Jasmine A Nirody

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Employment

2018 — present **The Rockefeller University**, New York, NY, USA.
Independent Fellow, Center for Studies in Physics and Biology.

2017 — present **All Souls College, University of Oxford**, Oxford, UK.
Independent Postdoctoral Research Fellow.

Education

2012 — 2017 **PhD**, **Biophysics**, **University of California, Berkeley**.
Designated Emphasis in Computational and Genomic Biology.
Dissertation: *Talking about a revolution: dynamics of the rotary motor of bacterial flagella.*
Committee: George Oster (advisor), Carlos Bustamante, Oskar Hallatschek, David Steigmann

2008 — 2010 **MA**, **Medical Sciences**, **Boston University School of Medicine**.
Awarded with Distinction in Research.
Thesis: *Electron microscopy and molecular dynamics on a D137L mutant of tropomyosin.*
Advisor: William J. Lehman

2004 — 2008 **BA**, **Mathematics and Biology**, **New York University**.
Advisors: David L. Hu and Michael J. Shelley

Selected Awards and Fellowships

- Intersections Science Fellow, 2021
- Leading Edge Fellow, 2021
- Rising Stars in Soft and Biological Matter, University of Chicago, 2020
- Rising Stars in Physics, Heising-Simons Foundation/MIT/Princeton, 2020
- APS Award for Outstanding Doctoral Thesis Research in Biological Physics, 2018
- Moore-Sloan Data Science Fellowship, 2015-2017
- NSF CiBER-IGERT Fellowship, 2012-2014
- Dutch Mathematical Research Institute Master Class Fellowship, 2009-2010
- New York University Presidential Honors Scholarship, 2004-2008
- NYU Courant Institute Undergraduate Research Grant, 2006 & 2007
- New York University Dean's Undergraduate Research Fund Grant (Individual), 2006

Grants

- James S. McDonnell Foundation Fellowship in Studying Complex Systems, 2017 ($200,000)
  Title: *Reducible complexity: nature's wheels and what makes them spin.*

Publications

[22] **Jasmine A Nirody**‡, Lisset A. Duran, Deborah Johnston, Daniel J. Cohen‡. Tardigrades exhibit robust inter-limb coordination across walking speeds and terrains. *Proceedings of the National Academy of Sciences*, 118(35), e2107289118, 31 August 2021. (biorXiv:10.1101/2021.03.19.436228v1)
‡Co-corresponding author.

[21] **Jasmine A Nirody**. Universal features in panarthropod inter-leg coordination patterns during forward walking. *Integrative and Comparative Biology*, icab097, 28 June 2021. Special issue 'Physical Mechanisms of Behaviour'. (arxiv:2104.01203)

[20] **Jasmine A Nirody**‡, Itay Budin, Padmini Rangamani‡. ATP synthase: evolution, energetics, and membrane interactions. *Journal of General Physiology* 152(11), 2 November 2020. (arXiv:2006.09357) ‡Co-corresponding author.

[19] **Jasmine A Nirody**‡, Ashley L. Nord, Richard M. Berry. Load-dependent adaptation near zero load in the bacterial flagellar motor. *Journal of the Royal Society Interface* 16(159), 2 October 2019. (arXiv:1904.05846) ‡Corresponding author.

[18] Oleg Igoshin, Jing Chen, Jianhua Xing, Jian Liu, [Timothy C. Elston*, Michael Grabe*, Kenneth S. Kim*, **Jasmine A Nirody***, Padmini Rangamani*, Sean Sun*, Hongyun Wang*, Charles Wolgemuth*]. Biophysics at the coffee shop: lessons learned working with George Oster. *Molecular Biology of the Cell* 30(16), 19 July 2019. [*Equal contribution, listed alphabetically.]

[17] [**Jasmine A Nirody***‡, Judy Jinn*], Ardian Jusufi, Timothy Lee, Thomas Libby, David L. Hu, Robert J. Full‡. Geckos race across the water's surface using multiple mechanisms. *Current Biology* 28, 17 December 2018. [*Co-first authors.] ‡Co-corresponding author.

[16] Michael Getz, **Jasmine Nirody**, and Padmini Rangamani: Stability analysis of spatial modeling of cell signaling. *WIREs Systems Biology and Systems Medicine*, 10(1), January/February 2018.

[15] Ashley L. Nord, Emilie Gachon, Ruben Perez-Carrasco, **Jasmine A Nirody**, Alessandro Barducci, Richard M. Berry, Francesco Pedaci. A catch-bond drives stator mechanosensitivity in the bacterial flagellar motor. *Proceedings of the National Academy of Sciences* 114(49): 12952-7, 5 December 2017.

