 2022

(*Thesis: “Topology, Symmetry and Mechanics: Deciphering and Controlling information flows in a living cell”. Advisor: Nikta Fakhri)

Peking University Beijing, China
Bachelor of Science in Physics Jul. 2016

(*Thesis: “A dynamical network analysis in epithelial-mesenchymal transition signaling behaviors”. Advisor: Qi Ouyang)

SELECTED AWARDS AND HONORS

- **SFI Complexity Postdoctoral Fellowship**, Santa Fe Institute (*declined*) Jan. 2022
- Women Interactive Materials Award (WIMA) 2nd Place, DWI-Leibniz Institute Oct. 2021
- MathWorks Science Fellowship 2021 – 2022
- **Rising Star Award** in Soft and Biological Matter, UChicago Materials Research Center Oct. 2020
- Student Speaker Award Finalist, GSNP (Topical Group on Statistical and Nonlinear Physics), APS Mar. 2020
- **Morton E. Goulder Presidential Fellowship**, Department of Physics, MIT 2016 – 2017
- Wusi Scholarship, Peking University 2014 – 2015, 2015 – 2016
- Weiming Scholarship for Outstanding Undergraduate Research, Peking University 2013 – 2014
- Ke-chi Shen Scholarship, Peking University 2012 – 2013

PUBLICATIONS

- **Liu J***, Bukart T*, Ziepke A, Reinhard J, Chao Y C, Tan T H, Swartz S Z, Frey E[†], Fakhri N[†]. (2022). Light-induced cortical excitability reveals programmable shape dynamics in starfish oocytes. [In preparation]
- Foster P J[†], **Liu J**, Zampetaki A, Fürthauer S[†], Fakhri N[†]. (2022). Active mechanics of sea star oocytes. [[preprint](#) (*elder version*)]
- **Liu J**, Totz J F, Miller P W, Hastewell A D, Chao Y C, Dunkel J[†], Fakhri N[†]. (2021). Topological braiding and virtual particles on the cell membrane. Proceedings of the National Academy of Sciences, 118(34). [[pdf](#)]
[American Mathematical Society \(AMS\) Math in the Media](#)
- Wigbers M C*, Tan T H*, Brauns F, **Liu J**, Swartz S Z, Frey E[†], Fakhri N[†]. (2021). A hierarchy of protein patterns robustly decodes cell shape information. Nature Physics, 1-7. [[pdf](#)]
[LMU News](#) | [PHYS.org](#)
- Tan T H*, **Liu J***, Miller P W*, Tekant M, Dunkel J[†], Fakhri N[†]. (2020). Topological turbulence on the membrane of a living cell. Nature Physics, 1-6. [[pdf](#)]
[Cover Article](#) | [Nature Research Highlights](#) | [Physics World Frontier](#) | [MIT News](#) | [PHYS.org](#)
- Hoek T A, Axelrod K, Biancalani T, **Liu J**, Gore J[†]. (2016). Resource availability modulates the cooperative and competitive nature of a microbial cross-feeding mutualism[J]. PLoS biology, 14(8). [[pdf](#)]

* Authors contribute equally to the publication † Corresponding authors

INVITED TALKS

2021 Complexity Postdoctoral Fellow Talks, Santa Fe Institute Virtual
2021 ELBE Colloquia, MPI-PKS and MPI-CBG Virtual

2021 Center for the Physics of Biological Function (CPBF) Fellow Symposium, Princeton University	Princeton, NJ
2021 Women Interactive Materials Award (WIMA) Symposium, DWI-Leibniz Institute	Virtual
2021 Harvard Condensed Matter Theory Kid's Seminars	Cambridge, MA
2020 UChicago Rising Stars in Soft and Biological Matter Symposium	Virtual
2020 APS March Meeting (online), GSNP Speaker Award Session	Virtual
2019 Universality: Turbulence Across Vast Scales, Flatiron Institute [video]	New York, NY
2019 Gordon Research Seminar on Soft Condensed Matter Physics, Colby-Sawyer College	New London, NH
2019 Theory of Living Systems Meeting, Boston University [video]	Boston, MA

* Upcoming conferences included

CONTRIBUTED TALKS

2018 - 2023 APS March Meetings	Los Angeles, CA / Boston, MA / Virtual / Chicago, IL / Las Vegas, NV
2020 MIT Physics Departmental Special Tuesday Lunch Talk Series	Virtual
2018 Annual Biophysics Retreat, MIT	Provincetown, MA

POSTERS

2023 Gordon Research Conference on Soft Condensed Matter Physics, Colby-Sawyer College	New London, NH
2019 Annual Biophysics Retreat, MIT (*Grand Poster Prize Winner)	Provincetown, MA
2019 Gordon Research Conference on Soft Condensed Matter Physics, Colby-Sawyer College	New London, NH
2015 Annual Biophysics Retreat, MIT	Provincetown, MA
2014, 2015 Annual Undergraduate Research Honor Program in Biology Retreat, Peking University	Beijing, China

TEACHING AND MENTORING

Graduate Mentor, Undergraduate Research Opportunities Program (UROP), Ariana Park (MIT Physics)

Rotation Mentor, G1 Graduate Research, Lisa Lin (MIT Physics) | Yu-Chen Chao (Harvard SEAS) | Hugh Higinbotham (MIT Physics) | Sebastian T. Coupe (MIT Biology)

Teaching Assistant, MIT course 8.13, "Junior Lab in Experimental Physics"

Feb. 2021 – May. 2021

Cambridge, MA

Teaching Assistant, MIT course 8.241, "Introduction to Biological Physics"

Feb. 2020 – May. 2020

Cambridge, MA

SERVICES

Departmental **Advising Resources for Easing Friction and Stress (REFS)**, MIT Physics

2019 – 2021

Cambridge, MA

Residential Chair, Edgerton Graduate Housing Committee

2017 – 2019

Cambridge, MA

Volunteer Service Team Leader, School of Physics, Peking University

Jan. 2013 – Oct. 2013 (*Volunteer Service Award in Dec. 2013)

Beijing, China

REFERENCES

Nikta Fakhri | fakhri@mit.edu | Thomas D. and Virginia W. Cabot Career Development Associate Professor of Physics, Massachusetts Institute of Technology

Jörn Dunkel | dunkel@mit.edu | Professor of Mathematics, Physical Applied Mathematics Robert E Collins Distinguished Scholar, Massachusetts Institute of Technology

Mehran Kardar | kardar@mit.edu | Professor of Physics, Massachusetts Institute of Technology

Jeff Gore | gore@mit.edu | Professor of Physics, Massachusetts Institute of Technology

Hazel Sive | h.sive@northeastern.edu | Professor Emerita, Massachusetts Institute of Technology; Dean of Science, Northeastern University

Qiongyi He | qiongyihe@pku.edu.cn | Professor of Physics, Peking University