

# Kirill S. Korolev

Assistant Professor in Physics and Bioinformatics, Boston University  
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## EDUCATION

*Harvard University*, Cambridge, MA

- **Ph.D. in theoretical condensed matter physics** May 2010  
Thesis: Statistical physics of topological emulsions and expanding populations  
Advisor: David R. Nelson

*Moscow Institute of Physics and Technology (MIPT)*, Dolgoprudny, Russia

- **B.S. with highest honors in applied physics and applied mathematics** July 2005  
Undergraduate thesis: Magnetization relaxation in monocrystals of YBaCuO  
Advisor: Lyudmila S. Uspenskaya

## APPOINTMENTS

- Associate Professor (with tenure), *Boston University* 2020–present  
Joint appointment between the Department of Physics and the Graduate Program in Bioinformatics
- Assistant Professor, *Boston University* 2013–2020  
Joint appointment between the Department of Physics and the Graduate Program in Bioinformatics
- Pappalardo Postdoctoral Fellow, *MIT* 2010–2013  
Advisors: Leonid A. Mirny and Jeff Gore
- Postdoctoral Fellow, *Harvard University* 2010  
Advisor: David R. Nelson

## HONORS AND AWARDS

- Cottrell Scholar, *Research Corporation for Science Advancement (RCSA)* 2017
- Simons Investigator in the Mathematical Modeling of Living Systems, *Simons Foundation* 2016
- Junior Faculty Fellow, *Hariri Institute for Computing* 2015
- Scialog Fellow, *Research Corporation for Science Advancement* 2014–2016
- Pappalardo Postdoctoral Fellow, *MIT* 2010–2013
- Certificate of Distinction in Teaching, *Harvard University* 2009
- Goldhaber Prize to an outstanding PhD candidate, *Harvard University* 2008
- Purcell Fellowship to incoming PhD students, *Harvard University* 2005–2006
- Scholarship for academic excellence, *MIPT* 2002–2005
- Potanin Fellowship, *MIPT* 2002–2005
- Gold medal International Physics Olympiad (IPhO) XXXII, Turkey 2001

## FUNDING

*Current*

- Title: Relationship between genealogies and biophysical processes during spatial growth  
Sponsor: NIH/NIGMS  
Award Number: 1R01GM138530-01 (PI: KOROLEV)  
Dates: 09/11/2020-06/30/2025  
Total Costs to Korolev lab: \$1,424,380

- Title: Simons Investigator in the Mathematical Modeling of Living Systems  
Sponsor: Simons Foundation  
Award Number: 409704 (PI: KOROLEV)  
Dates: 08/01/2016 - 07/31/2021  
Total Costs to Korolev lab: \$660,000

*Completed*

- Title: Chiral pattern formation and the benefits of chirality  
Sponsor: Research Corporation for Science Advancement  
Award Number: 24010 (PI: KOROLEV)  
Dates: 07/01/2017 - 06/30/2020  
Direct Costs to Korolev lab: \$100,000
  
- Title: The evolutionary dynamics of temporal division of labor  
Sponsor: Research Corporation for Science Advancement  
Award Number: 26119 (PIs: KOROLEV & KIM)  
Dates: 10/01/2018 - 09/31/2019  
Total Costs to Korolev lab: \$55,000
  
- Title: What is fitness in expanding populations?  
Sponsor: Gordon and Betty Moore Foundation  
Award Number: 6790.08 (PIs: KOROLEV & KIM)  
Dates: 07/26/2017 - 07/25/2018  
Total Costs to Korolev lab: \$56,250
  
- Title: Social Networks at Microscale  
Sponsor: Hariri Institute for Computing and Computational Science & Engineering  
Award Number: 2016-10-005 (PIs: KOROLEV & SEGRE)  
Dates: 01/01/2017 - 12/31/2017  
Direct Costs to Korolev lab: \$10,000
  
- Title: Hariri Junior Faculty Fellow  
Sponsor: Hariri Institute for Computing and Computational Science & Engineering  
Direct Costs to Korolev lab: \$5,000

