

Karna Gowda

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PROFESSIONAL EXPERIENCE

- The Ohio State University**, Columbus, OH 2024 – present
Assistant Professor, Department of Microbiology and Biophysics Graduate Program
- The University of Chicago**, Chicago, IL 2020 – 2023
Postdoctoral Scholar, Department of Ecology & Evolution
Mentors: Seppe Kuehn and Madhav Mani
- University of Illinois Urbana-Champaign**, Urbana, IL 2017 – 2020
James S. McDonnell Foundation Postdoctoral Fellow, Department of Physics
Mentors: Seppe Kuehn and Madhav Mani

EDUCATION

- Northwestern University**, Evanston, IL 2012 – 2017
PhD, Engineering Sciences and Applied Mathematics
Advisor: Mary Silber
- Marine Biological Laboratory**, Woods Hole, MA 2016
MBL Physiology Course
- Northwestern University**, Evanston, IL 2011 – 2012
MS, Engineering Sciences and Applied Mathematics
- University of Illinois Urbana-Champaign**, Urbana, IL 2005 – 2008
BS, Mathematics (with distinction)

PUBLICATIONS

*co-first author, †co-corresponding author.

13. M Urvoy, C Howard-Varona, C Owusu-Ansah, A Stai, J Bouranis, M Burris, N Solonenko, RL Hettich, K Holmfeldt, MM Tfaily, **K Gowda**, and MB Sullivan. "Phage resistance mutations in a marine bacterium impact biogeochemically-relevant cellular processes." *Nat Microbiol* (2025). doi:10.1038/s41564-025-02202-5
12. K Crocker, K Lee, M Chakraverti-Wuerthwein, Z Li, M Tikhonov, M Mani, **K Gowda**[†], and S Kuehn[†]. "Environmentally dependent interactions shape patterns in gene content across natural microbiomes." *Nat Microbiol* **9**, 2022–2037 (2024). doi:10.1038/s41564-024-01752-4
11. A Skwara, **K Gowda**, M Yousef, J Diaz-Colunga, A Raman, A Sanchez, M Tikhonov, and S Kuehn. "Statistically learning the functional landscape of microbial communities." *Nat Ecol Evol* **7**, 1823–1833 (2023). doi:10.1038/s41559-023-02197-4
↔ Highlighted by D Amor. *Nat Ecol Evol* **7**, 1754–1755 (2023). doi:10.1038/s41559-023-02214-6
10. J Diaz-Colunga*, A Skwara*, **K Gowda***, R Diaz-Uriarte*, M Tikhonov*, D Bajic*, and A Sanchez*. "Global epistasis on fitness landscapes." *Philos T R Soc B* **378**, 20220053 (2023). doi:10.1098/rstb.2022.0053
9. **K Gowda** and S Kuehn. "Microbial biofilms: An ecological tale of Jekyll and Hyde." *Curr Biol* **32**, R1349–R1351 (2022). doi:10.1016/j.cub.2022.10.068
8. **K Gowda**, D Ping, M Mani, and S Kuehn. "Genomic structure predicts metabolite dynamics in microbial communities." *Cell* **185**, 530–546 (2022). doi:10.1016/j.cell.2021.12.036
↔ Highlighted by A Flamholz and D Newman. *Curr Biol* **32**, R215–R218 (2022). doi:10.1016/j.cub.2022.02.002
7. C Gopalakrishnappa*, **K Gowda***, K Prabhakara*, and S Kuehn. "An ensemble approach to the structure-function problem in microbial communities." *iScience* **25**, 103761 (2022). doi:10.1016/j.isci.2022.103761

6. DT Fraebel, **K Gowda**, M Mani, and S Kuehn. "Evolution of generalists by phenotypic plasticity." *iScience* **23**, 101678 (2020). doi:10.1016/j.isci.2020.101678
5. P Gandhi, L Werner, S Iams, **K Gowda**, and M Silber. "A topographic mechanism for arcing of dryland vegetation bands." *J R Soc Interface* **15**, 20180508 (2018). doi:10.1098/rsif.2018.0508
4. **K Gowda**, S Iams, and M Silber. "Signatures of human impact on self-organized vegetation in the Horn of Africa." *Sci Rep* **8**, 3622 (2018). doi:10.1038/s41598-018-22075-5
3. **K Gowda**, Y Chen, S Iams, and M Silber. "Assessing the robustness of spatial pattern sequences in a model of dryland vegetation." *Proc R Soc A* **472**, 20150893 (2016). doi:10.1098/rspa.2015.0893
2. **K Gowda*** and C Kuehn*. "Early-warning signs for pattern-formation in stochastic partial differential equations." *Commun Nonlinear Sci Numer Simul* **22**, 55–69 (2015). doi:10.1016/j.cnsns.2014.09.019
1. **K Gowda**, H Riecke, and M Silber. "Transitions between patterned states in vegetation models for semiarid ecosystems." *Phys Rev E* **89**, 022701 (2014). doi:10.1103/PhysRevE.89.022701