[14] **Jasmine A Nirody**, Yi-Ren Sun, Chien-Jung Lo. The biophysicist's guide to the bacterial flagellar motor. *Advances in Physics: X*, 2(2): 324-343, March 2017.

[13] **Jasmine A Nirody**‡, Richard M. Berry, George Oster. The limiting speed of the bacterial flagellar motor. *Biophysical Journal*, 111(3): 557-64, Aug 2016. (arXiv:1505.05966) ‡Corresponding author.

[12] Ursula Heilmeier, Karen Cheng, Courtney Pasco, Robin Parrish, **Jasmine Nirody**, Janina Patsch, Chiyuan A. Zhang, Gabby B. Joseph, Andrew J. Burghardt, Ann V. Schwartz, Thomas M. Link, Galateia Kazakia. Cortical bone laminar analysis reveals increased midcortical and periosteal porosity in type 2 diabetic postmenopausal women with history of fragility fractures compared to fracture-free diabetics. *Osteoporosis International* 27: 1-12, June 2016.

[11] [Kranthi K. Mandadapu*, **Jasmine A Nirody***], Richard M. Berry, George Oster. The mechanics of torque generation in the bacterial flagellar motor. *Proceedings of the National Academy of Sciences* 112(32): E4381–E4389, 11 August 2015. (arXiv:1501.02883) [*Co-first authors.]

[10] **Jasmine A Nirody**, Karen P. Cheng, Robin M. Parrish, Andrew J. Burghardt, Thomas Link, Sharmila Majumdar, Galateia J. Kazakia. Spatial distribution of intracortical porosity varies across age and sex. *Bone*, 75(1): 88–95, June 2015.

[9] Marcel A.J. Lourens, Bettina C. Schwab, **Jasmine A Nirody**, Hil G.E. Meijer, Stephan A. van Gils. Exploiting pallidal plasticity for stimulation in Parkinson's disease. *Journal of Neural Engineering*, 12(2), February 2015.

[8] [Paula Tataru*, **Jasmine A Nirody***], Yun S. Song. diCal-IBD: demography-aware inference of identity-by-descent tracts in unrelated individuals. *Bioinformatics*, 30(23): 3430-1, December 2014. (bioRxiv: dx.doi.org/10.1101/005082). [*Co-first authors.]

[7] Galateia J. Kazakia, Willy Tjong, **Jasmine A Nirody**, Andrew J. Burghardt, Julio Carballido-Gamio, Janina M. Patsch, Thomas Link, Brian T. Feeley, C. Benjamin Ma. The influence of disuse on bone microstructure and mechanics assessed by HR-pQCT. *Bone*, 63(1): 132-40, June 2014.

[6] **Jasmine A Nirody**. Development of spatial coarse-to-fine processing in the visual pathway. *Journal of Computational Neuroscience*, 36(3): 401-14, June 2014. (arXiv:1212.0621).

[5] Willy Tjong, **Jasmine A Nirody**, Julio Carballido-Gamio, Andrew J. Burghardt, Sharmila Majumdar, Galateia J. Kazakia. Structural analysis of cortical porosity applied to HR-pQCT data. *Medical Physics*, 41(1): 1-12, January 2014.

[4] Susana Serna, **Jasmine A Nirody**, Miklós Z. Rácz. Analysis of unstable behavior in a mathematical model for erythropoiesis. *Journal of Mathematical Biology* 66(3): 595-625, Feb 2013.

[3] Galateia J. Kazakia, **Jasmine A Nirody**, Greg Bernstein, Miki Sode, Andrew J. Burghardt, Sharmila Majumdar. Age- and gender-related differences in cortical geometry and microstructure: improved sensitivity by regional analysis. *Bone* 52(2): 623-31, February 2013.

[2] Jeffrey R. Moore, Xiaochuan (Edward) Li, **Jasmine Nirody**, Stefan Fischer, William Lehman. Structural implications of conserved aspartate residues located in tropomyosin's coiled-coil core. *BioArchitecture* 1(5): 250-5, September/October 2011.

[1] David L. Hu, **Jasmine Nirody**, Terri Scott, Michael J. Shelley. The mechanics of slithering locomotion. *Proceedings of the National Academy of Sciences* 106(25): 10081-5, 23 June 2009.

Internships and Visits

2015 — 2017 **University of Oxford**, Oxford, UK.
Mentor: Richard M. Berry
Visiting student, Department of Physics.

Summer 2015 **Microsoft Research**, Cambridge, UK.
Mentor: Neil Dalchau
Research intern in the Biological Computation group.

2011 — 2012 **University of California, San Francisco**, San Francisco, CA.
Mentor: Galateia Kazakia
Research intern in the Department of Radiology.

