

Armita Nourmohammad

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Education	2008 - 2012	PhD in Theoretical Physics, University of Cologne, Germany Grade: summa cum laude Thesis: <i>Evolution of regulatory complexes: a many-body system</i> Advisor: Prof. Dr. Michael Lässig
	2006 - 2008	Master's degree in physics at University of Cologne, Germany Grade: 1.1 (very good) Thesis: <i>From microsatellite slippage to cis-regulatory module evolution</i> Advisor: Prof. Dr. Michael Lässig
	2003 - 2006	Bachelor degree in Physics, Sharif University of Technology, Tehran, Iran
Employments	2023 - present	Associate Professor of Physics, University of Washington, Seattle
	9/2018 - 2023	Assistant Professor of Physics, University of Washington, Seattle (on leave until 9/2019)
	9/2017 - 12/2021	Max Planck Research Group Leader, Max Planck Institute for Dynamics and Self-organization, Göttingen, Germany (non-tenure track position) Group start date: 1/2018, 20% affiliation from 9/2019 (remote)
	9/2015 - 8/2017	Part-time lecturer in Physics and the Lewis-Sigler Institute for Integrative Genomics, Princeton University, Princeton, USA
	10/2014 - 8/2017	Associate research scholar, Lewis-Sigler Institute for Integrative Genomics, Princeton University, Princeton, USA
	10/2012 - 10/2014	James S. McDonnell postdoctoral fellow, Lewis-Sigler Institute for Integrative Genomics, Princeton University, Princeton, USA
Professional Affiliations	2023 - present	Adjunct Associate Professor of Computer Science and Engineering University of Washington, Seattle
	9/2022 - present	Adjunct Associate Professor of Applied Mathematics University of Washington, Seattle
	7/2022 - 9/2023	Adjunct Assistant Professor of Applied Mathematics University of Washington, Seattle
	9/2021 - present	Faculty of the "Molecular and Cellular Biology (MCB) graduate program", University of Washington, Seattle
	2/2020 - present	Affiliate Investigator, Herbold Computational biology Division Fred Hutchinson Cancer Research Center, Seattle
	10/2019 - present	Faculty of "UW Computational Molecular Biology graduate program", University of Washington, Seattle
	7/2019	Joliot Chair (visiting faculty), ESPCI, Paris, France
	5/2018 - 12/2021	Faculty of the graduate graduate "Physics of biological and complex systems" (PBCS), University of Göttingen, Germany
	1/2018 - 12/2021	Faculty of the GAUSS graduate graduate "Theoretical and computational neuroscience" (PTCN), University of Göttingen
9/2017 - 8/2018	Affiliate Professor of Physics, University of Washington, Seattle	

**Professional
Offices
& Awards**

2022 - 2025 Member at large (**elected**), American Physical Society
2021 Early Career Award from American Physical Society (APS),
Division of Biological Physics (DBIO)
2021 NSF CAREER award
2021 NIH Early Stage Investigator R35 MIRA award
2014 Postdoctoral travel award for the annual meeting of SMBE 2014
2012 Klaus-Liebrecht award for distinguished PhD dissertation
2011 James S. McDonnell Foundation (JSMF) postdoctoral fellowship for studying
complex systems (amount of \$200,000)
2011 Student fellowship by Burroughs Wellcome Fund to attend the KITP program,
Microbial and viral evolution, at UC Santa Barbara
2007 Scholarship from Bonn-Cologne excellency school of physics and astronomy
2003 Ranked 15th nationwide in the Iranian university entrance exam among
more than 300,000 participants

**Research
Projects, Grants
& Contracts**

External

2024 - 2025 NIH R03 award (no. 1R03AI175977-01A1)
Title: Investigating the dynamics and composition of T-cell receptor repertoires
in patients with post-acute sequelae from COVID-19 (PASC)
Amount: \$30,000 sub-award to A.N.
Role: co-PI
2023 - 2025 EMSL Large-Scale Research Proposal award
DOE office of science user facility
Title: Physics-guided Machine Learning for Protein Modeling and Design
Amount: 200K node hour GPU access
Role: PI
2021 - 2026 NSF CAREER award, (no. 2045054)
Title: CAREER: Emergence of functional organization in the adaptive
immune system
Amount: \$900,000 (\$612,535 direct cost)
Role: PI
2021 - 2026 NIH Early Stage Investigator R35 MIRA award (no. 1R35GM142795 - 01)
Title: Learning a molecular shape space for the adaptive immune system
Amount: \$1,838,760 (\$1,250,000 direct cost)
Role: PI
2018 - 2021 German Science Foundation grant, SFB1310 *Predictability in Evolution*
Title (PI's project): Adaptive immune control of evolving pathogens
Amount (PI's project): EUR 207,000
Role: co-PI
2017 - 2021 Max Planck Society, Research Group Funding
Amount: EUR 1,851,000 (direct cost)
Role: PI

