

# Nathaniel Bernard Edelman, PhD

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## Education

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PhD, Department of Organismic and Evolutionary Biology  
Harvard University, Graduate School of Arts and Sciences  
Advisor: Dr. James Mallet  
2014-2020  
Cambridge, MA

BA, Biology, *cum laude*  
Concentration: Genetics and Development  
Cornell University, College of Arts and Sciences  
2007-2011  
Ithaca, NY

## Research Positions

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Hutchinson Postdoctoral Fellow  
Dr. David Skelly Lab, Yale Institute for Biospheric Studies  
2020-Present  
New Haven, CT

Research Technician  
Dr. David Keays Lab, Institute of Molecular Pathology  
2011-2013  
Vienna, Austria

Undergraduate Research Assistant  
Dr. Daniel Barbash Lab, Cornell University  
2009-2011  
Ithaca, NY

Research Assistant  
Dr. Marissa Ehringer Lab, University of Colorado  
2009  
Boulder, CO

## Publications

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### *In prep*

18. **Edelman NB**, Arietta AZA, Marek Kučka, Yingguang Frank Chan, Skelly DK. Haplotype-resolved local adaptation with migration in a wood frog metapopulation

17. **Edelman NB**, Arietta AZA, Marek Kučka, Yingguang Frank Chan, Skelly DK. Structure of the wood frog sex chromosome identified through linked-read sequencing. *Invited contribution, special issue of Molecular Ecology*

### *Ahead of Print*

16. Lamb S, Taylor AM, Hughes TA, McMillan BR, Larsen RT, Khan R, Weisz D, Dudchenko O, Aiden EL, **Edelman NB**, Frandsen PB. 2021. De novo chromosome-length assembly of the mule deer (*Odocoileus hemionus*) genome. GigaByte. *Accepted*

15. Rosser N\*, **Edelman NB\***, Queste LM, Nelson M, Seixas F, Dasmahapatra KK, Mallet J. 2021. Complex basis of hybrid female sterility and Haldane's rule in *Heliconius* butterflies: Z-linkage and epistasis. *Molecular Ecology*. *Accepted*  
\*Authors contributed equally

14. Veller C, **Edelman NB**, Muralidhar P, Nowak MA. Recombination, variance in genetic relatedness, and selection against introgressed DNA. bioRxiv 846147; doi: <https://doi.org/10.1101/846147>

*Peer-reviewed Publications*

13. **Edelman NB** and Mallet J. 2021. The prevalence and adaptive impact of introgression in animals. *Annual Reviews Genetics*. 55(1)

12. Seixas F, **Edelman NB**, Mallet J. 2021. Synteny-based genome assembly for 16 species of *Heliconius* butterflies, and an assessment of structural variation across the genus. *Genome Biology and Evolution*. 13(7) evab069

11. Veller, C, **Edelman NB**, Muralidhar P, Nowak MA. 2020. Variation in genetic relatedness is determined by the aggregate recombination process. *Genetics*. 216(4): 985-994

10. **Edelman NB**, Frandsen P, Miyagi M, Clavijo B, Davey J, Dikow R, García-Accinelli G, Van Belleghem S, Patterson N, Neafsey D, Challis R, Kumar S, Moreira G, Salazar C, Chouteau M, Counterman B, Papa R, Whibley A, Dasmahapatra KK, Kronforst M, Joron M, Jiggins CD, McMillan WO, Di Palma F, Blumberg AJ, Wakeley J, Jaffe D, Mallet J. 2019. Genomic architecture and introgression shape a butterfly radiation. *Science*. 366(6465)594-599.

9. Ray DA, Grimshaw JR, Halsey MK, Korstian JM, Osmanski AB, Sullivan KAM, Wolf KA, Reddy H, Foley N, Knisbacher B, Levy O, Counterman B, **Edelman NB**, Mallet J. 2019. Simultaneous TE analysis of 19 heliconiine butterflies yields novel insights into rapid TE-based genome diversification and multiple SINE births and deaths. *Genome Biology and Evolution*. 11(8):2162-2177

8. Rosser N, Queste L, Cama B, **Edelman NB**, Mann F, Morris J, Segami C, Velado P, Schulz S, Mallet J, Dasmahapatra KK. 2019. The effect of geography on contrasting modes of pre- and postzygotic isolation in *Heliconius elevatus* and *Heliconius pardalinus*. *Evolution*. 73(9):1821-1838

