# MICHAEL BAYM

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Harvard Medical School
Department of Biomedical Informatics
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## Academic Appointments

*Harvard Medical School*
**Assistant Professor**, Department of Biomedical Informatics — 2017 – present
**Member**, Laboratory of Systems Pharmacology — 2017 – present
**Affiliate Faculty**, Department of Microbiology — 2022 – present

*Broad Institute of MIT and Harvard*
**Associate Member** — 2019 – present

*Rice University*
**Visiting Scholar** in the Center for Theoretical Biological Physics — Spring 2017

## Education and Training

*Harvard Medical School*
**Research Fellow** (postdoctoral) in Systems Biology — 2009 – 2017
Supervisor: Roy Kishony

*Massachusetts Institute of Technology*
**Ph.D. in Applied Mathematics** — 2009
Advisor: Bonnie Berger
Thesis title: "Large, Noisy, and Incomplete: Mathematics for Modern Biology"

*University of Illinois at Urbana-Champaign (UIUC)*
**A.M. in Mathematics** — 2003
**B.S. in Mathematics** with Highest Distinction — 2002
Senior Theses in Mathematics and Chemical Biology

## Prizes, Awards, and Honors

**Systems, Synthetic and Quantitative Biology PhD Program Mentorship Award** — 2022

**A. Clifford Barger Excellence in Mentoring Award** (HMS) (about) — 2021
Harvard Medical-wide mentorship award

**Pew Biomedical Scholarship** (about) — 2020

**Sloan Research Fellowship** (about) — 2020
in Computational and Evolutionary Molecular Biology

**MIT Mystery Hunt Winning Team** — 2019

**Packard Fellowship for Science and Engineering** (about) — 2018

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| **NSF Mathematical Sciences Postdoctoral Research Fellowship** (about) | 2009 |
| **Hertz Foundation Graduate Fellowship** (about) | 2004 |
| **ASEE-NDSEG Graduate Fellowship** (about) | 2004 |
| **Undergraduate Mathematics Major Award** (UIUC Math) (about) | 2002 |
| **Salma Wanna Award** (UIUC Math) (about) | 2001 |
| **Colgate-Palmolive Award for Undergraduate Research** (UIUC) | 2001 |
| **Chancellor's Scholar** (UIUC) (about) | 1999 – 2002 |

## Publications

Google Scholar: `https://scholar.google.com/citations?user=AKLIO9AAAAAJ`

### Reviewed Articles

1. A. Limdi, **M. Baym**, *Resolving deleterious and near-neutral effects requires different pooled fitness assay designs*, Journal of Molecular Evolution, **91**, 325–333 (2023)
2. A. Nyerges, S. Vinke, R. Flynn, S.V. Owen, E.A. Rand, B. Budnik, E. Keen, K. Narasimhan, J.A. Marchand, M. Baas-Thomas, M. Liu, K. Chen, A. Chiappino-Pepe, F. Hu, **M. Baym**, G.M. Church, *Swapped genetic code blocks viral infections and gene transfer,* Nature, **615**, 720–727 (2023)
3. C.L. Dulberger*, C.A. Guerrero-Bustamante*, S.V. Owen, S. Wilson, M.G. Wuo, R.A. Garlena, L.A. Serpa, D.A. Russell, J. Zhu, B.J. Braunecker, G.R. Squyres, **M. Baym**, L. Kiessling, E.C. Garner, E.J. Rubin†. G.F. Hatfull†, *Mycobacterial nucleoid-associated protein Lsr2 is required for productive mycobacteriophage infection*, Nature Microbiology, **8**, 695–710 (2023)
4. J.A. Baaijens*, A. Zulli*, I.M. Ott*, M.E. Petrone, T. Alpert, J.R. Fauver, C.C. Kalinich, C.B.F. Vogels, M.I. Breban, C. Duvallet, K. McElroy, N. Ghaeli, M. Imakaev, M. Mckenzie-Bennett, K. Robison, A. Plocik, R. Schilling, M. Pierson, R. Littlefield, M. Spencer, B.B. Simen, Yale SARS-CoV-2 Genomic Surveillance Initiative, W.P. Hanage, N.D. Grubaugh†, J. Peccia†, **M. Baym**†, *Lineage abundance estimation for SARS-CoV-2 in wastewater using transcriptome quantification techniques*, Genome Biology, **23**, 1–20 (2022)
5. C. Herren, **M. Baym**, *Decreased thermal niche breadth as a trade-off of antibiotic resistance*, The ISME Journal, **16**, 1843–1852 (2022)
6. J.E. Silpe*, J.W.H. Wong*, S.V. Owen, **M. Baym**, E.P. Balskus, *The gut bacterial natural product colibactin triggers induction of latent viruses in diverse bacteria*, Nature, **603**, 315–320 (2022)
7. S.V. Owen*, N. Wenner*, C. Dulberger, E. Rodwell, A. Bowers-Barnard, N. Quinones-Olvera, D.J. Rigden, E.J. Rubin, E.C. Garner, **M. Baym**†, J.C.D. Hinton†, *Prophage-encoded phage defense proteins with cognate self-immunity*, Cell Host and Microbe, **29**, 1620–1633 (2021)
8. A.R. Rowe, F. Salimijazi, L. Trutschel, J. Sackett, O. Adesina, I. Anzai, L.H. Kugelmass, **M. Baym**, B. Barstow, *Identification of a Pathway for Electron Uptake in Shewanella oneidensis*, Communications Biology, **4**, 957 (2021)
9. K. Břinda, **M. Baym**†, G. Kucherov†, *Simplitigs as an efficient and scalable representation of de Bruijn graphs*, Genome Biology, **22**, 96 (2021)
10. L. Kennedy-Shaffer, **M. Baym**, W.P. Hanage, *Perfect as the enemy of good: tracing transmissions with low-sensitivity tests to mitigate SARS-CoV-2 outbreaks*, The Lancet Microbe, **2**, e219–24 (2021)
11. J. Kim, J.H. Bae, **M. Baym**, D.Y. Zhang, *Metastable Hybridization-based DNA Information Storage to Allow Rapid and Permanent Erasure*, Nature Communications, **11**, 5008 (2020)

