Nicole Nova, Ph.D.

High Meadows Environmental Institute, Princeton University
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Interests: Disease ecology, global change, molecular evolution, genomics, dynamics, animal behavior, One Health, wildlife conservation, data science, modeling.

EDUCATION

2016–2022 Ph.D. in Biology, Stanford University.
2018–2020 M.S. in Statistics, Stanford University.
2007–2012 M.Sc. in Dental Surgery, Karolinska Institutet.

PROFESSIONAL APPOINTMENTS

2022–present Postdoctoral Research Associate, High Meadows Environmental Institute, Princeton University.
2016–2022 Research Assistant, Department of Biology, Stanford University.
2016 Director, Research Science Institute, Center for Excellence in Education, Massachusetts Institute of Technology (MIT).
2015–2016 Research Associate, Department of Biology, Duke University.

AWARDS & HONORS

2022 Frances Lou Kallman Award for excellence in coursework, teaching and research, Department of Biology, Stanford University ($1,000).
2022 Rising Environmental Leader, Woods Institute for the Environment, Stanford University.
2021 Outstanding Paper Award (honorable mention), Disease Ecology Section, Ecological Society of America.
2020 Murray F. Buell Award for Excellence in Ecology runner-up (honorable mention), for an outstanding student oral presentation, Ecological Society of America. PR
2020 Annabelle B. Bush Memorial Endowed Scholar Award, Philanthropic Educational Organization (PEO).
2020 PEO Scholar Award, International Chapter of the PEO Sisterhood ($15,000).
2017 Excellence in Teaching Award, Department of Biology, Stanford University.
2007 Best Student of the Year Award, Internationella Engelska Gymnasiet.
2007 First prize, National Science Fair, Swedish Federation of Young Scientists.

GRANTS & FELLOWSHIPS

2022 Stanford Office of Graduate Education Travel Grant ($1,000).
2022 Stanford Biology EcoEvo Conference Travel Grant ($800).
2021 Predoctoral Fellowship, Center for Computational, Evolutionary and Human Genomics, Stanford University ($16,000).
2020 Stanford Data Science Scholarship, Stanford University (salary & tuition for two years).

2020 Gålöstiftelsen Dissertation Stipend (100,000 SEK).
2020 Modeling of Infectious Disease Agent Study (MIDAS) Grant ($600).
2019 Stanford Disease Ecology, Health, and the Environment Travel Grant ($500).
2019 Stanford Biology EcoEvo Conference Travel Grant ($700).
2018 Environmental Venture Project Grant, Woods Institute for the Environment, Stanford University ($50,000).
2018 Bing Fellowship in Honor of Paul Ehrlich (salary & tuition for one year).
2017 Stanford Biology EcoEvo Conference Travel Grant ($600).
2015 Mathematical Biosciences Institute Travel Grant (all expenses paid).
2013 Google Women in Tech Conference and Travel Grant (1,000 €).
2011 European Union Erasmus Mundus Scholarship (1,000 €).
2010 Karolinska Institutet Summer Research Scholarship in Medical Sciences (9,000 SEK).
2008 Swedish Federation of Young Scientists Fellowship (all expenses paid) to attend National Youth Science Forum at Australian National University.
2007 Gålöstiftelsen Study Stipend (50,000 SEK for five years of university studies).
2007 Knut and Alice Wallenberg Fellowship (all expenses paid) to attend Research Science Institute at Massachusetts Institute of Technology.
2006 Karolinska Institutet Summer Research Scholarship in Biomedicine (5,000 SEK).

PUBLICATIONS

`Google Scholar` | Citations: 390 | h-index: 10 | i10-index: 10
*denotes co-first authorship | †denotes corresponding author

Peer-Reviewed Journal Articles

17. Holcomb KM†, Mathis S, Staples JE, Fischer M, Barker CM, Beard CB, Nett RJ, Keyel AC, Marcantonio M, Childs ML, Gorris ME, Rochlin I, Hamins-Puértolas M, Ray EL, Uelman JA, DeFelice N, Freedman AS, Hollingsworth BD, Das P, Osthus D, Humphreys JM, **Nova N**, Mordecai EA, Cohnstaedt LW, Kirk DG, Kramer LD, Harris MJ, Kain MP, Reed EMX, Johansson MA. 2022. Evaluation of an open forecasting challenge to assess skill of West Nile virus neuroinvasive disease prediction. *Parasites & Vectors*. In press. `Preprint`