2009 — 2010 **Mathematical Research Institute, Universiteit Utrecht**, Utrecht, The Netherlands.
Mentors: Hil G.E. Meijer and Stephan van Gils.
Master Class student, Numerical Bifurcation Analysis of Dynamical Systems. Fellowship provided by The Netherlands Organization for Scientific Research (NWO).

Summer 2008 **University of California, Los Angeles**, Los Angeles, CA.
Mentors: Susana Serna and Gilles Gnacadja
Undergraduate summer researcher in the Research in Industrial Projects for Students (RIPS) program at the Institute for Pure and Applied Mathematics (IPAM), funded by NSF Research Experiences for Undergraduates and Amgen, Inc.

Selected Presentations ([†]Invited)

March 2022 [†]American Physical Society March Meeting, Chicago, IL

January 2022 [†]Ecology and Evolution Seminar, University of Chicago, Chicago, IL (Virtual)

November 2021 [†]Physiology and Biophysics Seminar, University of Washington, Seattle, WA (Virtual)

November 2021 [†]Neurobiology Seminar, University of Cologne, Cologne, Germany (Virtual)

October 2021 [†]Physics Colloquium, Northwestern University, Evanston, IL (Virtual)

October 2021 [†]Soft Matter Symposium, Duke University, Durham, NC (Virtual)

September 2021 [†]Condensed Matter and Biophysics Seminar, Brown University, Providence, RI (Virtual)

September 2021 [†]Physics Colloquium, Georgia Institute of Technology, Atlanta, GA (Virtual)

June 2021 Mechanics in Physiological Systems: Organelles to Organisms, Janelia Research Campus (Virtual)

February 2021 [†]Biomechanics Seminar, University of California, San Diego, San Diego, CA (Virtual)

January 2021 Bacterial Locomotion and Signal Transduction (BLAST) XVI, Virtual

January 2021 Society of Integrative and Comparative Biology Annual Meeting, Virtual

October 2020 Rising Stars in Soft and Biological Matter, University of Chicago, Chicago, IL (Virtual)

August 2020 †Biological Physics-Physical Biology Seminar Series, Virtual Seminar
- Video: https://www.youtube.com/watch?v=EyC_Pgk66Rc

February 2020 †Mechanical Engineering Seminar, Columbia University, New York, NY
February 2020 †Ecology and Evolutionary Biology Seminar, Princeton University, Princeton, NJ
February 2020 †Center for Soft Matter Research Seminar, New York University, New York, NY
February 2020 †NanoSeminar, New York University, New York, NY
February 2020 †Condensed and Living Matter Seminar, University of Pennsylvania, Philadelphia, PA
August 2019 Postdocs in Complexity, Santa Fe Institute, Santa Fe, NM
June 2019 †Computational Biology Seminar, IBM Research, Yorktown Heights, NY
March 2019 †American Physical Society March Meeting, Boston, MA
June 2018 †Open Access Oxford, University of Oxford, Oxford UK
April 2018 †Widely Applied Mathematics Seminar, Harvard University, Cambridge, MA
March 2018 Postdocs in Complexity, Santa Fe Institute, Santa Fe, NM
November 2017 †Biophysics Seminar, Weill Cornell Medical School, New York, NY
March 2017 †Biological Physics Seminar, University of Oxford, Oxford, UK
February 2017 †Physics and Biology Seminar, Rockefeller University, New York, NY
February 2017 Biophysical Society Annual Meeting, New Orleans, LA
February 2017 †Physics of Living Systems Seminar, MIT, Cambridge, MA
January 2017 Postdocs in Complexity, Santa Fe Institute, Santa Fe, NM
October 2016 Moore-Sloan Data Science Environment Summit, New Paltz, NY
September 2016 Berkeley Biophysics Annual Retreat, Marshall, CA
August 2016 Symposium on Computational Biology, UC Berkeley, Berkeley, CA
June 2016 †Soft Matter Seminar, Simon Fraser University, Burnaby, Canada
May 2016 Microbiology Student Symposium, UC Berkeley, Berkeley, CA
April 2016 †Integrative Biology Biomechanics Seminar, UC Berkeley, Berkeley, CA
March 2016 American Physical Society Annual March Meeting, Baltimore, MD
March 2016 †Cardiovascular Research Institute Seminar, UCSF, San Francisco, CA
December 2015 †Statistical Physics Seminar, Eötvös University (ELTE), Budapest, Hungary
February 2015 †Integrative Biology Biomechanics Seminar, UC Berkeley, Berkeley, CA
November 2014 QB3 Computational Biology Annual Retreat, Marshall, CA
- Best Oral Presentation Award