GRANTS, HONORS & AWARDS

Postdoctoral

James S. McDonnell Foundation Postdoctoral Fellowship (# 220020499)	2017 – 2020
"Evolving communities: how adaptation shapes microbial interactions."	
Amount: \$200,000	

Graduate

NSF-RTG Graduate Training Fellowship, Northwestern University	2016 – 2017
NIH & Helmsley Charitable Trust Scholarship, Marine Biological Laboratory	2016
Presidential Fellowship Finalist, Northwestern University	2015
SAMSI Visiting Graduate Fellow, Program on Mathematical and Statistical Ecology	2014 – 2015
Professional Development Grant, The Graduate School, Northwestern University	2014
ComSciCon-Chicago Workshop Funding, Graduate Student Council, University of Chicago	2014
Walter P. Murphy Fellowship, Northwestern University	2012 – 2013
Travel grants to NSF Math & Climate Research Network meetings at SAMSI and Bowdoin College, and ComSciCon at Harvard University	2012 – 2014

Undergraduate

National Merit Scholarship	2005 – 2008
University of Illinois Honors Scholarship	2005 – 2006

SELECTED PRESENTATIONS

Invited talks and seminars

Goldschmidt Conference, Prague, Czech Republic	July 7, 2025.
Midwest Microbiome Symposium, The Ohio State University, Columbus, OH.	May 13, 2025
Biophysics Graduate Program Seminar, The Ohio State University, Columbus, OH.	September 11, 2024
Tara Oceans Retreat, Nice, France.	May 28, 2024
NITMB Ecological Dynamics of Microbial Communities Workshop, Chicago, IL.	April 29, 2024
Annual Microbial Communities Symposium, Columbus, OH.	April 12, 2024
American Physical Society March Meeting, Minneapolis, MN.	March 4, 2024
Annual Microbiology Symposium, Columbus, OH.	December 8, 2023

Microbial Sciences Institute Seminar, Yale University, West Haven, CT.	March 9, 2023
Ecology & Evolutionary Biology Seminar, Yale University, New Haven, CT.	March 8, 2023
Microbiology & Immunology Seminar, University of British Columbia, Vancouver, Canada.	March 1, 2023
Microbiology Seminar, Ohio State University, Columbus, OH.	February 20, 2023
Microbiology & Immunology Seminar, Stanford University School of Medicine, Stanford, CA.	February 6, 2023
College of Engineering Seminar, Boston University, Boston, MA.	January 26, 2023
School of Life Sciences Seminar, Arizona State University, Tempe, AZ.	January 17, 2023
Agricultural Biology Seminar, Colorado State University, Ft. Collins, CO.	December 5, 2022
Advanced Biomedical Computation Seminar, Harvard Medical School (virtual).	October 24, 2022
18th International Symposium on Microbial Ecology (ISME18), Lausanne, Switzerland	August 16, 2022
Laboratory of Living Matter, Institute for Advanced Study (virtual).	March 9, 2022
Host-microbe Center Seminar, University of Oregon (virtual).	January 31, 2022
KITP Program on the Ecology and Evolution of Microbial Communities, Santa Barbara, CA.	July 28, 2021
Math, Statistics, and Computer Science Seminar, St. Olaf College, Northfield, MN.	September 13, 2019
Institute for Genomic Biology Seminar, University of Illinois at Urbana-Champaign, Urbana, IL.	March 29, 2019
Statistics Seminar, University of Chicago, Chicago, IL.	February 3, 2017
Physics Seminar, University of Illinois at Urbana-Champaign, Urbana, IL.	April 8, 2016