16. Sokolow SH, **Nova N**†, Jones IJ, Wood CL, Lafferty KD, Garchitorena A, Hopkins SR, Lund AJ, MacDonald AJ, Le Boa C, Peel AJ, Mordecai EA, Howard ME, Buck JC, Lopez-Carr D, Barry M, Bonds MH, De Leo GA. 2022. Ecological and socioeconomic factors associated with the human burden of environmentally mediated pathogens: a global analysis. *The Lancet Planetary Health*. 6(11):e870–e879. `doi:10.1016/S2542-5196(22)00248-0`

15. Hopkins SR†, Lafferty KD, Wood CL, Olson SH, Buck JC, De Leo GA, Fiorella KJ, Fornberg J, Garchitorena A, Jones IJ, Kuris AM, Kwong LH, LeBoa C, Leon AE, Lund AJ, MacDonald AJ, Metz DCG, **Nova N**, Peel AJ, Remais JV, Stewart Merrill TE, Wilson M, Bonds MH, Dobson AP, Lopez Carr D, Howard ME, Mandle L, Sokolow SH. 2022. Evidence gaps and diversity among potential win–win solutions for conservation

and human infectious disease control. *The Lancet Planetary Health.* 6(8):e694–e705. doi:10.1016/S2542-5196(22)00148-6

14. Hopkins SR*†, Jones IJ*, Buck JC, LeBoa C, Kwong LH, Jacobsen K, Rickards C, Lund AJ, **Nova N**, MacDonald AJ, Lambert-Peck M, De Leo GA, Sokolow SH. 2022. Environmental persistence of the world's most burdensome infectious and parasitic diseases. *Frontiers in Public Health.* 10:892366. doi:10.3389/fpubh.2022.892366

13. **Nova N**†, Athni TS, Childs ML, Mandle L, Mordecai EA. 2022. Global change and emerging infectious diseases. *Annual Review of Resource Economics.* 14(1):333–354. doi:10.1146/annurev-resource-111820-024214

12. **Nova N**†, Pagliara R, Gordon DM†. 2022. Individual variation does not regulate foraging response to humidity in harvester ant colonies. *Frontiers in Ecology and Evolution.* 9:756204. doi:10.3389/fevo.2021.756204

11. Glidden CK*†, **Nova N***†, Kain MP, Lagerstrom KM, Skinner EB, Mandle L, Sokolow SH, Plowright RK, Dirzo R, De Leo GA, Mordecai EA. 2021. Human-mediated impacts on biodiversity and the consequences for zoonotic disease spillover. *Current Biology.* 31(19):R1342–R1361. doi:10.1016/j.cub.2021.08.070

10. **Nova N**†. 2021. Cross-species transmission of coronaviruses in humans and domestic mammals, what are the ecological mechanisms driving transmission, spillover, and disease emergence? *Frontiers in Public Health.* 9:717941. doi:10.3389/fpubh.2021.717941

9. Childs ML*, Kain MP*, Harris MJ*, Kirk DG, Couper LI, **Nova N**, Delwel I, Ritchie J, Becker AD, Mordecai EA†. 2021. The impact of long-term non-pharmaceutical interventions on COVID-19 epidemic dynamics and control: the value and limitations of early models. *Proceedings of the Royal Society B.* 288(1957):20210811. doi:10.1098/rspb.2021.0811

8. Couper LI†, Farner JE, Caldwell JM, Childs ML, Harris MJ, Kirk DG, **Nova N**, Shocket MS, Skinner EB, Uricchio LH, Exposito-Alonso M, Mordecai EA. 2021. How will mosquitoes adapt to climate warming? *eLife.* 10:e69630. doi:10.7554/eLife.69630

7. Hopkins SR†, Sokolow SH, Buck JC, De Leo GA, Jones IJ, Kwong LH, LeBoa C, Lund AJ, MacDonald AJ, **Nova N**, Olson SH, Peel AJ, Wood CL, Lafferty KD. 2021. How to identify win–win interventions that benefit human health and conservation. *Nature Sustainability.* 4(4):298–304. doi:10.1038/s41893-020-00640-z

6. Athni TS, Shocket MS, Couper LI, **Nova N**, Caldwell IR, Caldwell JM, Childress JN, Childs ML, De Leo GA, Kirk DG, MacDonald AJ, Olivarius K, Pickel DG, Winokur OC, Young HS, Cheng J, Grant EA, Kurzner PM, Kyaw S, Lin BJ, Lopez RC, Massihpour DS, Olsen EC, Roache M, Ruiz A, Schultz EA, Shafat M, Spencer RL, Bharti N, Mordecai EA†. 2021. The influence of vector-borne disease on human history: socio-ecological mechanisms. *Ecology Letters.* 24(4):829–846. doi:10.1111/ele.13675