□ **Internal**

- 2021- 2022 UW Azure Cloud Computing award (UW eScience Institute)
Title: Learning of Protein Shape Space with Holographic Convolutional
Neural Networks
Amount: \$20,000
Role:PI
- 2020 - 2021 Royalty Research Fund
Title: Learning the shape space of protein universe to predict function
Amount: \$38,000
Role: PI

Trainee Awards

- Oskar Schnaack Fulbright Fellowship (2021)
Assya Trofimov Mahan postdoctoral fellowship (2021 - 2024)
Quinn Bellamy Mary Gates scholarship (2021)

Publications

¹: equal contribution as first author, [†]: corresponding author (equal contribution if multiple),
bold face: group members

□ **Preprints and in-press articles**

- i. **G. Visani, W. Galvin, M. Pun, and A. Nourmohammad[†]**, H-Packer: Holographic rotationally equivariant convolutional neural network for protein side-chain packing. [**in press**: *Proceedings of Machine Learning Research* (PMLR)]
- ii. **G. Visani, M.N. Pun, A. Nourmohammad[†]** (2022) Holographic-(V)AE: an end-to-end SO(3)-Equivariant (Variational) Autoencoder in Fourier Space. [arXiv:2209.15567](https://arxiv.org/abs/2209.15567). [**in press**: *Phys Rev Research*]
- iii. **O. Schnaack, L. Peliti, A. Nourmohammad[†]** (2021) Risk-utility tradeoff shapes memory strategies for evolving patterns. [arXiv:2110.15008](https://arxiv.org/abs/2110.15008)

□ **Peer Reviewed Research Articles**

1. **G. Isacchini, V. Quiniou, P. Barennes, V. Mhanna, H. Vantomme, P. Stys, E. Mariotti-Ferandiz, D. Klatzmann, A. Walczak[†], T. Mora[†], and A. Nourmohammad[†]**, Local and global variability in developing human T-cell repertoires. [PRX Life 2, 013011](https://doi.org/10.1016/j.prlife.2023.013011)
2. **M.N. Pun, A. Ivanov, Q. Bellamy, Z. Montague, C. LaMont, P. Bradley, J. Otwinowski, and A. Nourmohammad[†]** (2024) Learning the shape of protein micro-environments with a holographic convolutional neural network. [Proc. Natl. Acad. Sci. 121 \(6\) e2300838121](https://doi.org/10.1016/j.pnas.2024.121006)
3. K. Abadie, E. Clark, R. M. Valanparambil, **O. Ukogu, W. Yang, R. Daza, K. K.H. Ng, J. Fathima, A. Wang, A. Bhandoola, A. Nourmohammad, R. Ahmed, J. Shendure, J. Cao, H. Y. Kueh** (2024) Reversible, tunable epigenetic silencing of TCF1 generates flexibility in the T cell memory decision. [Immunity, DOI: https://doi.org/10.1016/j.immuni.2023.12.006](https://doi.org/10.1016/j.immuni.2023.12.006)
4. C. Kreer, C. Lupo, M. S. Ercanoglu, L. Gieselmann, N. Spisak; J. Grossbach, M. Schlotz, P. Schommers, H. Gruell, L. Dold, A. Beyer, **A. Nourmohammad, T. Mora, A.M. Walczak, F. Florian Klein** (2023) Probabilities of developing HIV-1 bNAb sequence features in uninfected and chronically infected individuals. [Nat Commun 14, 7137](https://doi.org/10.1016/j.natcomm.2023.7137)

