

CURRENT

Branco Weiss Fellow, postdoc-to-faculty transition fellowship October 2024 – 2029
Lewis-Sigler Theory Scholar, Princeton University Princeton, NJ
Fellow, Center for the Physics of Biological Function, City University of New York New York, NY
September 2021 – present

EDUCATION

Harvard University Cambridge, MA
Ph.D., Biophysics. Advised by Michael Brenner. May 2021
National Defense Science and Engineering Graduate (NDSEG) Fellowship
Princeton University Princeton, NJ
A.B., Physics; Graduated with Highest Honors. May 2016
Research advisors: Ben Machta, David Huse, Ned Wingreen.
Certificates: Quantitative & Computational Biology; Applied & Computational Mathematics

SELECTED FELLOWSHIPS, HONORS AND AWARDS

Branco Weiss Fellowship ~\$660K over 5 years to support postdoc-to-faculty transition 2024 – 2029
Awarded to 7/360 applicants worldwide across sciences, engineering, humanities
Lewis-Sigler Theory Scholar Princeton University; salary + \$25K/year in research funding 2021 – present
Quantitative Biology Ph.D. Fellowship Harvard University 2019 – 2021
Certificates of Distinction in Teaching Harvard University March 2018, September 2018
DBIO Graduate Student Travel Award to present at APS March Meeting January 2017
National Defense Science and Engineering Graduate Fellowship June 2016
Princeton Kusaka Memorial Prize in Physics for outstanding 4th year research and coursework June 2016
Princeton Applied and Computational Mathematics Prize for outstanding independent research June 2016
Princeton Quantitative and Computational Biology Award for outstanding independent research June 2016
Member, Phi Beta Kappa Society; Society of Sigma Xi June 2016
Princeton Allen G. Shenstone Prize in Physics for outstanding 3rd year research and coursework May 2015
2015 Education Committee Travel Award to present at Biophysical Society Meeting February 2015
Shapiro Prize for Academic Excellence awarded to top 3% of 1st/2nd year Princeton students December 2014
Presidential Scholar Semifinalist; National Merit Scholarship Finalist January 2012

PUBLICATIONS

O. Kimchi, Y. Meir, N. S. Wingreen. *Bacterial defense and phage counter-defense lead to coexistence in a modeled ecosystem*. Proceedings of the National Academy of Sciences, USA 121(44), e2414229121 (2024).

O. Kimchi, Y. Meir, N. S. Wingreen. *Lytic and temperate phage naturally coexist in a dynamic population model*. The ISME Journal 18(1), wrac093 (2024).

O. Kimchi^{*}, B. B. Larsen^{*}, O. R. S. Dunkley, A. J. W. te Velthuis, C. A. Myhrvold. *RNA structure modulates Cas13 activity and enables mismatch detection*. bioRxiv 560533 (2023). Under review at Nature (2nd round).

O. Kimchi[†], E. M. King, M. P. Brenner. *Uncovering the mechanism for aggregation in repeat expanded RNA reveals a reentrant transition*. Nature Communications 14 (2023). Selected for Editor's Highlights.

A. I. Curatolo, **O. Kimchi**, C. P. Goodrich, R. K. Krueger, M. P. Brenner. *A computational toolbox for the assembly yield of complex, heterogeneous structures*. Nature Communications 14 (2023).

T. Chiang, **O. Kimchi**, H. K. Dhaliwal, D. A. Villarreal, F. F. Vasquez, M. P. Brenner, V. Manoharan, R. Garmann. *Measuring intramolecular connectivity in long RNA molecules using two-dimensional DNA patch-probe arrays*. bioRxiv 532302 (2023). Under review at Nucleic Acids Research (2nd round).

O. Kimchi[†], M. P. Brenner, L. J. Colwell. *RNA structure prediction including pseudoknots through direct enumeration of states: A user's guide to the LandscapeFold algorithm*. RNA structure prediction, Methods in Molecular Biology Springer (2022).

O. Kimchi[†], C. P. Goodrich, A. Courbet, A. I. Curatolo, N. B. Woodall, D. Baker, M. P. Brenner. *Self-assembly based post-translational protein oscillators*. Science Advances 6(51) (2020).

J. Kames, D.D. Holcomb, **O. Kimchi**, M. DiCuccio, N. Hamasaki-Katagiri, T. Wang, A. A. Komar, A. Alexaki, C. Kimchi-Sarfaty. *Sequence analysis of SARS-CoV-2 genome reveals features important for vaccine design*. Scientific Reports 10, 15643 (2020).

O. Kimchi[†], T. Cragolini, M. P. Brenner, L. J. Colwell[†]. *A polymer physics framework for the entropy of arbitrary pseudoknots*. Biophysical Journal 117(3):520-532 (2019).

O. Kimchi, S. L. Veatch, B. B. Machta. *Ion channels can be allosterically regulated by membrane domains near a de-mixing critical point*. Journal of General Physiology 150(12):1769-1777 (2018). Accepted for cover.

M. Watts, J. Ha, **O. Kimchi**, A. Sherman. *Paracrine Regulation of Glucagon Secretion: The β - α - δ Model*. American Journal of Physiology—Endocrinology & Metabolism 310(8):E597-E611 (2016).

*Co-first authors †Corresponding author

PATENT APPLICATIONS

Method of determining secondary structure of a nucleic acid. U.S. Patent Application No. 17/482,765, March 31, 2022. R. F. Garmann, T. K. Chiang, V. N. Manoharan, **O. Kimchi**, M.P. Brenner.