5. **Nova N**†, Deyle ER, Shocket MS, MacDonald AJ, Childs ML, Rypdal M, Sugihara G, Mordecai EA. 2021. Susceptible host availability modulates climate effects on dengue dynamics. *Ecology Letters*. 24(3):415–425. doi:10.1111/ele.13652

4. Allen WE*, Altae-Tran H*, Briggs J*, Jin X*, McGee G*, Shi A*, Raghavan R, Kamariza M, **Nova N**, Pereta A, Danford C, Kamel A, Gothe P, Milam E, Aurambault J, Primke T, Li W, Inkenbrandt J, Huynh T, Chen E, Lee C, Croatto M, Bentley H, Lu W, Murray R, Travassos M, Coull BA, Openshaw J, Greene CS, Shalem O, King G, Probasco R, Cheng DR, Silbermann B, Zhang F, Lin X†. 2020. Population-scale longitudinal mapping of COVID-19 symptoms, behaviour and testing. *Nature Human Behaviour*. 4(9):972–982. doi:10.1038/s41562-020-00944-2

3. Smith JR†, Hendershot JN, **Nova N**, Daily GC. 2020. The biogeography of ecoregions: Descriptive power across regions and taxa. *Journal of Biogeography*. 47(7):1413–1426. doi:10.1111/jbi.13871

2. Sokolow SH†, **Nova N**, Pepin MK, Peel AJ, Pulliam JRC, Manlove K, Cross PC, Becker DJ, Plowright RK, McCallum H, De Leo GA. 2019. Ecological interventions to prevent and manage zoonotic pathogen spillover. *Philosophical Transactions of the Royal Society B*. 374(1782):20180342. doi:10.1098/rstb.2018.0342

1. Childs ML†, **Nova N**, Colvin J, Mordecai EA. 2019. Mosquito and primate ecology predict human risk of yellow fever virus spillover in Brazil. *Philosophical Transactions of the Royal Society B*. 374(1782):20180335. doi:10.1098/rstb.2018.0335

Submitted Manuscripts & Preprints

18. Leempoel K*, **Nova N***†, Sonawane C, Meyer JM, Hebert T, Hadly EA. The natural return of an apex predator (*Puma concolor*) to a suburban preserve triggers a behaviorally mediated trophic cascade. In revision. Preprint

19. Rice BL†, Rasambainarivo F, **Nova N**, Sheen J, Wesolowski A, Metcalf CJE, Hampson K. What drives pathogen circulation when host density is low? Insight from carnivores. Under review.

Book Chapters

2. Kirk DG*†, Skinner EB*, Shocket MS, Couper LI, **Nova N**, Athni TS, Pourtois JD, Farner JE, Childs ML, Nyathi S, Mordecai EA. Climate Change and Disease Ecology. In: Suzán G, Aguirre AA, Mills JM, editors. The Ecology of Infectious Diseases: Methods on Evolution, Biodiversity, and Environmental Interactions. *Oxford University Press*. In press.

1. Shocket MS†, Anderson CB, Caldwell JM, Childs ML, Couper LI, Han S, Harris MJ, Howard ME, Kain MP, MacDonald AJ, **Nova N**, Mordecai EA. 2021. Environmental drivers of vector-borne diseases. In: Drake JM, Bonsall M, Strand M, editors. Population Biology of Vector-borne Diseases (Ecology and Evolution of Infectious Diseases Series). *Oxford University Press*. ISBN:9780198853244

Published Abstract

Van Wert M, **Nova N**, Horowitz T, Wolfe J. 2008. What does performance on one visual search task tell you about performance on another? *Journal of Vision.* 8(6):312. doi:10.1167/8.6.312

Theses

Nova N. 2022. *Ecological and Evolutionary Mechanisms for Emerging Infectious Diseases: Case Studies in Humans and Mammalian Wildlife.* Ph.D. Dissertation, Department of Biology, Stanford University. Committee: Erin Mordecai, Dmitri Petrov, Giulio De Leo, Marcus Feldman, and Elizabeth Hadly. PDF

Nova N. 2012. *Chronic inflammation and pain: Assessment of c-Fos and ATF-3 as markers of spinal neuronal activity in a pain model of rheumatoid arthritis.* M.Sc. Thesis, Karolinska Institutet. Advisors: Per Alstergren & Camilla Svensson. PDF

PRESENTATIONS

Invited Talks

2022 How do nonlinear effects of climate and susceptibility interact to affect dengue dynamics? Models, Inference & Algorithms Seminar Series, Broad Institute of MIT and Harvard, Boston, MA.