**TEACHING EXPERIENCE**

*Boston University*

- Foundations of Programming, Data Analytics, and Machine Learning in Python      Fall 2019-2020
- Computational Physics      Fall 2019-2020
- Computational and Quantitative Reasoning for Bioinformatics and Systems Biology      Fall 2018
- Mathematical Physics      Fall 2013–2018
- Dynamics and Evolution of Biological Networks      Spring 2014–2017
- Bioinformatics Graduate Seminar      Spring 2014–2017

*Harvard University*

- Departmental Teaching Fellow; Physics Department      2009–2010  
Ran a training program in pedagogy for new Teaching Fellows
- Physical Sciences 2; Head Teaching Fellow      Fall 2008
- Advanced Electromagnetism; Teaching Fellow      Fall 2007
- Physical Sciences 3; Teaching Fellow      Spring 2007

- Physical Sciences 2; Teaching Fellow
- Physics 1a; Teaching Fellow

Fall 2006  
Summer 2006

## ADVISING

### *Postdoctoral scholars*

- Robert Marsland (2017–2020); PhD from MIT with Jeremy England, jointly advised with Pankaj Mehta and Daniel Segrè  
Publications: [32]
- Alexander Golden (2018–2021); PhD from University of Michigan with David Lubensky, jointly advised with Pankaj Mehta and Daniel Segrè
- Feng Wang (2014–2016); PhD from Hong Kong University of Science and Technology with Yilong Han  
Publications: [20], [23]  
he went on to do a second postdoc at HUST and then started a faculty position at Tianjin University

### *Graduate students*

- Dileep Kishore (2016–present)  
co-advised with Daniel Segrè on a project to create a database of microbial interactions  
Publications: [39], [40]
- Ashish George (2015–2020)  
Thesis: Evolutionary effects of broken symmetries and nonlinearities in range expansions  
Publications: [30], [33]
- Gabriel Birzu (2014–2019)  
Thesis: Stochastic reaction-diffusion fronts: Applications to ecology and evolution  
Publications: [31], [35], [37], [39], [40]
- Rajita Menon (2014–2018)  
Thesis: Network topology and community function in spatial microbial communities  
Publications: [18], [23], [27], [28], [29]  
upon graduation, she started on a research team at Vedanta Biosciences in Cambridge, MA
- Michael Chernicoff (2014–2015)  
graduated with a Master's degree in Physics and then in Education;  
started teaching in Cambridge Latin High School.

### *Undergraduate students*

- Pranai Basani (2019-present)  
investigates evolution of mechanical properties of cancer cells  
recipient of UROP funding for Summer 2019
- Ryan Cornelli (2018-2019)  
investigates growth of large microtubule complexes with cooperative nucleation
- Sakib Matin (2017-2018)  
carried out independent research on mode locking and diversity loss during invasions  
Publications: [33], [35]  
started PhD in Physics at BU
- Daniel Varoli (2016-2018)  
co-advised with Rama Bansil; senior thesis on patten formation in *Helicobacter pylori* colonies  
he went for a Master Degree in France, will start PhD in Biomedical Engineering at BU.
- Daniel Collins (2017-2018)  
co-advised with Shyamsunder Erramilli on the tradeoff between complexity and stability of proteins
- Michelle Patino (2018-2018)  
REU student in Bioinformatics from the University of Texas at El Paso;  
compared methods to carry out microbiome-wide association studies  
Publications: there is a potential for a future publication based on her work
- Brianna Richardson (2017-2017)  
REU student in Bioinformatics from the University of Maryland Baltimore County;

- carried out a microbiome-wide association study on collagenous gastritis
- Vivek Ramanan (2016-2016)  
REU student in Bioinformatics from Swarthmore College;  
developed new methods to separate direct from spurious associations in microbiome studies  
Publications: [29]
- Xiangxi Gao (2015-2015)  
REU student in Bioinformatics from Emory University;  
compared microbial interaction networks in controls and patients with Crohn's disease
- Peter Freese (2010-2012)  
senior thesis at Harvard University jointly advised with Irene Chen; went to graduate school at MIT.  
Thesis: Modeling and simulation of bacterial conjugation in spatially structured populations and its inhibition by bacteriophage infection  
Publications: [14].