12. J. Qian, Z. Lu, C.P. Mancuso, H. Jhuang, R. del Carmen Barajas-Ornelas, S.A. Boswell, F.H. Ramírez-Guadiana, V. Jones, A. Sonti, K. Sedlack, L. Artzi, G. Jung, M. Arammash, M. E. Pettit , M. Melfi, L. Lyon, S. V. Owen, **M. Baym**, A.S. Khalil, P. A. Silver, D.Z. Rudner, M. Springer, *Barcoded microbial system for high-resolution object provenance*, Science, **368**, 1135–1140 (2020)
13. D. Russ, F. Glaser, E.S. Tamar, I. Yelin, **M. Baym**, E.D. Kelsic, C. Zampaloni, A. Haldimann, R. Kishony, *Escape mutations circumvent a tradeoff between resistance to a beta-lactam and resistance to a beta-lactamase inhibitor*, Nature Communications, **11**, 2029 (2020)
14. K. Břinda, A. Callendrello, K. C. Ma, D,R. MacFadden, T. Charalampous, R.S. Lee, L. Cowley, C. B. Wadsworth, Y. H. Grad, G, Kucherov, J. O'Grady, **M. Baym**, W.P. Hanage, *Rapid heuristic inference of antibiotic resistance and susceptibility by genomic neighbor typing*, Nature Microbiology, **5**, 455-464 (2020)
15. R. Canals, R. R. Chaudhuri, R. E. Steiner, S.V. Owen, N. Quinones-Olvera, M. A. Gordon, **M. Baym**, M. Ibba, J. C. D. Hinton, *The fitness landscape of the African Salmonella Typhimurium ST313 strain D23580 reveals unique properties of the pBT1 plasmid*, PLOS Pathogens, **15(9)**, e1007948 (2019)
16. I. A. Anzai, L. Shaket, O. Adesina, **M. Baym**†, B. Barstow†, *Rapid curation of gene disruption collections using Knockout Sudoku*, Nature Protocols, **12**, 2110–2137 (2017)
17. D.T. Riglar, T.W. Giessen, **M. Baym**, S.J. Kerns, M.J. Niederhuber, R.T. Bronson, J.W. Kotula, G.K. Gerber, J.C. Way, P.A. Silver, *Engineered bacteria can function in the mammalian gut long-term as live diagnostics of inflammation*, Nature Biotechnology, **35**, 653–658 (2017)
18. C. Myhrvold, **M. Baym**, N. Hanikel, L.L. Ong, J.S. Gootenberg, P. Yin, *Barcode Extension for Analysis and Reconstruction of Structures*, Nature Communications, **8**, 14698 (2017)
19. **M. Baym***, L. Shaket, I.A. Anzai, O. Adesina, B. Barstow*, *Rapid Construction of a Whole-genome Transposon Insertion Collection for* Shewanella oneidensis *by Knockout Sudoku*, Nature Communications, **7**, 13270 (2016)
20. L.K. Stone, **M. Baym**, T.D. Lieberman, R. Chait, J. Clardy, R. Kishony, *Compounds that select against the tetracycline resistance efflux pump*, Nature Chemical Biology, **12**, 902–904 (2016)
21. **M. Baym**, T.D. Lieberman, E.D. Kelsic, R. Chait, R. Gross, I. Yelin, R. Kishony, *Spatiotemporal microbial evolution on antibiotic landscapes*, Science, **353**, 1147–1151 (2016)
    **Media attention including:** PBS News Hour, CNN, NPR, The Atlantic, Haaretz, The Scientist, Smithsonian, Vox, Vice Motherboard, Wired, Gizmodo, Slate
22. **M. Baym***, L.K. Stone*, R. Kishony, *Multidrug evolutionary strategies to reverse antibiotic resistance*, Science, **351**, 6268 (2016), **[review]**
23. A. Palmer*, E. Toprak*, **M. Baym**, S. Kim, A. Veres, S. Bershtein, R. Kishony, *Delayed commitment to evolutionary fate in antibiotic resistance fitness landscapes*, Nature Communications, **6**, 7385 (2015)
24. **M. Baym***, S. Kryazhimskiy*, T.D. Lieberman*, H. Chung*, M.M. Desai, R. Kishony, *Inexpensive Multiplexed Library Preparation for Megabase-Sized Genomes*, PLoS ONE, **10**, e0128036 (2015)
25. D.J. Klein, **M. Baym**, and P. Eckhoff, *The Separatrix Algorithm for Synthesis and Analysis of Stochastic Simulations with Applications in Disease Modeling*, PLoS ONE **9**, e103467 (2014)
26. N.M. Daniels, A. Gallant, J. Peng, L.J. Cowen, **M. Baym**, and B. Berger, *Compressive genomics for protein databases*, Bioinformatics **29:13** i283–i290 (2013)
27. **M. Baym** and D.B. West, *Bounds on the* k*-dimension of Products of Special Posets*, Order **30** 779–796 (2013)
28. P.-R. Loh*, **M. Baym***†, and B. Berger†, *Compressive Genomics*, Nature Biotechnology **30** 627–630 (2012)