5. M. Lässig[†], V. Mustonen[†], **A. Nourmohammad[†]** (2023) Steering and controlling evolution - from bioengineering to fighting pathogens. [Nat Rev Genet 24, 851–867](#)
6. **A. Nourmohammad**, M.N. Pun, G. Visani (2022) Machine-learning model reveals protein folding biophysics. [Physics 15, 183](#)
7. **C. LaMont**, J. Otwinowski, K. Vanshylla, H. Gruell, F. Klein, **A. Nourmohammad[†]** (2022) Design of an optimal combination therapy with broadly neutralizing antibodies to suppress HIV-1. [eLife 11:e76004](#)
Press: [eLife](#), [UW](#)
8. **A. Nourmohammad[†]** (2022) T-cell responses deciphered, [Science 376 \(6595\): 796–797](#)
9. **O.H. Schnaack**, L. Peliti, **A. Nourmohammad[†]** (2022) Learning and organization of memory for evolving patterns. [Phys. Rev. X 12, 021063](#)
Press: [Immune System’s Memory in an Evolving World \(APS Physics\)](#)
10. **G. Isacchini***, N. Spisak*, **A. Nourmohammad[†]**, T. Mora[†], A. Walczak[†] (2022) Mutual Information Maximization for Amortized Likelihood Inference from Sampled Trajectories: MINIMALIST. [Phys Rev E 105, 055309](#)
11. Y. Wang, R. Lei, **A. Nourmohammad**, N. C. Wu (2021) Antigenic evolution of human influenza H3N2 neuraminidase is constrained by charge balancing. [eLife 2021;10:e72516](#)
12. **Z. Montague***, H. Lv*, J. Otwinowski, W. S. DeWitt, **G. Isacchini**, G. K. Yip, W. W. Ng, O. T. Tsang, M. Yuan, H. Liu, I. A. Wilson, M. Peiris, N. C. Wu[†], **A. Nourmohammad[†]**, C. K. Mok[†] (2021) Dynamics of B-cell repertoires and emergence of cross-reactive responses in COVID-19 patients with different disease severity, [Cell Rep. 35\(8\), 109173](#)
Press: [The Physics of a Deadly Virus](#)
13. **O.H. Schnaack**, **A. Nourmohammad[†]** (2021) Optimal evolutionary decision-making to store immune memory. [eLife 2021;10:e61346](#)
Press: [Immune System’s Memory in an Evolving World \(APS Physics\)](#)
14. **G. Isacchini**, A. Walczak[†], T. Mora[†], **A. Nourmohammad[†]** (2021) Deep generative selection models of T and B cell receptor repertoires with soNNia, [Proc. Natl. Acad. Sci. 118 \(14\) e2023141118](#)
15. **A. Nourmohammad[†]** and C. Eksin (2021) Optimal evolutionary control for artificial selection on molecular phenotypes, [Phys Rev. X 11, 011044](#).
16. J. Otwinowski, **C. LaMont**, **A. Nourmohammad** (2020) Information-geometric optimization with natural selection, [Entropy, 22\(9\), 967](#)
17. **G. Isacchini**, C. Olivares, **A. Nourmohammad**, A. Walczak and T. Mora (2020) SOS: Online probability estimation and generation of T and B cell receptors, [Bioinformatics, btaa574](#)
18. **G. Isacchini**, Z. Sethna, Y. Elhanati, **A. Nourmohammad**, A. Walczak and T. Mora (2020) Generative models of T-cell receptor sequences, [Phys. Rev. E 101, 062414](#)
19. N.C. Wu, J. Otwinowski, A.J. Thompson, C.M. Nycholat, J.C. Paulson, **A. Nourmohammad** and I. A. Wilson (2020) Major hemagglutinin antigenic site B of human influenza H3N2 viruses has an evolving local fitness landscape, [Nature Communications 11,1233](#)

20. S. Bradde[†], **A. Nourmohammad**[†], S. Goyal[†], V. Balasubramanian[†] (2020) The size of the immune repertoire in bacteria, [Proc. Nat. Acad. Sci. 117 \(10\) 5144-5151](#)
Press: [CRISPR recognizes as many phage types as possible without overwhelming the Cas machinery \(Commentary in PNAS\)](#)
21. **A. Nourmohammad**[†], J. Otwinowski, M. Łuksza, T. Mora and A. M. Walczak (2019), Fierce Selection and Interference in B-Cell Repertoire Response to Chronic HIV-1, [Mol Biol Evol, 36\(10\): 2184-2194](#)
22. T. Hagai, X. Chen, R.J. Miragaia, R. Rostom ,T, Gomes, N. Kunowska, J. Henriksson, J. Park, V. Proserpio, G. Donati, L. Bossini-Castillo, F.A.V. Braga, G. Naamati, J. Fletcher, E. Stephenson, P. Vegh, G. Trynka, I. Kondova, M. Dennis, M. Haniffa, **A. Nourmohammad**, M. Lässig and S.A. Teichmann (2018), Gene expression variability across cells and species shapes innate immunity, [Nature 563: 197-202](#)
F1000Prime Recommended
23. **A. Nourmohammad**[†], J. Rambeau, T. Held, V. Kovacova, J. Berg and M. Lässig[†] (2017) Adaptive evolution of gene expression in Drosophila, [Cell Reports 20, 1385-95](#)
F1000Prime Recommended
24. **A. Nourmohammad**^{1†}, J. Otwinowski¹ and J. Plotkin (2016) Host-pathogen coevolution and the emergence of broadly neutralizing antibodies in chronic infections, [PLoS Genet. 12\(7\): e1006171](#)
25. T. Held, **A. Nourmohammad** and M. Lässig (2014) Adaptive evolution of molecular phenotypes, [J. Stat. Mech, P09029](#)
26. **A. Nourmohammad**¹, T. Held¹, M. Lässig, (2013) Universality and predictability in molecular quantitative genetics, [Curr Opin Genet Dev. 23\(6\):684-93](#)
27. **A. Nourmohammad**¹, S. Schiffels¹ and M. Lässig (2013) Evolution of molecular phenotypes under stabilizing selection, [J. Stat. Mech. P01012](#)
28. **A. Nourmohammad** and M. Lässig (2011) Formation of regulatory modules by local sequence duplication, [PLoS Comput Biol 7\(10\): e1002167](#)
29. R.H. Abdolvahhab, F. Roshani, **A. Nourmohammad**, M. Sahimi and MR. Tabar (2008) Analytical and numerical studies of sequence dependence of passage times for translocation of heterobiopolymers through nanopores, [J. Chem. Phys. 129\(23\):235102](#)