*Visiting graduate students*

- Keisuke Ishihara (2014-2016)  
PhD student from Tim Mitchison's lab at Harvard Medical School;  
now ELBE fellow, Max Planck Institute, Center for Systems Biology Dresden  
I advised him on mathematical modeling of the growth of large microtubule complexes  
Publications: [22], [38]
- Kohaku So (2015-2015)  
Physics PhD student from the University of Tokyo;  
studied the effect of density-dependent growth on the evolution of dispersal  
Publications: there is a potential for a future publication based on his work
- Quentin Hoarau(2014-2014)  
Physics Master student from Ecole Normale Superieure of Cachan;  
studied the effects of phenotypic heterogeneity on evolutionary dynamics

*High school students*

- Kaitlyn Hoxha (2018)  
6 week intern through BU RISE;  
studied the effects of different nucleation mechanisms on the growth of microtubule complexes  
Publications: there is a potential for a future publication based on her work
- Raghav Jain (2017)  
6 week intern through BU RISE;  
studied how phenotypic switching between growth and dispersal phenotypes affects tumor growth
- Sanjena Venkatesh (2016)  
6 week intern through BU RISE;  
studied how natural selection shapes the genetic architecture of tumor suppression in different tissues
- Adarsh Ramchandran (2015)  
6 week intern through BU RISE;  
studied predictability of microbiome time series data
- Luanna Ferreeira (2015)  
6 week intern through MIT RSI;  
studied predictability of microbiome time series data
- Andrew Li (2015)  
local high school student;  
studied predictability of microbiome time series data
- Alexander Smirnov(2015)  
6 week intern through BU RISE;  
studied the effect of recombination on fitness valley crossing in spatially structured populations
- You Jin Reo (2015)  
6 week intern through MIT RSI;  
studied nutrient distribution around growing microbial colonies

*Other mentees*

- Saurabh Gandhi (2015-2019)  
graduate student in Jeff Gore lab at MIT  
Thesis: Population and evolutionary dynamics during microbial range expansions  
Publications: [21], [36]
- Christopher McFarland (2010-2014)  
graduate student in Leonid Mirny lab at MIT; now postdoc at Stanford University  
Thesis: The role of deleterious passengers in cancer.  
Publications: [10], [16]
- Lei Dai (2011-2015)  
graduate student in Jeff Gore lab at MIT; postdoc at UCLA;  
now on faculty at Chinese Academy of Sciences in Shenzhen  
Thesis: Spatio-Temporal Dynamics Before Population Collapse (APS DBIO Thesis Prize)  
Publications: [8], [12], [17]

**SERVICE**

I perform service for both the Department of Physics and the Graduate Program in Bioinformatics. I am also a member of the Biological Design Center (BDC).

*Bioinformatics*

I am one of the four faculty members who oversee all aspects of the program that has about 60 PhD and 30 Master's students. We meet biweekly to resolve student issues, plan events such as an annual retreat and international conference, update curriculum, perform academic program reviews, etc. In addition, I serve as an academic advisor and a member of thesis committees for about 10 students a year and review applications and conduct interviews for PhD and Master's admissions. The four faculty share the work involved in applying for funding; we have just successfully renewed our NIH T32 grant and received NSF funding for an REU program. I also worked with Daniel Segrè to launch BU Microbiome initiative and fund it via Affinity Research Collaborative and other internal BU funding sources.

*Physics*

I have served on two faculty search committees, colloquium committee (10 semesters), graduate curriculum and student affairs committee (8 semesters), comprehensive examinations committee (5 semesters), group grants committee (2 semesters), website and marketing committee (4 semesters), graduate recruitment committee (2 semesters), and organized a brand new biophysics seminar for 1 year. I also serve as an academic advisor, thesis reader, oral exam committee member, thesis defense committee member for about 5 physics students a year.