**Selected for Highlights Track at RECOMB 2013 and ISMB 2013**

29. D. Park, R. Singh, **M. Baym**, C. Liao, and B. Berger, *IsoBase: A Database of Functionally Related Proteins across PPI Networks*, Nucleic Acids Research, **39** D295–300 (2011)
30. D.S. Lun, G. Rockwell, N.J. Guido, **M. Baym**, J.A. Kelner, B. Berger, J.E. Galagan, and G.M. Church,*Large-scale identification of genetic design strategies using local search*, Molecular Systems Biology **5:296** (2009)
31. C.-S.Liao, K. Lu, **M. Baym**, R. Singh, and B. Berger, *IsoRankN: Spectral methods for global alignment of multiple protein networks*, Bioinformatics, **25(12)**: i253–258 (2009)
32. **M. Baym***, C. Bakal*, N. Perrimon and B. Berger, *High-Resolution Modeling of Cellular Signaling Networks.*, Proceedings of the 12th Annual International Conference on Research in Computational Molecular Biology (RECOMB) LNBI **4955**: 257–271 (2008)
33. **M. Baym** and A.W. Hübler, *Conserved quantities and adaptation to the edge of chaos*, Phys. Rev. E. **73**, 056210 (2006)

## Preprints

34. K. Břinda, L. Lima, S. Pignotti, N. Quinones-Olvera, K. Salikhov, R. Chikhi, G. Kucherov, Z. Iqbal, M. Baym, *Efficient and Robust Search of Microbial Genomes via Phylogenetic Compression*, (2023)
    Preprint: `https://www.biorxiv.org/content/10.1101/2023.04.15.536996`
35. N. Quinones-Olvera*, S.V. Owen*, L.M. McCully, M.G. Marin, E.A. Rand, A.C. Fan, O.J. Martins Dosumu, K. Paul, C.E. Sanchez Castaño, J.S. Paull, R. Petherbridge, M. Baym, *Diverse and abundant viruses exploit conjugative plasmids*, (2023)
    Preprint: `https://www.biorxiv.org/content/10.1101/2023.03.19.532758`
36. A. Limdi, S.V. Owen, C.M. Herren, R.E. Lenski, **M. Baym**, *Parallel evolution of mutational fitness effects over 50,000 generations*, (2022)
    Preprint: `https://www.biorxiv.org/content/10.1101/2022.05.17.492023v2`
37. C. Herren, **M. Baym**, *Stronger connectivity of the resident gut microbiome lends resistance to invading bacteria*
    Preprint: `http://www.biorxiv.org/content/early/2018/02/08/261750`, (2018)
38. Y. J. Jiao*, **M. Baym***, A. Veres, R. Kishony, *Population diversity can jeopardize the efficacy of antibiotic cycling*
    Preprint: `http://www.biorxiv.org/content/early/2016/10/20/082107`, (2017)

*Authors contributed equally. †Co-senior author.

## Consensus Report

39. Contributing author to "*Combating Antimicrobial Resistance and Protecting the Miracle of Modern Medicine*", National Academy Press, Washington, DC, (2021)

## Perpective

40. **M. Baym**, *Sustainable Stewardship Needs Evolution*, Cell Host and Microbe, **26(1)**: 8 (2019)

## Issued Patents

1. *Method for isolating DNA molecules by generating a progenitor collection catalog*, US Patent #11,053,493

2. *Devices, systems, and methods for automated data collection*, US Patent #10,783,989
3. *Compressing, storing and searching sequence data*, US Patent #10,777,304
4. *Devices and methods for profiling microbiota of skin*, US Patent #10,575,834
5. *Portable electronic device directed audio emitter arrangement system and method*, US Patent #10,575,093
