

**Emily Louise Bruns**  
Assistant Professor of Biology  
University of Maryland, College Park, MD, 20784  
ebruns@umd.edu  
<http://www.emmebruns.com>

## Appointments

---

<b>Assistant Professor of Biology, <i>University of Maryland</i></b>	<b>Jan 2020-present</b>
<b>Visiting Assistant Professor, <i>University of Maryland</i></b>	<b>Feb 2019-Dec 2019</b>
<b>Research Assistant Professor, <i>University of Virginia</i>, Biology</b>	<b>Nov 2016-Dec 2019</b>
<b>Post-doc, <i>University of Virginia</i>, Biology</b> Advisor: Dr. Janis Antonovics	<b>Jan 2013-Nov 2016</b>

## Education

---

<b>Ph.D. <i>University of Minnesota</i>, Ecology, Evolution and Behavior</b> Dissertation: Genetic and ecological constraints on the evolution of pathogen virulence. Advisor: Dr. Georgiana May	<b>2007-2012</b>
<b>B.S. <i>University of California, Santa Cruz</i>, Ecology and Evolutionary Biology</b> Thesis: Maternal effects and fitness of chasmogamous and cleistogamous progeny of <i>Danthonia californica</i> . Advisor: Dr. Ingrid Parker	<b>2001-2005</b>

## Publications

---

Hulse, S., Antonovics, J., Hood, M.E., and **E. Bruns**. 2023. Specific resistance prevents the evolution of general resistance and facilitates disease emergence. *Journal of Evolutionary Biology*. Early view, 1– 11.

Jiranek J, Miller IF, An R, **Bruns E**, and J.C. Metcalf. 2023. Mechanistic models to meet the challenge of climate change in plant–pathogen systems. *Phil. Trans. R. Soc. B* 378: 2022001720220017.

LJ Buckingham, **EL Bruns**, B Ashby. 2023. The evolution of age-specific resistance to infectious disease. *Proceedings of the Royal Society B* 290: 20222000.

- J Antonovics, CR Amoroso, **E Bruns**, M Hood. 2022. Host density shapes the relative contribution of vector-based and aerial transmission of a pathogenic fungus. *Ecology*, e3970
- LH Uricchio, **EL Bruns**, ME Hood, M Boots, J Antonovics. 2022. Multimodal pathogen transmission as a limiting factor in host distribution. *Ecology*, e3956.
- EB Bruns**, ME Hood, J Antonovics, IH Ballister\*, SE Troy\*, JH Cho Can disease resistance evolve independently at different ages? Genetic variation in age-dependent resistance to disease in three wild plant species. *Journal of Ecology* 110: 2046-2061
- Bruns, E.** Antonovics, J. and M. E. Hood. (2021). From generalist to specialists: variation in the host range and performance of anther-smut pathogens on *Dianthus*. *Evolution*. 75: 2494-2508
- Lerner, N., Luizzi, V., **Bruns, E.**, Antonovics, J., and Hood, M. E. (2021). Resistance correlations influence infection by foreign pathogens. *The American Naturalist*. 198: 202-219.
- Bruns, E.**, Pierce, L. \*, Antonovics, J. and M. Hood. (2020). Vector preference and heterogeneity in host sex ratio can affect pathogen spread in natural plant populations. *Ecology*. 102: e0324
- Bruns, E.**, Miller, I\*., Hood, M., Carasso, V., and Antonovics, J. (2019) The role of infectious disease in the evolution of females: evidence from anther-smut disease on a gynodioecious alpine carnation. *Evolution*. **73**: 497-510
- Bruns, E.**, Antonovics J., and Hood, M.E. (2018) Is there a disease-free halo at species range limits? The co-distribution of anther-smut disease and its alpine host species. *Journal of Ecology*. **107**:1-11.
- Ashby, B. and **Bruns, E.** (2018) The evolution of juvenile susceptibility to infectious disease. *Proceedings of the Royal Society, B*. **285**: 20180844.
- Antonovics, J., Abbate, J., **Bruns, E.**, Fields, P., Forrester, N., Gilbert, K., Hood, M.E., Park, T., and Taylor. (2018) Effect of anther-smut disease caused by the fungal pathogen *Microbotryum* on the pre-flowering growth of its host *Silene latifolia*. *American Journal of Botany* **105**: 1088–1095.
- Tyson, D.\*, Antonovics, J. and **Bruns, E.** (2018) Anther-smut disease caused by *Microbotryum* on berry campion *Silene baccifera*: endemic pathogen or host-shift? *Plant Pathology*. **67**: 1850-1856.
- Bruns, E.**, Hood, M.E., and Antonovics, J. (2017) Transmission and temporal dynamics of anther-smut disease (*Microbotryum*) on alpine carnation (*Dianthus pavonius*). *Journal of Ecology*, **105**: 1413-1424.