**PROFESSIONAL ACTIVITIES**

*Editorial work and peer review*

- Serve on the editorial board of JSAT (Journal of Statistical Mechanics: Theory and Experiment).
- Review grant applications for Simons Foundation, Research Corporation for Science Advancement, Department of Defense, National Science Foundation
- Referee for Physical Review Letters, PNAS, eLife, Cell, Current Biology, Nature Communications, PLoS Biology, PLoS Computational Biology, Evolution, Proceedings of the Royal Society B, Europhysics Letters, Reviews of Modern Physics, Oikos, Trends in Cancer, Genetics, Physical Biology, Physical Review E, PLoS ONE, JSTAT, Nonlinearity Journal of the Royal Society Interface, Bulletin of Mathematical Biology, Journal of Mathematical Biology, Scientific Reports, ISME Journal, Cell Systems, Proceedings of the Royal Society Interface, New Journal of Physics, Physica D

*Conferences, meeting, and outreach*

- Co-organized BU Theory of Living Systems Conference

2019

- Co-organized BU Theory in Biology Conference 2018
- Organized BU biophysics seminar 2017–2018
- Co-organized invited session at APS March meeting titled  
“Complex microbial communities” 2016
- Outreach lecture to 30 Boston area high school science teachers on  
the synergies between research in physics and biology 2014
- Organized Harvard Condensed Matter Theory Kid’s Seminar 2008–2010
- Helped organize Biannual Teaching Conference, Harvard University 2009
- Helped organize High School Physics Olympiads, Russia 2001–2004

## INVITED TALKS

- Materials Research Science and Engineering seminar series, *Brandeis University* 2019  
Universality classes in the evolutionary dynamics of expanding populations
- Theory & Biology conference, *Simons Foundation, NYC* 2019  
Universality classes in the evolutionary dynamics of expanding populations
- Physics Colloquium, *University of Michigan* 2019  
Universality classes in the evolutionary dynamics of expanding populations
- Frontiers in Quantitative and Systems Biology seminar series, *UCLA* 2019  
The role of space in population dynamics
- Mathematical Modeling and Basic Biology groups, *Fred Hutch Cancer Center, Seattle* 2019  
The role of space in population dynamics
- Physicists working on cancer, *Weizemann Institute of Science, Israel* 2018  
Population genetics and ecology of spatially growing populations
- American Society for Microbiology Microbe Meeting, *Atlanta, GA* 2018  
Effects of cellular chirality on competition and cooperation in microbial colonies
- Microbiome: Applications & Future, *Synthetic Biology Center, MIT* 2018  
Theory & Microbiome
- American Physical Society March Meeting, *Los Angeles, CA* 2018  
Neither pulled nor pushed: A new class of reaction diffusion waves
- Condensed Matter Kid’s Seminar, *Harvard University* 2018  
Neither pulled nor pushed: A new class of reaction diffusion waves
- Fundamental problems in active matter, *Aspen Institute of Physics* 2018  
Effects of Cellular Chirality on Competition and Cooperation in Microbial Colonies
- Biomathematics Seminar, *Harvard University* 2017  
Evolution during range expansions of cooperatively growing populations
- Workshop on Systems Biology and Molecular Economy of Microbial Communities, 2017  
*International Center for Theoretical Physics (ICTP), Trieste, Italy*  
The role of spatial structure in microbial interactions
- BU Microbiome Day, *Boston University* 2017  
Statistical physics of microbial communities
- Bioinformatics and Computational Biology Seminar, *Worcester Polytechnic Institute* 2017  
Mutations that slow down cancer
- Physics Department Colloquium, *University of Massachusetts, Boston* 2016  
To grow or not to grow: From microtubules to cancer
- Center for Theoretical Biological Physics Seminar, *Rice University* 2016  
Beyond the Standard Model of Growth: From Chiral Cells to Polymer Networks
- Widely Applied Mathematics *Harvard University* 2016  
Survival of the chiral: Chiral microbes succeed by altering spatial structure
- Squishy Physics, *Harvard University* 2016  
Assembly and control of large microtubule complexes
- XXIII Summer School Nicolás Cabrera, *Madrid, Spain* 2016  
Phase transitions in populations dynamics of microbes and cancer
- Channing Network Science Seminar, *Harvard Medical School* 2016