7. Holt C, Campbell M, Keays DA, **Edelman N**, Kapusta, A, Maclary E, Domyan, ET, Suh A, Warren W.C, Yandell M, Thomas P, Gilbert M, Shapiro M.D. 2018. Improved genome assembly and annotation for the Rock Pigeon (*Columba livia*). *G3: Genes, Genomes, Genetics*. 8(5):1391-1398

6. **Edelman NB**, Fritz T, Nimpf S, Pichler P, Lauwers M, Hickman RW, Keays D. 2015. No evidence for intracellular magnetite in putative vertebrate magnetoreceptors identified by magnetic screening. *PNAS*. 112(1):262-267

5. Cuykendall TN, Satyaki P, Ji S, Clay DM, **Edelman NB**, Kimchy A, Li L, Nuzzo E, Parekh N, Park S, Barbash DA. 2014. A screen for F1 hybrid male rescue reveals no major-effect hybrid lethality loci in the *Drosophila melanogaster* autosomal genome. *G3: Genes, Genomes, Genetics*. 4(12):2451-2460

4. Treiber C, Salzer M, Breuss M, Ushakova L, Lauwers M, **Edelman N**, Keays D. 2013. High resolution anatomical mapping confirms the absence of a magnetic sense system in the rostral upper beak of pigeons. *Communicative & Integrative Biology*. 6:e24859

3. Lauwers M, Pichler P, **Edelman NB**, Resch GP, Ushakova L, Salzer MC, Heyers D, Saunders M, Shaw J, Keays DA. 2013. An iron-rich organelle in the cuticular plate of avian hair cells. *Current Biology*. 23(10):924-9
2. Treiber CD, Salzer MC, Riegler J, **Edelman N**, Sugar C, Breuss M, Pichler P, Cadiou H, Saunders M, Lythgoe M, Shaw J, Keays DA. 2012. Clusters of iron-rich cells in the upper beak of pigeons are macrophages not magnetosensitive neurons. *Nature*. 484: 367-370.
1. Kelleher ES, **Edelman NB**, Barbash DA. 2012. *Drosophila* interspecific hybrids phenocopy piRNA-pathway mutants". *PLoS Biology*. 10(11): e1001428.

### Workshops Attended

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SMBE satellite meeting on speciation genomics. June 17-19, 2019. Tjärnö, Sweden.

Subjects: Simulation with msPrime, detecting barriers to introgression, demographic inference with gIMble.

Instructors: Jerome Kelleher, Konrad Lohse, Dominik Laetsch, Georgia Tsambos, Derek Setter

Machine learning for population genetics. August 9, 2018, Cambridge, MA

Subject: Introduction to machine learning for population genetics

Instructor: Andrew Kern

### Outreach, Volunteer Experience, and Service

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Peer reviewer:	2019-2021
BMC Biology	
Molecular Biology and Evolution	
Evolution Letters	
Proceedings B	
Molecular Ecology	
Nature Communications	
Judge, Yale Climate Day Poster Competition	2021
Evolution Matters: Frontiers in Evolution Public Lecture, Cambridge, MA	2019
Insect art classroom presentation, Brookline High School, Brookline, MA	2018
Scientist of the Month, Evergreen School, Seattle, WA	February, October 2018
President, Cambridge Entomological Club, Cambridge, MA	2016-2017
Stream Monitor, Charles River Watershed Association, MA	2016
Invasive Weeds Crew Member, Montana Conservation Corps, Missoula, MT	2014

### Teaching, Mentorship and Supervisory Experience

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Organizer and instructor, SLiM evolutionary modeling workshop	2020
Teaching Fellow, GENED 1004: Understanding Darwinism	2019
Teaching Fellow, OEB 55: Ecology	2016, 2019
Supervisor to summer intern Siliang Song: Investigating the Evolutionary History of a Polymorphic Inversion	2018
Teaching Fellow, OEB 230: Comparative and Evolutionary Genomics	2018
Teaching Fellow, OEB 242: Population Genetics	2017
Supervisor to undergraduate research assistants Christian Perez and Jarreth Caldwell (Harvard University): Measuring Reproductive Isolation between <i>Heliconius</i> subspecies	2015
Teaching Fellow, Reading the New England Landscape	2015

