

# Samuel V. Hulse

Postdoctoral Associate  
Mathematical Evolutionary Biologist

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## Education

- 2021 **Ph.D., Biological Sciences**  
University of Maryland Baltimore County  
Baltimore, MD  
*Supervisor:* Dr. Tamra Mendelson
- 2021 **M.S., Applied Mathematics**  
University of Maryland Baltimore County  
Baltimore, MD
- 2012 **B.S., Environmental Science**  
Juniata College  
Huntingdon, PA

## Professional Appointments

- 2021 - Curr. **Postdoctoral Associate**  
Department of Biology  
University of Maryland College Park  
College Park, MD  
*Supervisor:* Dr. Emily Bruns

## Publications

### *Peer-Reviewed Publications*

- 2023 **Hulse, S.V.**, Antonovics, J., Hood, M.E., and Bruns, E.L. Host-pathogen coevolution promotes the evolution of general, broad-spectrum resistance and reduces foreign pathogen spillover risk. *Evolution Letters* 7: 467-477.
- 2023 **Hulse, S.V.**, Antonovics, J., Hood, M.E., and Bruns, E.L. Specific resistance prevents the evolution of general resistance and facilitates disease emergence. *Journal of Evolutionary Biology* 36: 753-763.
- 2022 **Hulse, S.V.**, Renoult, J.P., and Mendelson, T.C. Using deep neural networks to model similarity between visual patterns: Application to fish sexual signals. *Ecological Informatics* 67: 101486.

2020 **Hulse, S.V.**, Renoult, J.P., and Mendelson, T.C. Sexual signaling pattern correlates with habitat pattern in visually ornamented fishes. *Nature Communications* 11: 2561.

### ***Dissertation***

2021 **Hulse, S.V.** The Evolution of Visual Patterning in North American Freshwater Fishes.

### ***In Preparation***

2023 **Hulse, S.V.** Cost Functions in Models of Quantitative Traits.

## **Conferences and Presentations**

### ***Invited Talks***

2023 **Hulse, S.V.** Does host-pathogen coevolution increase the risk of foreign pathogen invasion? Ecology and Evolution of Infectious Diseases, State College, PA.

2023 **Hulse, S.V.** The evolution and maintenance of host genetic diversity for pathogen resistance. Mathematical Biology Seminar, University of Maryland College Park.

2022 **Hulse, S.V.** Applications of Deep Learning to Fish Behavioral Patterns. Machine Learners Group Seminar, Scripps Institution of Oceanography.

### ***Contributed Talks***

2023 **Hulse, S.V.** A theoretical model for the shape of evolutionary trade-offs. Southeastern Population Ecology and Evolutionary Genetics, Pembroke, VA.

2023 **Hulse, S.V.** The role of coevolution in maintaining host resistance structures. Evolution, Albuquerque, NM.

2021 **Hulse, S.V.** Visual statistics of habitat predict spatial aspect of visual signals. University of Maryland Behavior, Ecology, Evolution, and Systematics Department Retreat, Thurmont, MD.

2018 **Hulse, S.V.** The Efficient Coding Hypothesis and Signal Design. UMBC Biological Sciences Departmental Seminar, Baltimore, MD.

2018 **Hulse, S.V.**, and Mendelson, T.C. The efficient coding hypothesis and signal design. Annual meeting of the Society for Integrative and Comparative Biology, San Francisco, CA.

2017 **Hulse, S.V.**, and Mendelson, T.C. The efficient coding hypothesis and signal design. Spotlight Talk, Evolution, Portland, OR.

## ***Posters***

- 2022 **Hulse, S.V.**, and Bruns. E.L. Disease Resistance at the Whole Organism Level, The Joint Evolution of General and Specific Resistance. Ecology and Evolution of Infectious Diseases, Atlanta GA.
- 2020 **Hulse, S.V.**, Mendelson, T.C., and Renoult, J.P. The spatial statistics of sexual signals in fishes correspond to their habitat: extending sensory drive to signal design. NSF workshop: Biology through Information Communication Coding Theory, Alexandria, VA.
- 2018 **Hulse, S.V.**, Renoult, J.P., and Mendelson, T.C. The Efficient Coding Hypothesis and the Evolution of Signal Design. Evolution, Montpellier, France.
- 2017 **Hulse, S.V.**, and Mendelson, T.C. The efficient coding hypothesis and signal design. Annual meeting of the Society for Integrative and Comparative Biology, New Orleans, LA.

## ***Outreach***

- 2019 **Hulse, S.V.** Understanding the signals animals send each other. High School Assembly Presentation, The Park School of Baltimore.

## **Grants, Awards, and Fellowships**

### **Fellowships**

- 2018 Chateaubriand Fellowship, The Embassy of France in the United States (\$4200)

### **Travel Awards**

- 2020 NSF BIOTIC Workshop Student Support (Housing Support)
- 2018 SICB Charlotte Magnum Student Support (Housing Support)
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- 2018 Wilson Ornithological Society Travel Award (\$285)

### **Other Awards**

- 2018 AAAS/Science Program for Excellence in Science (Full AAAS Membership benefits)

## **Training**

- 2022 University of Maryland Mentoring Workshops for Postdoctoral Fellows, College Park, MD.
- 2020 MIT Brains, Minds Machines Virtual Summer Course, Woods Hole, MA.

## Teaching Experience

### ***Instructor of Record***

2024 Introduction to Python for Life Sciences.  
Developed an undergraduate course designed to introduce biologists to the python programming language.

### ***Teaching Assistant Roles and Guest Lectures***

2023 Guest Lecturer, Principles of Ecology and Evolution  
2015-2021 Teaching Assistant, Comparative Vertebrate Physiology Lab  
2016-2020 Teaching Assistant, Anatomy and Physiology II Lab  
2018 Guest Lecturer, Advanced Topics in Ecology and Evolution: Sexual Selection  
2017-2018 Guest Lecturer, Animal Behavior

## Mentoring

### **Undergraduate Mentoring**

2024 Bhargav Srinivasan, Undergraduate Student, University of Maryland College Park  
2023 Molly Gans, Visting Undergraduate Student from Amherst University  
2022 Daniel Fu, Undergraduate Student, University of Maryland College Park

## Academic Service

### **Peer Reviewing**

2024 Grant Reviewer: Deutsche Forschungsgemeinschaft  
2023 Biology Letters (Joint review with Dr. Emily Bruns)  
2022 Evolutionary Ecology  
2020 Behavioral Ecology

### **Other Service**

2023 - Curr. Founder and Organizer: UMD Mathematical Biology Journal Club  
2023 Poster Judge, Southeastern Population Ecological and Evolutionary Genetics 2023  
2023 SSE W. D. Hamilton Award Judge  
2023 Maryland Day 2023 Outreach Volunteer  
2016-2020 UMBC Department of Biological Science FUN Committee  
2016-2017 UMBC Graduate Student Association Senator