- Ecology and evolution of cancer tumors
- First MIT Meeting on Quantitative Ecology, *Massachusetts Institute of Technology* 2016  
The games microbes play
- Populations, Evolution, and Physics, *Aspen Institute of Physics* 2016  
Evolution during cooperative growth
- Center for Genomics and Computational Biology Seminar Series, *Duke University* 2015  
The tug-of-war between deleterious and beneficial mutations in cancer
- Hariri Institute for Computing and Computational Science & Engineering, *Boston, MA* 2015  
Why cancer is so rare?
- American Physical Society March Meeting, *San Antonio, TX* 2015  
Diffusion-limited mutualism
- Digestive Disease Week, *Chicago* 2014  
Community structure of bacteria in the human microbiome
- Biology Department Seminar Series, *Boston University* 2014  
Evolutionary dynamics in cancer
- Physics Department Colloquium, *Emory University* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Biophysics Seminar Series, *Massachusetts Institute of Technology* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Laufer Center Seminar, *University of Stony Brook* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Biophysics Theory Seminar, *Purdue University* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Complex Systems Seminar, *University of Michigan* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Evolution Seminar, *University of Pennsylvania* 2013  
Ecology and evolution of cancer tumors and expanding populations
- Systems Biology Seminar, *Boston University* 2013  
Ecology and evolution of cancer tumors and expanding populations
- 15th Annual Greater Boston Area Statistical Mechanics Meeting, *Brandeis University* 2013  
Dynamics of evolutionary innovations in cancer
- Workshop on Selection in Population Genetics, *Radcliffe Institute* 2012  
Dangerous passengers: A closer look at deleterious mutations in evolutionary models of cancer
- Condensed Matter Seminar, *UMass Amherst* 2012  
Statistical mechanics of genes in expanding microbial colonies
- Condensed Matter Theory Kid's Seminar, *Harvard University* 2012  
Dangerous passengers: A closer look at deleterious mutations in evolutionary models of cancer
- Towards Unifying Concepts in the Physics of Aperiodic Systems, *Princeton University* 2011  
Space, evolution, and the Petri dish: Statistical mechanics of stochastic demixing and deterministic mixing in microbial colonies
- Condensed Matter Seminar, *Virginia Tech* 2011  
Space, evolution, and the Petri dish
- Pappalardo Symposium; and Faculty lunch, *MIT* 2011  
Genetic demixing in bacterial colonies
- Mini Stat Mech Meeting, *UC Berkeley* 2011  
Genetic mixing and demixing in bacterial colonies
- Cells, Circuits, and Computation, *Harvard University* 2010  
Spatial assays for microbial evolution
- Center for the Physics of Living Cells, *UIUC* 2010  
Population genetics in a Petri dish
- Widely Applied Mathematics seminar, *Harvard University* 2009  
Genetic demixing and Fisher waves

## PUBLICATIONS AND CITATIONS

Up-to-date bibliometric information is available through my Google Scholar profile:  
<https://scholar.google.com/citations?user=-2jHQakAAAAJ>

## MANUSCRIPTS IN PREPARATION

41. Ilija Dukovski, Djordje Bajić, Jeremy M. Chacón, Michael Quintin, Jean C.C. Vila, Snorre Sulheim, Alan R. Pacheco, David B. Bernstein, William J. Rieh, [Kirill S. Korolev](#), Alvaro Sanchez, William R. Harcombe, Daniel Segrè, *Computation Of Microbial Ecosystems in Time and Space (COMETS): An open source collaborative platform for modeling ecosystems metabolism*, arXiv:2009.01734
40. Dileep Kishore\*, Gabriel Birzu\*, Zhenjun Hu, Charles DeLisi, [Kirill S. Korolev](#), and Daniel Segrè, *Inferring microbial co-occurrence networks from amplicon data: a systematic evaluation*, bioRxiv (2020); <https://doi.org/10.1101/2020.09.23.309781>
39. Zhenjun Hu, Yan Wang, Dileep Kishore\*, Gabriel Birzu\*, [Kirill S. Korolev](#), Charles DeLisi, and Daniel Segrè, *MIND—A web platform for visual analyses of the microbial interaction data*
37. Gabriel Birzu\*, Oskar Hallatschek, and [Kirill S. Korolev](#), *Genealogical structure changes as range expansions transition from pushed to pulled*, bioRxiv (2021); <https://doi.org/10.1101/2020.12.29.424763>