**Invited Seminars
& Conference
talks**

- | | |
|--------|--|
| 2/2024 | Emerging Directions Workshop, National Institute for Theory and Mathematics in Biology, Chicago, USA
title: <i>Learning the immune shape space with protein structures</i> |
| 2/2024 | Allen Institute, Theory and Computation Seminar, Seattle , USA
title: <i>Learning the immune shape space with protein structures</i> |
| 1/2024 | 1 st Andean school of host-pathogen dynamics, Bogota, Colombia
Title: <i>Principles of design in the adaptive immune system</i> |
| 8/2023 | Aspen Center for Physics meeting “Statistical Physics and Adaptive Immune Immune System”, Aspen (Co), USA
title: <i>Learning the immune shape space with protein structures</i> |
| 6/2023 | AMP seminar series at Adaptive Biotechnologies, Seattle, USA
title: <i>Learning the shape of the protein and immune universe</i> |

- 6/2023 Seminar at the Institute for Systems Biology, Seattle, USA
title: *Learning the shape of the protein and immune universe*
- 4/2023 Workshop: Working across scales in complex systems
Emory center for Theory and modeling of living systems,
Emory University, Atlanta, USA
title: *Learning the shape of the protein universe*
- 3/2023 Yale Center for Systems and Engineering Immunology,
Yale University, New Haven, USA
title: *Learning the shape of the immune and protein universe*
- 2/2023 Yale Biophysics Symposium, Yale University, New Haven, USA
title: *Learning the shape of the immune and protein universe*
- 1/2023 Keynote speaker at the annual meeting of the Computational Molecular
Biology (CMB) program, University of Washington, Seattle, USA
title: *Learning the shape of the immune and protein universe*
- 12/2022 Physics colloquium, Emory University, Atlanta, USA
title: *Learning the shape of the immune and protein universe*
- 11/2022 Seminar series, IBM, Zürich, Switzerland
title: *Learning the shape of the protein universe*
- 11/2022 Biocomplex seminar, EPFL, Lausanne, Switzerland
title: *Learning the shape of the protein universe*
- 11/2022 Biophysics seminar, Institut Curie, Paris, France
title: *Learning the shape of the immune and protein universe*
- 11/2022 QBio Biophysics seminar (Fresk), Paris, France
title: *encoding of memory in evolving environments: from olfaction to the
immune system*
- 11/2022 ENS Biophysics seminar, Paris, France
title: *Learning the shape of the protein universe*
- 11/2022 Nobel Symposia Series, WITS University,
Johannesburg, South Africa
title: *Learning the shape of the immune and protein universe*
- 10/2022 Nobel in Africa Physics Symposium I,
University of Kwazulu-Natal, Durban, South Africa
title: *Learning the shape of the protein universe*
- 10/2022 Nobel in Africa, Nobel Symposium in Physics: Predictability in the Age of AI
STIAS, Stellenbosch, South Africa
title: *Learning the shape of the protein universe*
- 10/2022 Condensed Matter Seminar Series at the University of Florida, USA
title: *Learning the shape of the immune and protein universe*
- 10/2022 Physics colloquium, University of Washington, Seattle, USA
title: *Learning the shape of the immune and protein universe*
- 9/2022 CUNY symposium: “Biophysics: searching for principles”, NYC, USA
title: *Learning the shape of the protein universe*
- 8/2022 Cargese meeting: “Physical Concepts and Computational Models
in Immunology”, Corsica, France
title: *Organization, prediction and control in immune system*
- 8/2022 BIRS meeting: “Mathematical Models in Biology: from Information Theory
to Thermodynamics”, Banff, Canada
title: *Organization and encoding of memory in evolving environments*
- 7/2022 Workshop “Dynamics of Immune Repertoires: Exploration & Translation”
Dresden, Germany
title: *Learning the protein and immune shape space*