- Alexander HM, **Bruns E**, Schebor H, and Malmstrom CM. (2017) Crop-associated virus infection in a native perennial grass: reduction in plant fitness and dynamic patterns of virus detection. *Journal of Ecology*. **105**: 1021-1031.
- Petit E., Silver, C., Cornille, A., Gladieux, P. Rosenthal, L., **Bruns, E.**, Yee, S., Antonovics, J., Giraud, T., Hood, M.E. (2017) Co-occurrence and hybridization of anther-smut pathogens specialized on *Dianthus* hosts. *Molecular Ecology*. **26**: 1877–1890.
- Miller, I\* and **Bruns, E.** (2016) The effect of disease on the evolution of females and the genetic basis of sex in populations with cytoplasmic male sterility. *Proceedings of the Royal Society, B*. **283**: 20153035.
- Bruns, E.**, Hood, M.E., and Antonovics, J. (2015) Resistance evolution and polymorphism in long- and short-lived hosts. *Evolution*. **69**: 551-560
- Bruns, E.**, Carson, M.L., and May, G. (2014) The Jack of all trades is master of none: a pathogen’s ability to infect a greater number of host genotypes comes at a cost of delayed reproduction. *Evolution*. **68**: 2453-2466.
- Bruns, E.**, Carson, M.L., and May, G. (2012) Pathogen and host genotypes differently affect pathogen life-history stages. *BMC Evolutionary Biology*. **12**: 135
- Asplen, M., **Bruns E**, David, A., Denison, R.F., Epstein, B., Kaiser, M.C., Kaiser, J.M., Lacroix, C., Mohl, E., Quiram, G., Prescott, K., Stanton-Geddes, J., Vincent, J., Wragg, P., and May, G. (2011) Do Trade-offs have explanatory power for the evolution of organismal interactions? *Evolution*. **66**: 1297-1307

## Other Invited Contributions

---

**Bruns, E.** (2019) Effects of host lifespan on the evolution of age-specific resistance: a case study of anther-smut disease on wild carnations. Chapter for ‘*Wildlife Disease Ecology: Linking Theory to data and application*’ Eds. Wilson, K., Fenton, A., and Tompkins, D. Cambridge University Press, Cambridge.

**Bruns, E.** (2016) Fitness Costs of Plant Disease Resistance. eLS.1-11.

## Grants

---

NSF 1936334 to **Bruns, E.** (lead P.I) and Ashby, B. “BEE NSFDEB-NERC: The eco-evolutionary dynamics of age-specific resistance to infectious disease.”  
Total award amount to Bruns: \$524,986.00 **2020-2023**

NIH -R01GM140457 to Hood, M (lead PI) and **Bruns E** (PI) “Resistance Variation to Endemic Disease as a Risk Factor of New Disease Emergence”  
Total award amount to Bruns: \$527,922.00 **2020-2024**

---

\* Undergraduate advisee co-author

NIH award R01GM12206 to Antonovics JA, **Bruns E**, Hood ME, and Boots M. 'Ecology and evolution of transmission mode: Anther smut as a model system.'  
 Total Award amount: \$1,643,459.00 **2016-2020**