## PEER-REVIEWED PUBLICATIONS

### 2020

38. Keisuke Ishihara\* and [Kirill S. Korolev](#), *Traveling fronts in self-replicating persistent random walks with multiple internal states*, **New Journal of Physics** 22(8) 083034 (2020)

### 2019

36. Saurabh R. Gandhi, [Kirill S. Korolev](#) and Jeff Gore, *Cooperation mitigates diversity loss in a spatially expanding microbial population*, **PNAS** 116(47), 23582-23587 (2019)
  - *Highlighted in a commentary by Mark Lewis: Feasting yeast and the sweetness of diversity in PNAS.*
35. Gabriel Birzu\*, Sakib Matin†, Oskar Hallatschek, and [Kirill S. Korolev](#), *Genetic drift in range expansions is very sensitive to density feedback in dispersal and growth*, **Ecology Letters** 22, 1817-1827 (2019)
34. Maxime Deforet, Carlos Carmona Fontaine, [Kirill S. Korolev](#), and Joao B. Xavier, *Contribution of growth and dispersal to the evolution of expanding populations*, **American Naturalist** 194(3), 291-350 (2019)
33. Ching-Hao Wang\*, Sakib Matin†, Ashish George\*, and [Kirill S. Korolev](#), *Pinned, locked, pushed, and pulled traveling waves in structured environments*, **Theoretical Population Biology** 127, 102-119 (2019)
32. Robert Marsland III\*, Wenping Cui, Joshua Goldford, Alvaro Sanchez, [Kirill S. Korolev](#), and Pankaj Mehta, *Available energy fluxes drive a phase transition in the diversity, stability, and functional structure of microbial communities*, **PLoS Computational Biology** 15(2), e1006793 (2019)
  - *Included in PLoS Microbiome Channel*

### 2018

31. Gabriel Birzu\*, Oskar Hallatschek, and [Kirill S. Korolev](#), *Fluctuations uncover a distinct class of traveling waves*, **PNAS** 115, E3645-E3654 (2018)
30. Ashish George\* and [Kirill S. Korolev](#), *Chirality provides a direct fitness advantage and facilitates intermixing in cellular aggregates*, **PLoS Computational Biology** 14(12), e1006645 (2018)
29. Rajita Menon\*, Vivek Ramanan†, and [Kirill S. Korolev](#), *Interactions between species introduce spurious associations in microbiome studies*, **PLoS Computational Biology** 14(1), e1005939 (2018)
28. Mohammad I. El Mouzan, Harland S. Winter, Assad A. Assiri, [Kirill S. Korolev](#), Ahmad A. Al Sarkhy, Scot E. Dowd, Mohammad A. Al Mofarreh, and Rajita Menon\*, *Microbiota profile in new-onset pediatric Crohn's disease: data from a non-Western population*, **BMC Gut Pathogens** 10, 49 (2018)



27. Mohammad I El Mouzan, [Kirill S. Korolev](#), Mohammad A. Al Mofarreh, Rajita Menon\*, Harland S. Winter, Ahmad A. Al Sarkhy, Scot E Dowd, Ahmad M. Al Barrag, and Asaad A Assiri, *Fungal dysbiosis predicts the diagnosis of pediatric Crohn's disease*, **World Journal of Gastroenterology** 24(39): 4510-4516 (2018)