- 6/2022 Cells-Energetics-Information Workshop, Okinawa Institute of Science and Technology Graduate University, Japan (virtual)
title: *Immune memory strategies in light of host-pathogen coevolution*
- 6/2022 Institute for Disease modeling (Gates Foundation), Seattle
title: *Immune memory strategies in light of host-pathogen coevolution*
- 5/2022 AI @ UW (plenary talk), University of Washington, Seattle
title: *Learning the shape of the protein universe*
- 4/2022 Biophysics Seminar Series, Simon Fraser University, Canada
title: *Evolutionary control of evolving populations: from molecular phenotypes to HIV therapy*
- 3/2022 Online symposium: Spatiotemporal Systems Biology, Center for Systems Biology, Dresden, Germany
title: *Adaptive immunity in light of host-pathogen coevolution*
- 3/2022 Invited session at the March meeting of the American Physical Society
title: *Organization and encoding of memory in evolving environments*
- 2/2022 BIRS meeting “Sensing and Signaling in Immune Systems: Mathematics meets Biology”, Banff, Canada ([online recording](#))
title: *immune memory strategies in light of host-pathogen coevolution*
- 11/2021 Cell Learning Seminar, Harvard Medical School
title: *Immune memory strategies in light of host-pathogen coevolution*
- 11/2021 Statistical Physics Seminar, University of Maryland,
title: *Adaptive immunity in light of host-pathogen coevolution*
- 10/2021 Physics Colloquium at Washington State University (WSU),
title: *Adaptive immunity in light of host-pathogen coevolution*
- 10/2021 Gordon Research Conference on “Stochastic Physics in Biology”
Ventura (CA), USA
title: *Immune memory strategies in light of host-pathogen coevolution*
- 9/2021 Annual meeting of the Computational Molecular Biology (CMB) program
University of Washington, Seattle, USA
title: *Inference of functional immune and protein shape spaces*
- 6/2021 Aspen Center for Physics meeting “Biology, Biophysics and Epidemiology of COVID-19 and other Pandemics”, Aspen (Co), USA
title: *Immune responses to SARS-CoV-2*
- 6/2021 “Predicting evolution” meeting, EMBL, Heidelberg, Germany (virtual)
title: *control comes after prediction: evolutionary control for HIV therapy*
- 6/2021 APS living histories (virtual: [online recording](#))
- 5/2021 Biozentrum Computational Biology Seminar Series, Basel, Switzerland (virtual)
title: *Inference of functional responses from immune receptor repertoires*
- 3/2021 Statistical Physics Seminar Series, the Institute for Theoretical Physics (IPhT), Saclay, France (virtual)
title: *Optimal evolutionary control for artificial selection on molecular phenotypes*
- 2/2021 Computational Biology Section, Fred Hutchinson Cancer Research Center, Seattle, USA
title: *Learning the shape of immune repertoires and protein universe*
- 1/2021 “Quantitative evolution, phylogeny and ecology: from models to data and back”, Institut Henri Poincaré, Paris (virtual meeting: [online recording](#))
title: *Control of molecular evolution*
- 12/2020 AIRR Community Meeting V (virtual meeting: [online recording](#))
title: *Dynamics of immune repertoires in COVID-19 patients*