6. *Modifying a cosmetic product based on a microbe profile*, US Patent #10,546,651
7. *Portable electronic device directed audio system and method*, US Patent #10,531,190
8. *Systems, methods, and devices for assessing microbiota of skin*, US Patent #10,448,929
9. *Apparatus, system, and method for controlling movement of an orthopedic joint prosthesis in a mammalian subject*, US Patent #10,420,666
10. *Mobile device for requesting the capture of an image*, US Patent #10,348,948
11. *Portable electronic device directed audio system and method*, US Patent #10,291,983
12. *Systems and methods for competency training and use authorization for dispensing an agent*, US Patent #10,229,607
13. *Robotic debridement apparatuses, and related systems and methods*, US Patent #10,226,307
14. *Systems, methods, and devices for assessing microbiota of skin*, US Patent #10,219,789
15. *Electronically determining compliance of a medical treatment of a subject with a medical treatment plan for the subject*, US Patent #10,217,177
16. *Robotic debridement apparatuses, and related systems and methods*, US Patent #10,213,225
17. *Portable electronic device directed audio targeted multiple user system and method*, US Patent #10,181,314
18. *Modifying a cosmetic product based on a microbe profile*, US Patent #10,140,424
19. *Apparatus, system, and method for controlling movement of an orthopedic joint prosthesis in a mammalian subject*, US Patent #10,137,024
20. *Mobile device for requesting the capture of an image*, US Patent #9,936,114
21. *Portable electronic device directed audio targeted user system and method*, US Patent #9,886,941
22. *Systems, devices, and method for determining treatment compliance including tracking, registering, etc. of medical staff, patients, instrumentation, events, etc. according to a treatment staging plan*, US Patent #9,864,839
23. *Modifying a cosmetic product based on a microbe profile*, US Patent #9,811,641
24. *Modifying a cosmetic product based on a microbe profile*, US Patent #9,805,171
25. *Systems, devices, admixtures, and methods including transponders for indication of food attributes,* US Patent #9,792,539
26. *Systems, devices, and method for determining treatment compliance including tracking, registering, etc. of medical staff, patients, instrumentation, events, etc. according to a treatment staging plan*, US Patent #9,734,543
27. *Compressing, storing and searching sequence data*, US Patent #9,715,574
28. *Systems and devices for profiling microbiota of skin*, US Patent #9,610,037
29. *Liquefied breathing gas systems for underground mines*, US Patent #9,605,806
30. *Devices, systems, and methods for automated data collection*, US Patent #9,589,106
31. *Mining drill with gradient sensing and method of using same*, US Patent #9,587,482
32. *Kinetic penetrator with a retrieval tether*, US Patent #9,562,396
33. *Systems, methods, and devices for assessing microbiota of skin*, US Patent #9,557,331
34. *Devices and methods for sampling and profiling microbiota of skin*, US Patent #9,549,703