26. Mina Nazari, Xiaoqing Li, Mohammad Amin Alibakhshi, Haojie Yang, Kathleen Souza, Christopher Gillespie, Suryaram Gummuluru, Björn M. Reinhard, [Kirill S. Korolev](#), Lawrence D. Ziegler, Qing Zhao, Meni Wanunu, Shyamsunder Erramilli, *Femtosecond Photonic Viral Inactivation Probed Using Solid-State Nanopores*, **Nano Futures** 2, 045005 (2018)

## 2017

25. Ana B. Pavel\* and [Kirill S. Korolev](#), *Genetic load makes cancer cells more sensitive to common drugs: evidence from Cancer Cell Line Encyclopedia*, **Scientific Reports** 7, 1938 (2017)

24. Liselotte Jauffred, Rebecca Munk-Vejborg, [Kirill S. Korolev](#), Stanley Brown, and Lene B. Oddershede, *Chirality in microbial biofilms is mediated by close interactions between the cell surface and the substratum*, **ISME Journal** 11, 1688-1701 (2017)

23. Mohammad El Mouzan, Feng Wang\*, Mohammad Al Mofarreh, Rajita Menon\*, Ahmad Al Barrag, [Kirill S. Korolev](#), Ahmad Al Sarkhy, Mona Al Asmi, Yassin Hamed, Anjum Saeed, Scot Dowd, Asaad Assiri, and Harland Winter, *Fungal microbiota profile in newly-diagnosed treatment-naive children with Crohn disease*, **Journal of Crohn's and Colitis** 11, 586-592 (2017)

## 2016

22. Keisuke Ishihara\*, [Kirill S. Korolev](#), Timothy J. Mitchison, *Physical basis of large microtubule aster growth*, **eLife** e19145 (2016)

21. Saurabh R. Gandhi, Eugene A. Yurtsev, [Kirill S. Korolev](#) and Jeff Gore, *Range expansions transition from pulled to pushed waves as growth becomes more cooperative in an experimental microbial population*, **PNAS** 113, 6923 (2016)

• *Highlighted in a PNAS Commentary by Mark Lewis: Finding the sweet spot for invasion theory.*

20. Feng Wang\*, Jess L. Kaplan, Benjamin D. Gold, Manoj K. Bhasin, Naomi L. Ward, Richard Keller-mayer, Barbara S. Kirschner, Melvin B. Heyman, Scot E. Dowd, Stephen B. Cox, Haluk Dogan, Blaire Steven, George D. Ferry, Stanley A. Cohen, Robert N. Baldassano, Christopher J. Moran, Elizabeth A. Garnett, Lauren Drake, Hasan H. Otu, Leonid A. Mirny, Towia A. Libermann, Harland S. Winter, and [Kirill S. Korolev](#), *Detecting microbial dysbiosis associated with pediatric Crohn disease despite the high variability of the gut microbiota*, **Cell Reports** 14, 945 (2016)

## 2015

19. [Kirill S. Korolev](#), *Evolution arrests invasions of cooperative populations*, **Physical Review Letters** 115, 208104 (2015)

• *Highlighted in APS Physics, Focus: Evolution sometimes slows things down.*

18. Rajita Menon\* and [Kirill S. Korolev](#), *Public good diffusion limits microbial mutualism*, **Physical Review Letters** 114, 168102 (2015)

• *Highlighted in APS Physics, Synopsis: Microbes share, but not too much.*

17. Lei Dai, [Kirill S. Korolev](#), and Jeff Gore, *Relation between stability and resilience determines the performance of early warning signals under different environmental drivers*, **PNAS** 112, 10056 (2015)

## 2014

16. Christopher D. McFarland\*, Leonid A. Mirny, and [Kirill S. Korolev](#), *Tug-of-war between driver and passenger mutations in cancer and other adaptive processes*, **PNAS** 111, 15138 (2014)

• *Highlighted in Editor's Choice in Science.*

15. [Kirill S. Korolev](#), Joao B. Xavier, and Jeff Gore, *Turning ecology and evolution against cancer*, **Nature Reviews Cancer** 14, 371 (2014)