Contributed talks and posters

American Physical Society March Meeting, Chicago, IL.	March 16, 2022
American Physical Society March Meeting (virtual).	March 3, 2020
SIAM Conference on Dynamical Systems, Snowbird, UT.	May 23, 2017
SIAM Conference on Dynamical Systems, Snowbird, UT (poster).	May 19, 2015
Spatio-Temporal Dynamics in Ecology, Leiden, Netherlands (poster).	December 8, 2014
International Centre for Mathematical Sciences Tipping Points, Edinburgh, U.K. (poster).	September 9, 2013
SACNAS National Conference, San Antonio, TX.	October 5, 2013
SIAM Conference on Dynamical Systems, Snowbird, UT.	May 19, 2013
IUGG Conference on Mathematical Geophysics, Edinburgh, U.K. (poster).	June 18, 2012

TEACHING EXPERIENCE

Instructor

MICRBIO 5130, Biology by the Numbers	2025 – present
MICRBIO 7899, Microbiology Colloquium at the Ohio State University	2024 – present

Teaching assistant

<i>Physical Biology of the Cell</i> , Marine Biological Laboratory	2017
Differential Equations of Mathematical Physics, Northwestern University	2016
Engineering Analysis 4 (applied differential equations, lead TA), Northwestern University	2013
Honors Calculus for Engineers (multivariable calculus), Northwestern University	2012
Linear Algebra and Differential Equations, University of Illinois at Urbana-Champaign	2007 – 2008

MENTORSHIP EXPERIENCE

Thesis advisor

Dominic Cipiti, Department of Microbiology	2025 – present
Bryce Guidry, Biophysics Graduate Program	2025 – present

Thesis/MS committee member

Kyle Buffin, Sabree Lab	2025 – present
Yaowen Deng, Bundschuh Lab	2025 – present
Ian Baeten, Bell Lab	2025 – present
Shreyas Pulluri (MS), Krzycki Lab	2025
Aneel Biswas, Jouline Lab	2025 – present
Alexis Young, Bradley Lab	2024 – present
Samuel Adu Fosu, North Lab	2024 – present
Huan Luo, Jouline Lab	2024 – present
Courtney Sanderson (MS), Sullivan Lab	2024 – 2025
Joshua Groves, North Lab	2024 – present
Dawson Phan, Rich & Sullivan Labs	2024 – present

Undergraduate

Emily Yoon (Williams College), Summer Undergraduate Researcher	2025
Molly Easton, Undergraduate Researcher	2024 – 2025
Aouss Azzouz (Earlham College), Summer Undergraduate Researcher	2024

OUTREACH EXPERIENCE

Presented research to underserved high school students through the Schuler Scholar Program	2015 – 2016
Cofounded and led the <i>Communicating Science-Chicago (ComSciCon-Chicago)</i> workshop	2014 – 2016
Won 4th place in the Northwestern Scientific Images Contest	2016
Organized public outreach activity <i>American Scidol</i> at the MIT Museum	2014
Volunteered at the Northwestern Graduate Leadership Council's Science Pentathlon for middle schoolers	2014 – 2015
Organized the <i>Communicating Science National Workshop (ComSciCon)</i> , Cambridge, MA	2014
Attended inaugural <i>Communicating Science National Workshop (ComSciCon)</i> , Harvard University	2013

PROFESSIONAL SERVICE

Faculty advisor to Students for the Advancement of Microbiology (SAM)	2024 – present
Organizing Quantitative Microbiology Journal Club for graduate students	2024 – present
Organized <i>Theory in Biology</i> virtual seminar	2021 – 2022
Refereed manuscripts for <i>Nature Microbiology</i> , <i>Cell Systems</i> , <i>The ISME Journal</i> , <i>Nature Plants</i> , <i>Science Advances</i> , <i>Current Biology</i> , <i>iScience</i> , <i>SIAM Journal on Applied Mathematics</i> , <i>Journal of Mathematical Biology</i> , <i>Chaos</i> , and <i>Communications in Nonlinear Science and Numerical Simulation</i>	2013 – present
Designed and administered the <i>Math and Climate Research Network</i> online platform	2015 – 2016
Organized the <i>Mathematics of Climate Tipping Points</i> focus group	2012 – 2015

SELECTED PRESS

- News & Views in *Nature Ecology & Evolution*, [Smooth functional landscapes in microcosms](#) October 2, 2023
- Dispatch in *Current Biology*, [The metabolic rate is the trait](#) March 14, 2022
- U. Chicago News, [The genomic structure of microbial communities can predict metabolic activity](#) January 26, 2022
Also carried by [Northwestern News](#), [Phys.org](#), and [EurekaAlert](#).
- SIAM News, [Modeling Vegetation Patterns in Vulnerable Ecosystems](#) March 1, 2017