Enhanced nucleic acid detection using Cas13 and designed secondary structure. U.S. Patent Application No. 63/542,704, October 5, 2023. C. Myhrvold, B. Larsen, **O. Kimchi**, O. Dunkley, A. te Velthuis.

NON-ACADEMIC RESEARCH EXPERIENCE

Google Research

Summer Intern

Palo Alto, CA

Summer 2019

- *What information is encoded by continuous glucose monitors?*
 - Analyzed large time-series datasets of patient continuous glucose monitoring data
 - Employed machine learning, neural networks (LSTMs, CNNs, FCNs)
- *Are correlations in language truly long-range?* Advisor: Bill Bialek
 - Conducted large-scale dataset analysis on English text documents
 - Used information theory approaches to compare correlations to those expected by chance

National Institutes of Health Laboratory of Biological Modeling

Summer Intern

Bethesda, MD

Summer 2013

- *What leads to anti-synchronous pancreatic insulin/glucagon oscillations?* Advisor: Arthur Sherman
 - Developed and numerically solved large ODE system predicting biological α/β cell coupling

SELECTED PRESENTATIONS

Invited speaker, Flatiron Institute, New York City, NY	2024
Invited speaker, APS March Meeting, Minneapolis, MN	2024
Invited speaker, Aspen Center for Physics Workshop: the Physics of Biological Data Analysis, Aspen, CO	2024
Poster, CSHL Meeting: Genome Engineering—CRISPR Frontiers, Cold Spring Harbor, NY	2024
Poster, Winter Q-Bio conference, Ko Olina, HI	2024
Poster, Biophysical Society Annual Meeting, Philadelphia, PA	2024
Invited speaker, MIT Physics of Living Systems Short Talks, Cambridge, MA	2023
Poster, Soft Matter Physics Gordon Research Conference, New London, NH	2023
Selected lightning talk, Rutgers-Princeton Biomolecular Condensates Day, Princeton, NJ	2023
Speaker & session chair, APS March Meeting, Las Vegas, NV	2023
Invited speaker, Boston College Biology Seminar, Boston, MA	2021
Selected oral presentation, 1 st Annual Biodesign Research Conference, Virtual	2020
Speaker & session chair, APS March Meeting, Virtual	2020
Speaker & poster, Harvard QBio symposium, Cambridge, MA	2020

Speaker, <i>APS March Meeting, Boston, MA</i>	2019
Poster, <i>Stochastic Physics in Biology Gordon Research Conference, Ventura, CA</i>	2019
Speaker, <i>APS March Meeting, Los Angeles, CA</i>	2018
Poster, <i>Cargèse summer school, Cargèse, France</i>	2018
Poster, <i>Vannevar Bush Faculty Fellowship 10th Anniversary Symposium, Washington, D.C.</i>	2018
Speaker, <i>APS March Meeting, New Orleans, LA</i>	2017
Poster, <i>Intracellular Phase Transitions Meeting, Princeton, NJ</i>	2017

TEACHING AND MENTORSHIP

Research advisor Summer 2020 – present

- Mentored high school student on project relating to CRISPR-based methods to treat Huntington’s disease
- Mentored post-bac student on project relating to analysis of large RNA-DNA hybridization dataset
- Provided mentorship on experimental design and presentations to graduate and post-bac students
- Provided thought leadership and technical mentorship to undergraduate researchers on covid-19 modeling
- Wrote recommendation letter for post-bac student, who started graduate school at Stanford in Fall 2023

Preceptor and course instructor Fall 2021, Summer 2022

- Co-led precepts for Integrated Science, an intensive Freshman course
- Organized discussion group for Princeton Summer Undergraduate Program about scientific presentations

Course developer and instructor Summer 2020

- Developed and taught quantitative biology course about how to read and understand scientific papers
- Course aimed at 12 minority and underrepresented students performing summer research at Harvard

Teaching fellow

- Graduate student teaching fellow Fall 2017, Spring 2018, Fall 2020
 - Constructed problem sets, led recitations, and mentored students in independent projects
 - Courses were at both graduate and undergraduate level in mathematical modeling
- QuantLab tutor at Princeton University Freshman Scholars Institute Summers 2014 – 2015
 - Mentored students in problem sets and labs to make quantitative majors more accessible
 - Program was for incoming freshmen to Princeton from minority, low-income backgrounds

COMMUNITY ACTIVITIES

Peer reviewer

- *Physical Review Letters; PNAS; Nature Communications; PLOS Computational Biology*

Conference organizer January 2024

- Co-organized workshop “Bacteria vs. Phage: The Main Event” at Princeton Center for Theoretical Science.
- Recruited speakers, emphasizing diversity across different axes; led discussions throughout workshop

DEI community service Winter 2024 – present

- Member, LSI Climate Committee, Princeton University
- Promote inclusiveness and diversity through community engagement and broader initiatives

Seminar leader Fall 2019 – Spring 2021

- Ran Kavli seminar: weekly seminar series with diverse speakers fostering intra-Harvard collaborations
- Shepherded seminar into virtual space in March 2020, maintaining high attendance and engagement

REFERENCES

Ned S. Wingreen, Princeton University. wingreen@princeton.edu

Cameron A. Myhrvold, Princeton University. cmyhrvol@princeton.edu

Michael P. Brenner, Harvard University. brenner@seas.harvard.edu