

# Samuel V. Hulse

Postdoctoral Associate  
Theoretical Evolutionary Biologist

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## Professional Experience

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

## Education

2021 **Ph.D., Biological Sciences**  
*University of Maryland Baltimore County, Baltimore, MD*  
*Dissertation:* The Evolution of Visual Patterning in North American Freshwater Fishes  
*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*

## 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. *In Press, Evolution Letters*.

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 Preperation***

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

## **Conferences and Presentations**

### ***Invited Talks***

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.

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

### ***Contributed Talks***

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

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

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

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.

2019 Mendelson, T.C., **Hulse, S.V.**, Renoult, J.P. Complex nuptial patterns of fish species mimic the spatial statistics of their habitat. Annual meeting of the Animal Behavior Society, Chicago, IL.

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.

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

### **Fellowships**

- 2019 Millhauser Fellowship, The Park School of Baltimore (\$250)
- 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**

### ***Courses Taught***

- 2023 BSCI 338V: Introduction to Python for Life Sciences.  
Currently developing a 1 credit course designed to introduce biologists to the python programming language. This course will be offered in the winter 23/24 session.

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

2015-2021	Teaching Assistant, Comparative Vertebrate Physiology Lab
2016-2020	Teaching Assistant, Anatomy and Physiology II Lab
2018	Guest Lecturer, Sexual Selection
2017, 2018	Guest Lecturer, Animal Behavior

## **Mentoring**

### **Undergraduate Mentoring**

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

## **Academic Service**

### **Peer Reviewing**

2023	Biology Letters (Joint review with Dr. Emily Bruns)
2022	Evolutionary Ecology
2020	Behavioral Ecology

### **Other Service**

2023 - Curr.	Founder and Organiser: 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