- 11/2020 Research seminar at the Collaborative Research Center (SFB1310: *Predictability of Evolution*) Cologne, Germany (virtual)
title: *Adaptive immune control of evolving populations*
- 10/2020 4th Annual Symposium on Physical Concepts and Computational Models in Immunology, Cologne, Germany
title: *Memory strategies in the adaptive immune system*
- 8/2020 “Physical Biology of the Cell Course”, Marine Biological Laboratory, Woods Hole (MA), USA (virtual seminar: [online recording](#))
title: *coevolutionary processes in the adaptive immune system*
- 1/2020 Math Modeling Affinity Seminar Series, Fred Hutchinson Cancer Research Center, Seattle, USA
title: *Optimal evolutionary control for molecular phenotypes*
- 12/2019 Computational Biology Section, Fred Hutchinson Cancer Research Center, Seattle, USA
title: *coevolutionary dynamics in the immune system*
- 12/2019 “Adaptation symposium”, Graduate Center, CUNY, NYC
title: *Adaptation and control in molecular evolution*
- 8/2019 “Out-of-equilibrium processes in evolution and ecology”, Oaxaca, Mexico
title: *coevolutionary dynamics in the immune system*
- 7/2019 “From Molecular Basis to Predictability and control of evolution” Nordita Institute, Stockholm, Sweden
title: *optimal control for evolution of molecular phenotypes*
- 6/2019 Gordon Research Conference “Molecular Mechanisms of Evolution”, Stonehill College, USA
title: *coevolutionary dynamics in the immune system*
- 4/2019 Campus seminar at Max Planck Institute for Biological Cybernetics, Tübingen, Germany
title: *Statistical physics of molecular evolution across scales*
- 3/2019 APS March meeting, invited session “Statistical physics of large populations of Cells: from microbes to tissues”, Boston, USA
title: *Coevolutionary dynamics in the immune system*
- 11/2018 Department of Physics, University of Toronto, Canada,
title: *Statistical physics of molecular evolution across scales*
- 11/2018 National Institute of Health, Bethesda, USA
title: *Population dynamics of immune repertoire in response to HIV-1*
- 10/2018 “Stochasticity and control in the dynamics and diversity of immune repertoires”, Paris, France
title: *population dynamics of immune repertoires in response to HIV-1*
- 9/2018 “Physical concepts and computational models in immunology”, ENS, Paris
- 9/2018 “Paths in Statistical Physics (in honor of Luca Peliti)”, Paris, France
title: *Statistical physics of molecular evolution: from genotypes to phenotypes*
- 4/2018 “APS Physics-Next Meeting: Physics of Living Matter”, Long Island, USA
- 4/2018 “Exploring the unreasonable ineffectiveness of mathematics in biology”, University of Pennsylvania, Philadelphia, USA (panel speaker)
- 2/2018 Evolution of Diversity, Les Houches, France
title: *Population dynamics of immune repertoires in response to HIV-1*
- 1/2018 Regulation and inference in biological networks, Bardonecchia, Italy
title: *Population dynamics of immune repertoires in response to HIV-1*
- 1/2018 SFB 937 seminar, Göttingen, Germany
title: *Population dynamics of immune repertoires in response to HIV-1*

- 10/2017 EMBO conference “Quantitative Principles in Biology”,
Heidelberg, Germany
title: *Population dynamics of immune repertoires in response to HIV-1*
- 3/2017 Seminar at the physics department, Yale University, New Haven, USA
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 3/2017 Biophysics seminar, Department of physics, UCLA, USA
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 2/2017 Department of Physics, Caltech, Pasadena, USA
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 2/2017 Physics Colloquium, University of Washington, Seattle, USA
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 1/2017 Seminar at the Max Planck Society, Berlin, Germany
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 1/2017 Physics department seminar, ICTP-SAIFR, São Paulo, Brazil
title: *Statistical physics of molecular evolution*
- 11/2016 Center for Studies in Physics and Biology seminar series,
Rockefeller University, New York, USA
title: *effective theory of immune-pathogen interactions*
- 10/2016 Seminar at Gulliver, ESPCI, Paris, France
title: *Statistical physics of molecular evolution*
- 10/2016 Biophysics seminar, ENS & ESPCI, Paris, France
title: *Evolution of molecular phenotypes: from gene regulation to immune system*
- 10/2016 CIRB seminar, Collège de France, Paris, France
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 10/2016 Séminaire de LPTMS, Orsay, France
title: *Statistical physics of molecular evolution: from gene regulation to immune system*
- 9/2016 SFB 680 Evolution Colloquium, Cologne, Germany
title: *Effective theory of immune-pathogen interactions*
- 9/2016 20th evolutionary biology meeting, Marseilles, France
title: *effective theory of immune-pathogen interactions*
- 6/2016 Seminar at AMOLF, Amsterdam, the Netherlands
title: *Statistical physics of molecular evolution*
- 4/2016 Fred Hutchinson Cancer Research Center, Seattle, USA
title: *Quantitative molecular evolution: from gene regulation to immune system*
- 3/2016 Quantitative Life Sciences seminar, ICTP, Trieste, Italy
title: *Statistical physics of molecular evolution*
- 3/2016 APS March meeting, “Quantitative Immunology” session, Baltimore, USA
title: *Effective theory of immune-pathogen interactions*
- 2/2016 Quantitative immunology, KITP Program, UCSB, USA
Online Talk: [effective theory of immune-pathogen interactions](#)
- 7/2015 Forecasting evolution?, Gulbenkian Institute, Portugal
title: *Adaptation of molecular traits: from gene regulation to antibody-viral interaction*

