

DOMINIC J. SKINNER

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EDUCATION

2017-2022 Massachusetts Institute of Technology, Cambridge, MA
 PhD in mathematics advised by Professor Jörn Dunkel
2013-2017 Trinity Hall, University of Cambridge, Cambridge, UK
 Part III Mathematics (MMath), distinction
 Parts I & II Mathematics (BA), 1st class

EMPLOYMENT

2022-present Northwestern University, Evanston, IL
 NSF-Simons postdoctoral fellow at the Center for Quantitative Biology

PUBLICATIONS

G. Stepaniants, A. D. Hastewell, **D. J. Skinner**, J. F. Tetz, and J. Dunkel. Discovering dynamics and parameters of nonlinear oscillatory and chaotic systems from partial observations. arXiv:2304.04818.

H. Jeckel, K. Nosh, K. Neuhaus, A. D. Hastewell, **D. J. Skinner**, D. Saha, N. Netter, N. Paczia, J. Dunkel and K. Drescher. Space-time transcriptomes of bacterial swarms reveal supra-generational cooperation during multicellular development. Submitted.

D. J. Skinner, H. Jeckel, A. C. Martin, K. Drescher, and J. Dunkel. Topological packing statistics distinguish living and non-living matter. arXiv:2209.00703.

H. Jeckel*, F. Díaz-Pascual*, **D. J. Skinner***, B. Song*, E. J. Siebert, E. Jelli, S. Vaidya, J. Dunkel, and K. Drescher. Shared biophysical mechanisms determine early biofilm architecture development across different bacterial species. PLoS Biol. **20**, e3001846, (2022).

H. Kim, **D. J. Skinner**, D. Glass, A. Hamby, B. Stuart, J. Dunkel, and I. Riedel-Kruse. 4-bit adhesion logic enables universal multicellular interface patterning. *Nature* **608**, 324, (2022). On the cover and featured in Nature News and Views.

D. J. Skinner, J. Dunkel. Estimating entropy production from waiting time distributions. *Phys. Rev. Lett.*, **127** 198101 (2021). Editors' suggestion and featured in *Physics* magazine.

D. J. Skinner, J. Dunkel. Improved bounds on entropy production in living systems. *Proc. Natl Acad. Sci. U.S.A.*, **118**, e2024300118 (2021).

D. J. Skinner, B. Song, H. Jeckel, E. Jelli, K. Drescher, J. Dunkel. Topological metric detects hidden order in disordered media. *Phys. Rev. Lett.*, **126**, 048101 (2021). Editors' suggestion and featured in *Physics* magazine.

C. Rackauckas, Y. Ma, J. Martensen, C. Warner, K. Zubov, R. Supekar, **D. J. Skinner**, A. Ramadhan, A. Edelman. Universal Differential Equations for Scientific Machine Learning. arXiv:2001.04385.

P. Pearce, B. Song, **D. J. Skinner**, R. Mok, R. Hartmann, P. K. Singh, H. Jeckel, J. S. Oishi, K. Drescher, J. Dunkel. Flow-induced symmetry breaking in growing bacterial biofilms. *Phys. Rev. Lett.*, **123**, 258101 (2019).

J. R. Lister, **D. J. Skinner**, T. M. J. Large. Viscous control of shallow elastic fracture: Peeling without precursors. *J. Fluid Mech.*, **868**, 119-140 (2019).

CONFERENCE PROCEEDINGS

D. J. Skinner, R. Maulik. Meta-modeling strategy for data-driven forecasting. Tackling Climate Change with Machine Learning workshop, NeurIPS 2020. arXiv:2012.00678.

ACADEMIC AND COMMUNITY SERVICE

Referee for *PNAS*, *Phys. Rev. Lett.*, *Phys. Rev. Research*, *Phys. Rev. E*, *Soft Matter*, and *J. Chem. Phys.*

Volunteer mentor for the graduate-undergraduate math mentoring initiative, MIT, 2020-2021.

Organizer of the physical applied math group meeting seminar, MIT, 2020-2022.

Organizer of MIT math music recital, 2022.

INVITED TALKS

Georgia Tech, BLaST seminar 2022 (virtual)

Boston University, Dynamics and PDEs Seminar 2022.

University of Pennsylvania, Mathematical Biology Seminar 2022 (virtual).

NORDITA, Soft Matter Seminar 2022 (virtual).

Memorial University of Newfoundland, Department of Physics 2021 (virtual).

CONTRIBUTED TALKS AND POSTERS

APS March Meeting 2023.

Physics of Morphing Matter, Princeton 2022.

APS March Meeting 2022.

Greater Boston Area Statistical Mechanics Meeting 2021.

Stochastic Physics in Biology, Gordon Research Conference 2021.

Physics of Life Symposium, Princeton 2021 (virtual).

Workshop on Stochastic Thermodynamics II 2021 (virtual).

APS March Meeting 2021 (virtual).

Tackling Climate Change with Machine Learning workshop, NeurIPS 2020 (virtual).

APS March Meeting 2020 (virtual).

Theory in Living Systems Meeting, Boston University 2019.

AWARDS AND FELLOWSHIPS

Philip Loew Memorial Award (2022).

MathWorks Science Fellowship (2020-2021).

Center For The Physics of Biological Function Symposia Travel Award (2020).

NSF Mathematical Sciences Graduate Internship (2020). *Argonne National Laboratory*.
Everett Longstreth Jazz Award (2019).
Emerson Music Scholar (2019-2022).
MIT Presidential Fellowship (2017-2018).
Mayhew Prize (2017). *Top honours in applied mathematics in Part III, University of Cambridge*.
Parks Prize For Mathematics (2017). *Trinity Hall, Cambridge*.
Wylie Prize For Mathematics (2016). *Trinity Hall, Cambridge*.

TEACHING EXPERIENCE

Instructor for computational science and engineering 18.085, MIT, Summer 2021
Teaching assistant for differential equations 18.03, MIT, Fall 2019 and Spring 2020
Mentor for one month directed reading program, MIT, Winter 2020, 2021, 2022
Mentor for the research science institute high school program, MIT, Summer 2018, 2019
Mentor for the Cambridge entrance exam study school, Cambridge, UK, Spring 2015

OTHER EXPERIENCE

Research intern at Argonne National Laboratory, working with Dr Romit Maulik on adaptive sampling and meta-modeling methods for scientific machine learning. 8 week internship, Argonne National Laboratory, Chicago, IL, Summer 2020

Research intern at Microsoft Research working on the C-library for Microsoft's Ziria project, a programming language designed for wireless systems. 8 week internship, Microsoft Research, Cambridge, UK, Summer 2015.

PROGRAMMING LANGUAGES

Extensive experience with MATLAB, Julia, and spectral PDE solver Dedalus. Working knowledge of C, CUDA, python, bash.

INTERESTS

Studied double bass under Keala Kaumeheiwa 2019-2022. Principal bassist with MIT's Festival Jazz Ensemble 2017-2022. Member of the Darius Hampton small jazz ensemble at Bienen School of Music 2022-2023.