2020 Empirical dynamic modeling reveals ecological drivers of dengue dynamics. Ecology and Evolution of Infectious Disease Seminar, University of California Berkeley, CA.

2018 Phylogenetics and disease dynamics of canine distemper virus in Nearctic carnivores. Genomics of Diseases in Wildlife, Colorado State University, Fort Collins, CO.

2018 Ecological and evolutionary drivers of infectious diseases. Centre for Mathematical Biology, University of South Bohemia, Ceske Budejovice, Czech Republic.

2015 Mathematical Modeling in the Biosciences. 30th Jubilee Symposium of Research Program in Biomedicine, Karolinska Institutet, Stockholm, Sweden.

Accepted Talks

2022 Phylogenetics and genomic characteristics of canine distemper virus in Arctic foxes. Arctic Fox Conference, Norwegian Polar Institute, Longyearbyen, Svalbard.

2021 Susceptible host availability modulates climate effects on dengue dynamics. Bay Area Ecology and Evolution of Infectious Diseases, University of California Davis, CA.

2020 Empirical dynamic modeling reveals ecological drivers of dengue dynamics. Ecological Society of America Annual Meeting, Salt Lake City, UT.

2019 Predictors of pathogen sharing across taxa reveal ecological levers to prevent pathogen spillover from wildlife to humans. Ecological Society of America Annual Meeting, Louisville, KY.

Campus or Departmental Talks

2020 Empirical dynamic modeling reveals ecological drivers of dengue dynamics. Arbovirus Seminar, Department of Biology, Stanford University, Stanford, CA.

2019 Linear noise approximation: Epidemiological inference from pathogen genealogies. Literature Seminar, Department of Statistics, Stanford University, Stanford, CA.

2007 High and Low Prevalence Visual Search in Luggage Screening. Twenty-Fourth Annual Research Science Institute Symposium, Massachusetts Institute of Technology, Cambridge, MA.

Poster Presentations

2020 Genomic characteristics of canine distemper virus in Arctic wildlife. Annual Meeting of the Society for Molecular Biology and Evolution, Quebec City, Canada (cancelled due to COVID-19).

2018 Empirical dynamic modeling reveals that temperature and rainfall drive dengue dynamics. Ecology and Evolution of Infectious Diseases, University of Glasgow, UK.

2018 Environmental factors drive dengue incidence in Puerto Rico. Stanford Global Health Research Convening, Stanford University, Stanford, CA.

2017 Environmental factors driving dengue incidence in Central and South America. Ecology and Evolution of Infectious Diseases, University of California Santa Barbara, CA.

2015 Modeling the development of neutralizing antibody breadth in chronic-stage HIV infection. Triangle Center for Evolutionary Medicine Symposium, The Solution Center in Research Triangle Park, Durham, NC.

2013 Autonomous robot accomplishing standstill balance and forward motion using Segway technology. Electrical Engineering Symposium, KTH Royal Institute of Technology, Stockholm, Sweden.

2010 Assessment of c-Fos as a marker of spinal neuronal activity in a pain model of rheumatoid arthritis. Annual Medical Sciences Symposium, Karolinska Institutet, Stockholm, Sweden.

2006 Activation of Liver X Receptor affects the function and differentiation of osteoclasts. Biomedical Sciences Symposium, Karolinska Institutet, Stockholm, Sweden.

RESEARCH EXPERIENCE

2022–present High Meadows Environmental Institute, Princeton University (Advisors: Bryan Grenfell and C. Jessica Metcalf).

2016–2022 Department of Biology, Stanford University (Advisors: Erin Mordecai and Dmitri Petrov).

2015–2016 Department of Biology, Duke University (Advisor: Katia Koelle).

2014–2015 Department of Data Science, Dana-Farber/Harvard Cancer Center (Advisor: Franziska Michor).

2010–2012 Department of Physiology and Pharmacology, Karolinska Institutet (Advisor: Camilla Svensson).

2007 Department of Brain and Cognitive Sciences, Harvard Medical School, Brigham and Women's Hospital (Advisor: Jeremy Wolfe).