35. *Devices and methods for profiling microbiota of skin*, US Patent #9,526,480
36. *Devices and methods for profiling microbiota of skin*, US Patent #9,526,450
37. *Radiofrequency particle separator*, US Patent #9,480,991
38. *Acoustic source fragmentation system for breaking ground material*, US Patent #9,468,932
39. *Oral implant system for releasing encapsulated food additives by exposure to energy*, US Patent #9,462,822
40. *Devices, systems, and methods for automated data collection*, US Patent #9,460,264
41. *Systems, methods, and devices for assessing microbiota of skin*, US Patent #9,456,777
42. *Apparatus, system, and method for controlling movement of an orthopedic joint prosthesis in a mammalian subject*, US Patent #9,439,797
43. *Devices and methods for competency training and use authorization for dispensing an agent*, US Patent #9,390,457
44. *Systems, methods, and devices for assessing microbiota of skin*, US Patent #9,390,312
45. *Actively released food additives*, US Patent #9,357,865
46. *Devices, systems, and methods for automated data collection*, US Patent #9,317,662
47. *Focusing electromagnetic radiation within a turbid medium using ultrasonic modulation*, US Patent #9,232,896
48. *Systems and devices for sampling and profiling microbiota of skin*, US Patent #9,186,278
49. *Systems, devices, and method for determining treatment compliance including tracking, registering, etc. of medical staff, patients, instrumentation, events, etc. according to a treatment staging plan*, US Patent #9,008,385
50. *Determining a next value of a system-simulation parameter in response to a representation of a plots having the parameter as a dimension*, US Patent #8,949,084
51. *Determining a next value of a system-simulation parameter in response to representations of plots having the parameter as a dimension*, US Patent #8,938,374
52. *Focusing electromagnetic radiation within a turbid medium using ultrasonic modulation*, US Patent #8,917,442
53. *Mining drill with gradient sensing*, US Patent #8,857,539
54. *Determining a next value of a parameter for system simulation*, US Patent #8,855,973
55. *Material, system, and method that provide indication of a breach*, US Patent #8,845,969
56. *Systems, devices, admixtures, and methods including transponders for indication of food attributes*, US Patent #8,746,576
57. *Material, system, and method that provide indication of a breach*, US Patent #8,715,576
58. *Systems and methods for dynamic drug therapy response to blood pressure incidents*, US Patent #8,702,683
59. *Inflatable cuff with built-in drug delivery device for dynamic drug therapy response to blood pressure incidents*, US Patent #8,702,614
60. *Systems, devices, admixtures, and methods including transponders for indication of food attributes*, US Patent #8,695,884

## Published Patent Applications

Full list of 103 searchable at: `https://ppubs.uspto.gov/pubwebapp/`

## Teaching and Mentoring

### Courses

**Harvard University**

HMS PHAGES Summer Phage Discovery Internship (Roxbury Community College) 2022-present
Concepts in Genome Analysis (Graduate) 2018-present

**MIT Teaching Assistant in Mathematics**

Group Theory with Applications to Physics (Graduate) 2004
Principles of Applied Mathematics (Undergraduate) 2003

### Postdoctoral Fellows

**Célia Souque, PhD** 2022-present

**Fernando Rossine, PhD** 2021-present

**Siân Owen, PhD** 2018-present

**Lucy McCully Espinosa, PhD** 2019-2023

**Karel Břinda, PhD** 2017-2022
Now: INRIA Starting Faculty, INRIA, Rennes, France

**Jasmijn Baaijens, PhD** 2019-2021
Now: Assistant Professor of Computer Science, TU Delft, The Netherlands

**Cristina Herren, PhD** 2017-2021
Now: Assistant Teaching Professor of Marine and Environmental Sciences, Northeastern University