Supervisor to master's student Tanja Fritz (University of Vienna): A search for magnetic cells in the pigeon *Columba livia*

## Grants and Honors

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AGA President's symposium travel award American Genetics Association; \$400	2021
Hutchinson Postdoctoral Fellowship Yale University; \$134,000.00	2020
Postdoctoral Fellowship, Finalist Life Sciences Research Foundation	2020
Robert G Goelet Research Grant Harvard University; \$5,778.00, \$1,646.00, \$240.00	2015, 2016, 2019
Bok Center Certificate of Distinction in Teaching Harvard University	2017, 2018, 2019
Putnam Expedition Grant Harvard University, \$3,880.00	2017
IMP/IMBA Scientific Recess Poster Prize	2012

## Invited Presentations

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- AGA President's Symposium 2021: Conservation Genomics, October 11-13, Snowbird, UT  
**Selected Talk: Edelman NB**, Arietta AZ, Skelly DK: Haplotype-resolved local adaptation with migration in a wood frog metapopulation
- Yale Institute for Biospheric Studies, 2020, September 11  
Departmental Seminar: **Edelman NB**: The evolutionary impact of hybridization in *Heliconius* butterflies
- International *Heliconius* Seminar Series, 2020, July 20  
**Edelman NB**, Rosser N, Dasmahapatra KK, Mallet J: The molecular basis of hybrid female sterility in *Heliconius pardalinus* subspecies
- Guest Lecture, BYU, 2020, February 20  
**Edelman NB** Making the most of your genomes: a practical guide to current practices in evolutionary genomics.
- Gordon Research Conference on Ecological and Evolutionary Genomics, 2019, July 13-18  
**Edelman NB**, Frandsen P, Miyagi M, Clavijo BJ, Mallet J: Genome Architecture and Introgression in *Heliconius* butterflies
- Cambridge Entomological Club President's Address, 2017  
**Edelman NB**. Broad-scale hybridization in *Heliconius* butterflies
- Frontiers in Phylogenetics 2016; September 9. National Museum of Natural History, Washington, DC  
**Edelman NB**, Frandsen P, Mallet J "One, Two, Skip a Few: What can we learn from sequencing 21 Heliconiinae genomes?"

## Contributed Presentations

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- Evolution 2019, June 21-25, Providence, RI  
**Poster: Edelman NB**, Rosser N, Dasmahapatra KK, Mallet J: Molecular basis of hybrid sterility in

*Heliconius* butterflies

Boston Evolutionary Genomics Supergroup Retreat, 2018, September 6, Cambridge, MA

**Talk: Edelman NB**, Miyagi M, Frandsen P, Dikow R, Mallet J, *Heliconius* 21-genome consortium: Hybridization throughout the *Heliconius* radiation

Heliconius Meeting 2018, August 23-25, Montpellier, France

**Talk: Edelman NB**, Miyagi M, Frandsen P, Dikow R, Mallet J, Heliconius 21-genome consortium: Whole genome assembly of 21 Heliconiinae assemblies identifies introgression throughout radiation

II Joint Congress on Evolutionary Biology, 2018, August 18-22, Montpellier, France

**Selected Talk: Edelman NB**, Miyagi M, Frandsen P, Dikow R, Mallet J, *Heliconius* 21-genome consortium: Whole genome assembly of 21 Heliconiinae assemblies identifies introgression throughout radiation

Heliconius Meeting 2016; June 13-14. Sheffield, UK

**Poster: Edelman NB, Mallet J** “One, Two, Skip a Few: What can we learn from sequencing 21 Heliconiinae genomes?”

Australian Neuroscience Society (ASN) Conference 2013; Feb 3-6. Melbourne, Australia

**Poster: Edelman NB**, Fritz T, Pichler P, Lauwers M, Ushakova L, Keays DA. “A screen for magnetic cells in the pigeon *Columba livia*”

IMP/IMBA Annual Scientific Recess 2012; Oct 3-5. Vienna, Austria

**Poster: Edelman NB**, Fritz T, Pichler P, Lauwers M, Ushakova L, Keays DA. “A screen for magnetic cells in the pigeon *Columba livia*”