University of Minnesota Doctoral Dissertation Grant **2012**

### **Awards and Honors**

---

Early Career Award, Society for Evolutionary Demography	<b>2016</b>
NSF Graduate Research Fellowship, Honorable Mention	<b>2009</b>
Dean and Chancellors Award for Undergraduate Thesis, UC Santa Cruz	<b>2006</b>
Highest Honors in Ecology and Evolutionary Biology, UC Santa Cruz	<b>2005</b>

### **Invited Presentations**

---

**Bruns E.** 2023. The evolution of age-specific disease resistance: a tale of anther-smut disease on carnations. James Madison University. Biology Dept. Seminar.

**Bruns E.** 2023. Evolution of disease resistance in wild plant populations. Botanical Society of Washington DC. Virtual Seminar.

**Bruns E.** 2022. Disease transmission, age-structure, and resistance evolution in wild plant populations. Clemson University, Dept. of Biology, Clemson SC.

**Bruns E.** 2021. 'Disease transmission, age-structure, and resistance evolution in wild carnations.' American Society of Plant Biologists Mid-Atlantic -UMD Plant Symposium 2021. Virtual Seminar.

**Bruns E.** 2021. 'Disease transmission and host evolution in natural populations.' Villanova University, Dept of Biology. Virtual Departmental Seminar.

**Bruns E.** 2021. 'Disease transmission and host evolution in natural populations.' Plant Biology Seminar Series. University of Pennsylvania, Dept of Biology. Virtual Seminar.

**Bruns E.** 2019. 'Disease dynamics in natural populations: insights from a model plant system'. University of Kentucky, Dept. of Biology. Lexington, KY.

**Bruns E.** 2019. 'Why do babies get sick? The evolution of age-specific resistance.' Key note speaker. Sixth Annual Evolutionary Demography Meeting. University of Miami, Coral Gables, FL.

**Bruns E.** 2018. 'Disease dynamics in natural populations: insights from a model plant system' University of Maryland, Dept. of Biology. College Park, MD.

- Bruns E.** 2018. 'The evolution of age specific resistance: why are juveniles more susceptible'. Triangle Center for Evolutionary Medicine. North Carolina State, Raleigh, NC.
- Bruns E.** 2018. 'Disease dynamics and evolution in natural populations' Biology Department. University of North Carolina, Chapel Hill, NC
- Bruns E.** 2018. 'Transmission and resistance in natural populations' Mountain Lake Biological Station, Giles County, VA
- Bruns E.** 2017 'Disease in natural populations: impacts of transmission mode and resistance evolution' Siena College, Biology Departmental Seminar, Albany, NY
- Bruns E.** 2016. 'Disease dynamics in natural populations: anther-smut disease on wild carnations.' Georgia Southern University, Biology Departmental Seminar, Statesboro, GA.
- Bruns E.** 2016. 'Demography of disease in natural plant populations: host lifespan and the evolution of resistance.' Evolutionary Demography Meeting, Charlottesville, VA.
- Bruns E, Antonovics J, Hood ME.** 2016. 'Disease at species range margins: Co-distribution of alpine plants and their vector-transmitted pathogens.' 2<sup>nd</sup> International Conference on Wild Plant Pathosystems. Helsinki, Finland.
- Bruns E, Antonovics J, Hood ME.** 2016. 'Disease at species range margins: Co-distribution of alpine plants and their vector-transmitted pathogens.' 14<sup>th</sup> Annual Conference on the Ecology and Evolution of Infectious Disease. Cornell, NY.
- Bruns E.** 2016. 'Disease dynamics in natural populations: anther-smut disease on wild carnations.' SUNY Albany, Biology Departmental Seminar, Albany, NY
- Bruns E.** 2016. 'Disease dynamics in natural populations: anther-smut disease on wild carnations.' Emory University, Biology Departmental Seminar, Atlanta, GA.
- Bruns E.** 2015. 'Disease dynamics in natural populations: anther-smut disease on wild carnations.' University of San Diego, Biology Departmental Seminar, San Diego, CA.
- Bruns, E.** 2015. 'The effect of disease on the evolution of separate sexes.' University of Kansas. Quantitative Biology Seminar, Lawrence, KS.
- Bruns, E.** 2015. 'The role of life history in host-pathogen evolution.' University of Kansas. Ecology and Evolution Departmental Seminar, Lawrence, KS.
- Bruns, E., Hood, M.E., and Antonovics, J.** 2014. 'Rate of resistance and prevalence in long- and short-lived hosts.' 12<sup>th</sup> Annual Conference on the Ecology and Evolution of Infectious Disease. Fort Collins, CO.