### PhD Students

**Sophia Wiesenfeld** Systems, Synthetic, and Quantitative Biology 2023-present

**Amy Zamora** Systems, Synthetic, and Quantitative Biology 2021-present

**Arya Kaul** Bioinformatics and Integrative Genomics 2020-present

**Eleanor Rand** Systems, Synthetic, and Quantitative Biology 2020-present

**Natalia Quiñones-Olvera** Systems, Synthetic, and Quantitative Biology 2018-present

**Anurag Limdi** Molecules, Cells, and Organisms 2018-2023

### Masters Students

**Eve Rahbé** École Polytechnique Fédérale de Lausanne (EPFL) 2018-2019
*Best Masters Thesis in Life Sciences and Technology (EPFL)*

**Simone Pignotti** Université Paris-Est 2018

### Undergraduates

**Alice Fan** Sysbio Summer Internship / BU Summer 2021

**Carmen Hernandez Perez** SHURP / Cal State Northridge Summer 2022

**Katelyn Lee** Sysbio Summer Internship / Caltech Summer 2021

**Mische Holland** SIMBI / University of California San Diego Summer 2019 & 2020

**Gabriella "Elle" Deich** MIT MSRP / Duke University — Summer 2019

**Isabel Ott** University of Georgia — Summer 2018

**Winston Michalek** Harvard College — Spring 2018

## Media Coverage (selected)

**60 Minutes (CBS)** Could antibiotic-resistant "superbugs" become a bigger killer than cancer? — 2019

**NPR Here and Now (audio interview)** Viral Video Shows How Frighteningly Fast Bacteria Can Evolve — 2016

**PBS News Hour** Watch antibiotic-resistant bacteria evolve right before your eyes — 2016

**CNN** See for yourself A giant petri dish models antibiotic resistance — 2016

**NPR** WATCH : Bacteria Invade Antibiotics And Transform Into Superbugs — 2016

**The Atlantic** Stunning Videos of Evolution in Action — 2016

**Wired** A Gorgeous and Unsettling Video of Evolution in Action — 2016

**Slate** Watch Evolution Occur Before Your Eyes — 2016

**Sydney Morning Herald** Scientists reveal the frightening speed at which bacteria can develop antibiotic resistance — 2016

## Other Positions Held

**Institute for Disease Modeling at Intellectual Ventures** — 2009 – 2014
Research Consultant in Epidemiological Modeling and Biomedical Technologies

**Santa Fe Institute (SFI)** — 2003
*Visiting Researcher* in Chaos Theory and Theoretical Biology
Advisors: Alfred Hübler and Stuart Kauffman

**UIUC Department of Chemistry** — 2001, 2002
*Research Assistant* in Computational Chemical Biology
Advisor: Zaida Luthey-Schulten

**UIUC Department of Mathematics** — 2001
*UNIX Consultant*

**Sigma Digital Designs** — 1996 – 1998
*Co-founder and web content designer*

## Invited Talks

**University of Pittsburgh** Center for Evolutionary Biology and Medicine seminar — 2023

**University of Washington** Microbiology seminar (student invitee) — 2023

**McGill University** Quantitative Life Sciences seminar (Montreal, Canada) — 2022

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| **UC San Diego** Collaborative to Halt Antibiotic-Resistant Microbes (CHARM) Seminar | 2022 |
| **US-Israel Blavatnik Scientific Forum on Strategies and Technologies to Combat Antibiotic Resistance** | 2022 |
| **UMass Amherst** Microbiology Seminar | 2022 |
| **EMBARK AMR** Seminar (Sweden) | 2021 |
| **UC Berkeley** Bioengineering Seminar | 2021 |
| **Skype a Scientist** Live discussion | 2020 |
| **University of Southern California** Virtual Academic Job Workshop Panelist | 2020 |
| **Cal State San Marcos** Microbiology Course Seminar and Fireside Chat | 2020, 2021, 2022 |
| **Vanderbilt University** Evolutionary Seminar Series ⋆cancelled due to Covid-19 | 2020⋆ |
| **University of Alabama Birmingham** Biology seminar (student invitee) | 2019 |
| **Worcester Polytechnic Institute** Biology and Biotechnology seminar (student invitee) | 2019 |
| **31st annual Packard Fellows Symposium** | 2019 |
| **University of Massachusetts Medical School** Systems Biology seminar | 2019 |
| **Emory University** Microbiology and Molecular Genetics symposium (student invitee) | 2019 |
| **University of Washington** Physics colloquium | 2019 |
| **Boston University** Systems Biology seminar | 2019 |
| **Okinawa Institute of Science and Technology** seminar (Okinawa, Japan) | 2019 |
| **Texas A&M University** Biochemistry and Biophysics departmental seminar (student invitee) | 2018 |
| **Washington University St. Louis** Center for Genome Sciences and Systems Biology seminar | 2018 |
| **6th annual Southern California Microbiome Symposium** plenary | 2018 |
| **Lake Arrowhead Microbial Genomics Conference** plenary | 2018 |
| **Microbial Stress Response Gordon Research Conference** plenary | 2018 |
| **15th annual Harvard Microbial Sciences Initiative Symposium** plenary | 2018 |
| **Michigan State University** Microbiology and Molecular Genetics departmental seminar (student invitee) | 2018 |
| **University of Massachusetts, Boston** Biology and Physics cross-departmental seminar | 2018 |
| **Oregon State University** Microbiology departmental seminar | 2017 |
| **Broad Institute of MIT and Harvard** Infectious Disease and Microbiome seminar | 2017 |
| **Microbial Darwinian Medicine Workshop** plenary talk (Leiden, Netherlands) | 2017 |