	10/2014	Seminar at MPI for Cell Biology and Genetics, Dresden, Germany title: <i>Predictive adaptation of molecular traits: a case study of gene expression evolution.</i>
	9/2014	Quantitative Systems Biology seminar, IST, Austria title: <i>Predictive adaptation of molecular traits: a case study of gene expression evolution.</i>
	7/2014	Biophysics seminar, Rutgers University, USA title: <i>Predictive adaptation of molecular traits: a case study of gene expression evolution.</i>
	3/2011	Natural History Seminars, University of Chicago, USA
	2/2011	Microbial and Viral Evolution, KITP Program, UCSB, USA Online Talk: evolutionary modes of regulatory sequences in eukaryotes
Invited lectures in summer schools & workshops	1/2024	1 st Andean school of host-pathogen dynamics, Bogota, Colombia
	8/2020	Physical Biology of the Cell at Marine Biological Laboratory, Woods Hole, Massachusetts (virtual)
	7/2019	Boulder summer school on theoretical biophysics, Boulder, CO, USA
	11/2018	International Curie course on biophysics, “Multiscale Integration in Biological Systems”, Institut Curie, Paris
	1/2017	VI Southern-Summer School on Mathematical-Biology ICTP-SAIFR, São Paulo, Brazil
Seminars for service to the community & outreach	11/2022	Public Lecture at the Nobel Symposia Series, WITS University, Johannesburg, South Africa title: <i>Learning the shape of the immune and protein universe</i>
	10/2022	Seminar and discussion at the township Mayville Secondary school Durban, South Africa
	6/2021	APS living histories (virtual: online recording)
	4/2018	Symposium on “Exploring the unreasonable ineffectiveness of mathematics in biology”, University of Pennsylvania, Philadelphia, USA (panel speaker)
Undergrad & Graduate Teaching	Winter 2024	Introductory electromagnetism (PHYS 122 - undergraduate level)
	Fall 2023	Thermodynamics and Statistical Mechanics (Phys 524 - graduate level) University of Washington, Seattle
	Spring 2023	Introductory mechanics (PHYS 121 - undergraduate level),
	Fall 2020	University of Washington, Seattle
	Spring 2020	
	Winter 2023	Biophysics (PHYS 429 -undergraduate level),
	Winter 2022	University of Washington, Seattle
	Winter 2020	
	Spring 2022	Selected topics in theoretical physics (PHYS 578 - graduate level): Physics of Statistical Inference, University of Washington, Seattle
	Spring 2021	Special topics (PHYS 578 & PHYS 428 - graduate and undergraduate levels): Statistical Physics of Living Systems, University of Washington, Seattle
Spring 2018	Statistical Physics in Biology [<i>guest lecturer</i>], George-August University, Göttingen, Germany	
2015-2017	<i>Integrated science curriculum</i> , Lewis-Sigler Institute for Integrative Genomics, Princeton University, Princeton, USA	

**Service to the
UW Physics
Department**

Departmental Committee Activities

2023-2024 Colloquium, Graduate Exam, Graduate Program, Introductory Teaching
2022-2023 Graduate Admissions, Graduate Program, Public Lecture
2021-2022 Exchange Student Liason, Graduate Admissions, Public Lecture
2020-2021 Colloquium, Exchange Student Liason, Graduate Program, Strategic Planning
2019-2020 Colloquium, Exchange Student Liason, Graduate Admissions

**Other Duties,
Service to
Broader Scientific
Community**

Referee and editorial activities

Reviewing editor: *eLife*

Guest editor: *PLoS computational biology*

ad-hoc reviewer: *American Naturalist, BMC Evolutionary Biology, eLife, Genetics, Interface Focus, Journal of Statistical Mechanics, Journal of Statistical Physics, Molecular Biology, Nature Communications, and Evolution, PNAS, Physical Review Letters, Physical Review E, Physical Review Research, PLoS computational biology, Science, Virus Evolution*

recommandeuse: “Peer Community in”

Grant reviewer: QLife: Institut Curie, France
Vidi grant: NWO Domain Science (Dutch Research Council)
ANR: France National Research Agency
ad-hoc reviewer, National Science Foundation (NSF)
mail-in reviewer, National Institutes of Health (NIH)

Meeting (co-)organizer

9/2024 Kavli Institute for Theoretical Physics (KITP) workshop:
“[Interactions and Co-evolution between Viruses and Immune Systems](#)”,
UCSB, Santa Barbara, USA
8/2023 Aspen summer workshop: “Statistical Physics and Adaptive Immunity”,
Aspen (CO), USA
2/2022 BIRS workshop: “[Sensing and Signaling in Immune Systems](#)”,
Banff Center, Canada
8/2019 BIRS workshop: “[Out-of-equilibrium processes in evolution and ecology](#)”,
Casa Matematica Oaxaca (CMO), Oaxaca, Mexico
7/2019 “[From Molecular Basis to Predictability and control of evolution](#)”,
Nordita, Stockholm, Sweden
7/2018 “[Predictability of rapid evolutionary processes](#)”, SMBE session,
Yokohoma, Japan
3/2018 “Immune-pathogen interactions”, CRC 1310 theory symposium,
Cologne, Germany
4/2016 “[Molecular coevolution: lessons from pathogen-immune system interactions](#)”
PCTS workshop, Princeton University, Princeton, USA
7/2015 “[Beyond the equilibrium paradigm: the role of temporal processes in
population genetics and evolution](#)”, SMBE session, Vienna, Austria
2011 “Statistical physics of biological systems”, BCGS session,
Workshop of Bonn-Cologne Graduate School (BCGS), Bonn, Germany