## Contributed Presentations

---

- Bruns, E.** 2019. “Genetic variation in age-specific resistance to infectious disease.” South Eastern Population Ecology Evolution and Genetics (SEPEEG) Meeting, Clemson University (oral communication)
- Bruns, E.** 2018. “The evolution of age-specific resistance: theory and data from anther-smut disease on wild carnations’ South Eastern Population Ecology Evolution and Genetics (SEPEEG) Meeting, Mountain Lake Biological Station (oral communication)
- Bruns, E.** 2017. ‘Evolution of age-specific resistance: why are juveniles more susceptible.’ 15<sup>th</sup> Annual Conference on the Ecology and Evolution of Infectious Disease. Santa Barbara, CA (poster)
- Bruns, E.,** Antonovics, J., and Hood, M.E. 2015. ‘Disease distribution at ecological range-margins: a comparative study.’ 13<sup>th</sup> Annual Conference on the Ecology and Evolution of Infectious Disease. Athens, GA. (poster)
- Bruns, E.** 2015. “Sex specific floral behavior mediates exposure to an STD in wild carnations” South Eastern Population Ecology Evolution and Genetics (SEPEEG) Meeting., Atlanta, GA. (oral communication)
- Bruns, E.,** Hood, M.E., and Antonovics, J. 2014. ‘Rate of resistance and polymorphism in long- and short-lived hosts.’ Evolution 2014. Raleigh, NC. (oral communication)
- Bruns, E.** 2013. ‘Do trade-offs limit the evolution of host breadth in pathogens?’ 39<sup>th</sup> Annual South Eastern Population Ecology Evolution and Genetics (SEPEEG) Meeting. Mountain Lake Biological Station, VA. (oral communication)
- Bruns, E.,** Carson, M.L., and May, G. 2013. ‘Is the Jack of all trades the master of none? The cost of expanded host genotype range in a plant pathogen.’ 11<sup>th</sup> Annual Conference on the Ecology and Evolution of Disease. State College, PN. (poster)
- Bruns, E.** 2013. ‘Inferring demographic history of disease in long-lived plants.’ 1<sup>st</sup> Annual Anther-smut Meeting. Amherst, MA. (oral communication)
- Bruns, E.,** Antonovics, J., Wu, M., and Hood, M.E. 2013. ‘Disease impacts on population dynamics: a demographic approach.’ Ecology and Evolution of Disease: PI Meeting. Athens, GA. (poster)
- Bruns, E.,** Carson, M.L., and May, G. 2011. ‘Pathogen traits involved in local adaptation vary with host genetic diversity.’ 79<sup>th</sup> Meeting of the Mycological Society of America. Fairbanks, AK. (oral communication)
- Bruns, E.,** Carson, M.L., and May, G. 2011. ‘Host population structure affects virulence and fitness in the rust fungus, *Puccinia coronata*.’ 26<sup>th</sup> Fungal Genetics Conference. Pacific Grove, CA. (poster)
- Bruns, E.,** Carson, M.L., and May, G. 2010. ‘Virulence and host genotype affect fitness in a plant pathogen.’ Evolution 2010. Portland, OR. (oral communication)