October 2014 †Microsoft Research Biological Computation Seminar, Cambridge, UK
September 2014 †Max Planck Institute for Biophysics, Frankfurt, Germany
August 2014 †SIAM Annual Conference on the Life Sciences, Charlotte, NC
- Highlighted in "SIAM Connects" video series (http://y2u.be/jnvUbKXr8Og)
- SIAM Student Travel Award

August 2014 UC Berkeley Symposium on Computational Biology, Berkeley, CA
April 2013 †23andMe, Mountain View, CA
February 2010 Biophysical Society Annual Meeting, San Francisco, CA
Sept 2008 Conference for Women in Mathematics in New England, Northampton, MA
March 2008 Symposium for Undergraduates in Mathematics, Providence, RI, USA

Posters

June 2017 Single-Cell Biophysics: Measurement, Modulation, Modeling, Taipei, Taiwan

June 2016 Engineering Approaches to Biomolecular Motors, Vancouver, Canada

- *Biophysical Journal* Outstanding Poster Award in the Student Category
- International Union for Pure and Applied Biophysics Travel Award

November 2014 Mechanobiology: Pushing and Pulling on Life, Palo Alto, CA

November 2014 QB3 Computational Biology Annual Retreat, Marshall, CA

September 2014 Cell Physics, Universität des Saarlandes, Saarbrücken, Germany

October 2013 UC Berkeley Biophysics Annual Retreat, Marshall, CA

July 2013 Computational Neuroscience Annual Meeting, Paris, France

- CNS Student / Postdoc Travel Award

October 2012 American Society for Bone and Mineral Research, Minneapolis, MN

October 2012 UCSF Annual Imaging Research Symposium, San Francisco, CA

August 2009 Mathematical Association of America MathFest, Portland, OR

Workshops

November 2019 Moore-Sloan Data Science Environment Summit, Santa Fe, NM

June 2017 Algorithmic Challenges in Genomics Reunion, Simons Institute, Berkeley, CA

March 2013 Mathematics of Biochemical Reaction Networks, AIM, Palo Alto, CA

February 2012 Stochastic Dynamics of Small Networks of Neurons, AIM, Palo Alto, CA

Organization

2018 – Present **Center for Physics and Biology Seminar, Rockefeller University**, New York, NY.
Weekly seminar series, co-organized with David Zeevi.

2018 **Reproducibility and Open Access in Research, All Souls College**, Oxford, UK.
Weekly seminar series, co-organized with Lisa Lodwick.

2017 — 2018 **Reproducible Research Hackathons, Berkeley Institute for Data Science**.
Two-day hackathons, co-organized with Hilmar Lapp, Kellie Ottoboni, Tracy Teal
Developed a curriculum on reproducible research practices using Jupyter notebooks
Curriculum taught at UC Berkeley, UC Merced, Duke, among other places

June 2017 **Cellular Biophysics: Experiment Meets Theory, QB3**, Berkeley, CA.
One-day symposium, co-organized with Matthew Akamatsu, Charlotte Kaplan, Carl Schreck
Sponsored and funded by QB3 and Nikon

Teaching, Mentoring, and Outreach

2018 **Tutor**, *Baliol College*, University of Oxford.
Held discussion sections and graded problem sets for masters-level (MPhys) students in statistical mechanics, fluid dynamics, and biophysics.

2015 — 2017 **Data Science Fellow**, University of California, Berkeley.
Held office hours for the UC Berkeley community on general data science questions.

2013 **Lecturer**, *c-Splash*, Courant Institute of Mathematical Sciences, New York, NY.
Gave a lecture on my work at Courant Splash, a day of lectures geared towards high school students interested in mathematics organized by the Courant Institute of Mathematical Sciences at NYU.

2007 — 2008 **Grader**, *Courant Institute for Mathematical Sciences*, NYU, New York, NY.
Grading and holding office hours for several undergraduate mathematics courses, including multivariable calculus, introductory statistics, and differential equations.

Mentoring the following students:

- Jordan Juritz (MPhys 2018, University of Oxford)
- Mantas Krisciunas (MPhys 2017, University of Oxford)
- Robin Parrish (BS Bioengineering 2014, UC Berkeley)

Service

2018 **Undergraduate admissions**, *St Catherine's College*, University of Oxford.
Conducted admissions interviews for the undergraduate and masters physics course at Oxford.

2015 — 2016 **Reproducibility Group Coordinator**, University of California, Berkeley.
Moderated reproducibility working group meetings in the Berkeley Institute for Data Science.

Reviewer for: *Nature Communications, Journal of Experimental Biology, Frontiers in Marine Science, Integrative and Comparative Biology, BioEssays, Biological Journal of the Linnean Society, Biomolecules, Acta Biotheoretica, Journal of Mechanics and Physics of Solids, Journal of Bacteriology, Physica Scripta.*