**Microbiological Society Annual Meeting** plenary talk (Edinburgh, Scotland) 2017

**University of Birmingham** Institute of Microbiology and Infection seminar (Birmingham, England) 2017

**Imperial College London** Biomathematics seminar (London, England) 2017

**Physical approaches for growing and evolving populations workshop** (Tokyo, Japan) 2017

**Georgia Tech** Biological Sciences seminar 2016

**Harvard Medical School** Talks @12 2016
Video: `https://www.youtube.com/watch?v=JZ8usjcKW9g`

**Microsoft Research New England** Computational Biology Seminar 2016

**Institute for Disease Modeling** Seminar (Seattle) 2016

**Harvard Medical School** Biomedical Informatics & Biostatistics Big Data Seminar 2016

**Genome Science Conference** Keynote (Liverpool, England) 2016

**Fannie and John Hertz Foundation Fellowship** Summer Workshop 2016

**Princeton University** Ecology and Evolutionary Biology Colloquium 2016

**University of Texas El Paso** Undergraduate Research Summer Symposium Keynote 2015

**MIT Mathematics** Computational Biology Seminar 2015

**Caltech** New Frontiers in Biological Engineering Symposium 2015

**Harvard School of Public Health** Infectious Disease Epidemiology Seminar 2014

**Harvard University Systems Biology** Bauer Forum 2014

**Science Hack Day Boston** keynote 2013

**MIT Mathematics** Computational Research in Boston and Beyond (CRIBB) Seminar 2011

**McGill University** Computer Science / Montreal Bioinformatics Users Group (MonBUG) Seminar (Montreal, Canada) 2011

**Tufts University** Computer Science Colloquium 2009

**Princeton University,** Lewis-Sigler Institute Seminar 2009

**UC Berkeley Mathematics** Mathematical and Computational Biology Seminar 2009

## Service

**National Academies of Sciences, Engineering, and Medicine (NASEM) Committee on the Long-term Health and Economic Effects of Antimicrobial Resistance** 2020 – 2021
Committee Member

**New PI Slack** 2019 – 2022
Advisory Board Member

**American Society of Microbiology ASM Microbe Meeting** 2019
Session Organizer: "Molecular Insights from Experimental Evolution"

**Natural Sciences and Engineering Research Council (NSERC)**, Canada 2018
External Reviewer

**Peer Reviewed Medical Research Program (PRMRP) for the Department of Defense Congressionally Directed Medical Research Programs (CDMRP)** 2018
Panel Reviewer

**Harvard Data-Powered Strategies to Counteract Antibiotic Resistance Symposium** 2018
Organizer

**Harvard Biostatistics – Biomedical Informatics – Big Data (B3D) Seminar** 2017 – 2018
Organizer

**L'Agence Nationale de la Recherche (National Research Agency)**, France 2017
External reviewer

**The Wellcome Trust**, UK 2017
Peer reviewer

**NSF Division of Environmental Biology** 2017
*Ad hoc* reviewer

**PLOS Genetics** 2017
Guest Editor

**Cell Systems; G3: Genes, Genomes, Genetics; mSystems; Nature Biotechnology; Nature Communications; PNAS; PLOS Biology; Science; Science Advances** 2014 – present
Reviewer

**NSF Division of Environmental Biology** 2009
Panel reviewer

**MIT Applied Mathematics Graduate Student Seminar (SPAMS)** 2007 – 2008
Organizer