## Teaching

---

**BSCI 477/708D, *Ecology and Evolution of Infectious Disease*,** Spring since 2022

University of Maryland

Enrollment: 36 undergrad/4 grad

**BSCI 160, *Principles of Ecology and Evolution*,** University of Maryland Fall since 2020

Enrollment: 60-100

**Teaching Assistant,** University of Minnesota 2008-2012

**Guest Lecturer,** Saint Catherine's University, St. Paul, MN 2011

## Teaching Development

---

**Sprint Design Course,** University of Maryland Aug 2020

- Participated in 4 session course through the TLTC to develop online teaching and learning tools

**Workshop on teaching ecology and evolution of infectious disease** 2017-2018

- Organized/led educational plenary sessions of curricular development in teaching disease ecology at the 2017 and 2018 EEID meetings (Ecology and Evolution of Infectious Disease)
- Developed and administer online community portal for shared teaching resources across institutions (<https://app.nuclino.com/EEID-teaching/settings>)

**Preparing Future Faculty Program,** University of Minnesota 2010-2011

- Completed a two-semester course on teaching in higher education.

**Teaching Mycology Workshop,** Mycological Society of America 2010

## Advising

---

### Graduate students

- 3rd year BEES student, Yanelyn Perez

### Undergraduates

- Mentoring 5 University of Maryland Undergraduate in independent research credit, three of these for honors thesis credit
- Mentored 11 University of Virginia undergraduates in independent research.
  - Five of these students did independent projects in my Italian field sites.
  - Published four papers with students.

## Science Outreach

---

- DC Mycological Society** – Chevy Chase, public library **2020**
- Public talk on “The wonderful world of rusts and smuts”. Attendance: 48
- UMD** – Scholars life sciences class **2020**
- Talked about research and career for Beth Parent’s class
- USOAR (Undergrad opportunities in academic research)** **2107**
- Panelist for discussion of STEM research at University of Virginia
- Darwin Day** **2013-2015**
- Prepared posters and presentation materials for 'Darwin Day', an exhibition on evolution research for the general public hosted by the University of Virginia.
- Teaching S.M.A.R.T. (Science, Math, and Research Technology)** **2008-2011**
- Volunteered with outreach program to bring science into under-funded grade schools in Minneapolis.
  - Developed and taught hands-on lessons on plants and fungi in food-webs.

## Service

---

- Theoretical Ecology Search committee** **2022**
- Biology Faculty Advisory committee** **2021-2023**
- Biology dept chair search committee** **2022**
- Conference committee for ASPB meeting** **2022**
- Cell Biology Lecturer search committee** **2021**
- BEES graduate student award committee** **2020**
- BEES admissions committee** **2020**
- NSF External reviewer**
- Prepared two external reviews on NSF proposals
- Peer reviewer**
- Evolution, Ecology, Ecology Letters, Journal of Ecology, New Phytologist, Oecologia, Okios, PLoS Pathogens, Proc. R. Soc. B. The American Naturalist, Evolutionary Applications, Virus Evolution
- ECR<sup>2</sup> Faculty-Grad Student Networking lunches with Evolution grad students**

## Affiliations / Memberships

---

- Society for the Study of Evolution **2010-present**
- Ecological Society of America **2019-present**



## References

---

**Janis Antonovics**

Research Professor of Biology

University of Virginia

[ja8n@virginia.edu](mailto:ja8n@virginia.edu)

434- 243-5076

Postdoctoral advisor

**Michael Hood**

Professor of Biology

Amherst College

[mhood@amherst.edu](mailto:mhood@amherst.edu)

413-542-8538

Colleague

**Helen Alexander**

Professor of Ecology and Evolution

University of Kansas

[halexander@ku.edu](mailto:halexander@ku.edu)

785-864-3221

Colleague

**Georgiana May**

Professor of Ecology and Evolution

University of Minnesota

[gmay@umn.edu](mailto:gmay@umn.edu)

612-624-6777

Ph.D. advisor