2006 Department of Biosciences and Nutrition, Karolinska Institutet (Advisor: Kirsten Robertson).

TEACHING EXPERIENCE

Teaching Assistantships

2019 Spring quarter, *Ecology and Evolution of Infectious Disease in a Changing World*, undergraduate level course, Department of Biology, Stanford University.
2017 Spring quarter, *Introduction to Research in Ecology and Evolutionary Biology*, undergraduate level course, Department of Biology, Stanford University.
2017 Winter quarter, *Fundamentals of Molecular Evolution*, undergraduate and graduate level course, Department of Biology, Stanford University.

Guest Lectures

2021 Spring quarter, *Globally Emerging Zoonotic Diseases*, undergraduate level course. Department of Comparative Medicine, Stanford University.
Lecture title: Climate impacts on vector-borne disease.
2015 Summer quarter, *NSF REU in Mathematical Biology*, undergraduate research course, Department of Mathematics and Statistics, University of North Carolina at Greensboro, NC. Lecture title: Mathematical Modeling of Cancer and Infectious Diseases.

SERVICE

Peer Reviewing

I have **reviewed papers** for: *BMC Public Health*, *Ecological Applications*, *Ecological Monographs*, *Ecology*, *PLoS Neglected Tropical Diseases*, and *Viruses*.

Mentoring

2022 **Data science mentor** for an undergraduate student (Marlem Lopez Meza), Inclusive Mentorship in Data Science, Stanford University.
2020 **Research mentor** for a high school student (Shreya Ramachandran), Research Science Institute, Center for Excellence in Education & MIT (remotely).
2019 **Research mentor** for two undergraduate students (Rachael Wang and Allen Huang), Biology Summer Undergraduate Research Program, Stanford University.
2011, 2012 **Mentorship Director** for 20 high school students, Research Academy for Young Scientists, Stockholm, Sweden.

Conference & Seminar Organizing

2019 Co-Organizer, Planetary Health Annual Meeting, Planetary Health Alliance, Stanford University, Stanford, CA.
2019 Co-Organizer, Organized Oral Session, *Ecological Levers to Improve Human Health*, Ecological Society of America Annual Meeting, Louisville, KY.

2016–2017 Chair, Biology Department Seminar Series Speaker Selection Student Committee, Stanford University, Stanford, CA.
2008–2009 Co-organizer, National Science Fair, Swedish Federation of Young Scientists, Stockholm, Sweden.

MEDIA COVERAGE

Mick Kulikowski. Study Pinpoints 'Win-Win' Solutions to Protect Human Health and Conserve Ecosystems. *NC State University News*. August 3, 2022.
news.ncsu.edu/2022/08/study-pinpoints-solutions-for-humans-and-environment/

Rob Jordan. Disease prevention: Stanford researchers find protecting biodiversity can protect human health. *Stanford Woods Institute for the Environment*. October 25, 2021.
twitter.com/StanfordWoods/status/1452666263931658247

Isabella Backman. Stanford course explores how diseases have shaped human history. *Stanford News*. January 27, 2021. news.stanford.edu/2021/01/27/diseases-history-intertwined

Vilina Mehta. Understanding COVID-19, zoonotic viruses. *The Stanford Daily*. April 27, 2020. www.stanforddaily.com/2020/04/27/understanding-covid-19-zoonotic-viruses

Hans Bergström. An IES alumnus at the forefront of virus research. *IES News*. April 21, 2020. engelska.se/news/en-ies-elev-vid-fronten-av-virusforskningen

Rob Jordan. Stanford-developed interactive model explores how different interventions affect COVID-19's spread. *Stanford News*. March 30, 2020.
news.stanford.edu/2020/03/30/modeling-social-distancings-impact

EXTRA TRAINING

2020 Annual Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID), University of Washington, Seattle, WA.
2018 Genomics of Wildlife Diseases Workshop, Colorado State University, Fort Collins, CO.
2018 Wilderness First Aid Certificate, Wilderness Medicine Training Center, WA.
2015 Evolutionary Game Theory Workshop, Mathematical Biosciences Institute, Ohio State University, Columbus, OH.
2013 2.03x: Dynamics, MIT via edX. `Certificate`
2013 PHYS102x: Electricity & Magnetism, Rice University via edX. `Certificate`
2013 BIO465x: Neuronal Dynamics, EPFL via edX. `Certificate`
2013 Electrical Engineering (60 credits), KTH Royal Institute of Technology (GPA 3.9/4.0).
2011 Surgical training, St. Bartholomew's and the Royal London School of Medicine and Dentistry, Queen Mary University of London.
2010 Maxillofacial International Training Course, Chiemsee-Akademie, Seebruck, Germany.
2010 Surgical training, Department of Cranio-, Maxillofacial and Oral Surgery, Medical University of Vienna.