• *Highlighted in MIT News.*

14. Peter D. Freese<sup>†</sup>, [Kirill S. Korolev](#), Jose I. Jimenez, and Irene A. Chen, *Genetic drift suppresses bacterial conjugation in spatially structured populations*, **Biophysical Journal** 106, 944 (2014)

## 2013

13. Manoshi S. Datta<sup>\*</sup>, [Kirill S. Korolev](#), Ivana Cvijovic<sup>†</sup>, Carmel Dudley<sup>†</sup>, and Jeff Gore, *Range expansion promotes cooperation in an experimental microbial metapopulation*, **PNAS** 110, 7354 (2013)

• *Highlighted in Quanta Magazine and Wired.com.*

12. Lei Dai, [Kirill S. Korolev](#), and Jeff Gore, *Slower recovery in space before collapse of connected populations*, **Nature** 496, 355 (2013)

• *Highlighted in Nature News and Views, Science News, and MIT News.*

11. [Kirill S. Korolev](#), *The fate of cooperation during range expansions*, **PLoS Computational Biology** 9, e1002994 (2013)

10. Christopher D. McFarland, [Kirill S. Korolev](#), Gregory V. Kryukov, Shamil Sunyaev, and Leonid A. Mirny, *The impact of deleterious passenger mutations on cancer progression*, **PNAS** 110, 2910 (2013)

• *Highlighted in Nature Reviews Cancer and MIT News.*

9. Maxim O. Lavrentovich, [Kirill S. Korolev](#), and David R. Nelson, *Radial Domany-Kinzel models with mutation and selection*, **Physical Review E** 87, 012103 (2013)

## 2012

8. Lei Dai, Daan Vorselen, [Kirill S. Korolev](#), Jeff Gore, *Generic indicators for loss of resilience before tipping point leading to population collapse*, **Science** 336, 1175 (2012)

• *Highlighted on yeastgenome.org: Yeast on the Brink and in Condensed Matter Journal Club.*

7. [Kirill S. Korolev](#), Melanie J.I. Müller, Nilay Karahan, Andrew W. Murray, Oskar Hallatschek, and David R. Nelson, *Selective sweeps in growing microbial colonies*, **Physical Biology** 9, 026008 (2012)

## 2011

6. [Kirill S. Korolev](#), Joao B. Xavier, David R. Nelson, and Kevin R. Foster, *A quantitative test of population genetics using spatiogenetic patterns in bacterial colonies*, **The American Naturalist** 178, 538 (2011)

5. [Kirill S. Korolev](#) and David R. Nelson, *Competition and cooperation in one-dimensional stepping-stone models*, **Physical Review Letters** 107, 088103 (2011)

## 2005 - 2010

4. [Kirill S. Korolev](#), Mikkel Avlund, Oskar Hallatschek, and David R. Nelson, *Genetic demixing and evolution in linear stepping stone models*, **Reviews of Modern Physics** 82, 1691 (2010)

• *Highlighted in Nature Physics: Dimensional Analysis.*

3. Oskar Hallatschek and [Kirill S. Korolev](#), *Fisher waves in the strong noise limit*, **Physical Review Letters** 103, 108103 (2009)

2. [Kirill S. Korolev](#) and David R. Nelson, *Defect-mediated emulsification in two dimensions*, **Physical Review E** 77, 051702 (2008)

1. L.S. Uspenskaya, [Kirill S. Korolev](#), and P.N. Yarykin, *Peculiarity of magnetization relaxation in finite size superconductors*, **Physica C** 423, 181 (2005)

## NOTES

<sup>\*</sup> denotes graduate students and postdoctoral scholars whose work for a given publication was supervised by me.

<sup>†</sup> denotes undergraduate students whose work for a given publication was supervised by me.

*PLoS* stands for Public Library of Science; a family of open access journals.

*PNAS* stands for Proceedings of the National Academy of Sciences, USA; a peer reviewed journal covering all natural and social sciences.

*ISME* stands for International Society of Microbial Ecology, which publishes ISME journal.

*BMC* stands for BioMed Central; a family of open access journals.