□ **Other experiences and professional memberships**

- 2024 - present Chair, DBIO Community Engagement Committee, American Physical Society
2023 - 2024 Vice chair, DBIO Community Engagement Committee,
American Physical Society
2022 - 2025 Member at large (**elected**), American Physical Society
2022 - 2023 (co-) founders and organizer: **The Insider Outsider Series**
2019 - 2023 Scientific Committee Member, International Research Network (IRN),
“Predictability, Adaptation, Navigation”
2018 Consultant on Burroughs Wellcome grant “Quantitative and Statistical
Thinking in the Life Sciences”

**Students
and Trainees**

□ **Postdoctoral scholars**

- 2022-present Assya Trofimov (Mahan postdoctoral fellow, UW & Fred Hutch)
2018 - present Colin LaMont (SFB1310 postdoc, MPIDS, Germany)

□ **Current graduate advisees**

- Zachary Montague (UW, Physics)
- Obinna Ukogu (UW, Applies Mathematics)
- Gian Marco Visani (UW, Computer Science & Engineering)
- Kevin Borisiak (UW, Physics)
- Ella Carlander (UW, Physics)
- Jerry Li (UW, Physics)
- Mckay Oyler (UW, Physics)

□ **Graduated PhD students**

- Michael Pun (UW)
graduated 6/2023, currently: AI Scientist at VantAI
- Vincent Balardi (MPIDS & ESPCI, Germany)
graduated 9/2021
- Giulio Isacchini (MPIDS & ENS, Germany)
graduated 9/2021, currently: postdoc at UC Berkeley and University of Leipzig
- Oskar Schnaack (MPIDS, Germany)
graduated 12/2021, currently: Machine Learning researcher at Amazon

□ **Current undergraduate advisees**

- Rhea Grover (UC Berkeley, Physics) - REU student at UW
- William Galvin (UW, Computer Science and Engineering)
- Eric Daniel (UW, Computer Science and Engineering)

□ **Recent undergraduate advisees**

- 2021-2023 Quinn Bellamy (UW, Physics; now: graduate student at ENS, Paris)
2022-2023 Aparna Krishnan (UW, Computer Science and Engineering)
2022 Uchenna Nwaeye (REU student at UW; Physics student at UC Riverside)
2022 Utheri Wagura (REU student at UW, Physics student at MIT)

2020-2021 Andrew Ivanov (UW, Physics; now: Physics Graduate Student at Caltech)
2021 Manny Munoz (UW, Computer Science) - LSAMP scholar

□ **Recent international exchange students**

2022 Arman Angaji
Joined as a graduate intern scholar from the University of Cologne (Germany)
now: Physics PhD student at the University of Cologne
2019 Kjartan van Driel
joined as an honors bachelor student from the University of Radboud (Netherlands)
now: PhD student at the University of Amsterdam

□ **High school students**

- Mari Torii-Karch (Summers 2020, 2021; now: undergraduate at UC Berkeley)

□ **Other thesis committee membership**

- *current:*

- Chengxuan Li (UW, Physics)
- Teresa Lo (UW, Physics)
- Jordan Fonseca (UW, Physics)
- Dean Huang (UW, Physics)
- Han Kyou Choi (UW, Physics)
- Alyssa La Fleur (UW, Compute Science and Engineering)
- Motoya Ohnishi (UW, Compute Science and Engineering)
- Christopher Yin (UW, Electrical and Computer Engineering)
- Shawn Herring (UW, Global Health)
- Chris Russo (UChicago, Biophysics)

- *prior*

- Christopher Thomas (UW, Physics)
- Kevin Cutler (UW, Physics)
- Jared Canright (UW, Physics)
- Zeeshawn Kazi (UW, Physics)
- Seth Hirsh (UW, Physics)
- William DeWitt (UW, Genome Sciences)
- Jared Callahan (UW, Mechanical Engineering)
- Ying-Jen Yang (UW, Applied Mathematics)
- Hengji Wang (UW, Physics)
- Sid Rath (UW, Materials Science and Engineering)
- Marco Molari (École Normale Supérieure, Paris)

March, 2024