

## Emily Louise Bruns

Research Assistant Professor of Biology  
University of Virginia, Charlottesville, VA, 22904  
(612) 360-1901, [elb5m@virginia.edu](mailto:elb5m@virginia.edu)  
<http://www.emmebruns.com>

### Appointments

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**Research Assistant Professor, University of Virginia, Biology** Nov 2016-present

**Post-doc, University of Virginia, Biology** Jan 2013-Nov 2016  
Advisor: Dr. Janis Antonovics

### Education

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**Ph.D. University of Minnesota, Ecology, Evolution and Behavior** 2007-2012  
Dissertation: Genetic and ecological constraints on the evolution of pathogen virulence.  
Advisor: Dr. Georgiana May

**B.S. University of California, Santa Cruz, Ecology and Evolutionary Biology** 2001-2005  
Thesis: Maternal effects and fitness of chasmogamous and cleistogamous progeny of  
*Danthonia californica*.  
Advisor: Dr. Ingrid Parker

### Publications

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**Bruns, E.**, Miller, I., Hood, M., Carasso, V., and Antonovics, J. (2018) The role of infectious disease in the evolution of females: evidence from anther-smut disease on a gynodioecious alpine carnation. *Evolution*. DOI:10.1111/evo.13640

**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. (In Press)

**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*. Early View. DOI: 10.1111/1365-2745.13009

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*. Early View. DOI: 10.1111/ppa.12910
- 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

## Invited Contributions

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

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\* Undergraduate co-author

## Grants

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NIH award R01GM12206 to Antonovics JA, <b>Bruns E</b> , Hood ME, and Boots M. 'Ecology and evolution of transmission mode: Anther smut as a model system.' Total Award amount: \$1,643,459.	2016
University of Minnesota Doctoral Dissertation Grant	2012
Dayton-Wilkie Natural History Research Fund	2010
Florence Rothman Fellowship	2009
STEPS Undergraduate Research Grant	2005

## Awards and Honors

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

## Invited Presentations

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- Bruns E.** '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.

### **Upcoming Invited Talks**

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- Jan 11, 2019.** Key note speaker. Sixth Annual Evolutionary Demography Meeting. University of Miami, Coral Gables, FL.

### **Contributed Presentations**

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- 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)

## **Classroom Experience**

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- Teaching Assistant, University of Minnesota** **2008-2012**
- 4 semesters TA experience for three different courses: Biology Foundations I & II and Evolution.
  - Developed and presented lectures for the Foundations lab courses.
  - Provided extensive feedback on writing.
- Guest Lecturer, Saint Catherine's University, St. Paul, MN** **2011**
- Three guest lectures on plant defenses and natural selection for a second semester introductory biology course on plant biology and natural selection.

## **Teaching Development**

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- Teaching the 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.

- Engaged in a mentorship with Jill Welter, a faculty member in the Biology program at Saint Catherine's University.
- Developed a course syllabus, final project, and full lesson plan for an undergraduate evolution course.
- Practiced teaching with active learning strategies.

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

**2010**

## **Undergraduate Mentoring**

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### **Advising**

- Mentored 11 University of Virginia undergraduates in independent research.
  - Five of these students did independent projects in my Italian field sites.
  - Published three papers with students.
  - Two students attended a conference in Athens GA and won awards for their presentations.
- Mentored three Italian high school students and two undergraduates from the University of Torino, Italy.
- Mentored three undergraduate students at the University of Minnesota.

### **Lab organization**

- Organized a weekly lab reading group to introduce undergraduates to important primary literature in evolutionary biology and disease ecology.
  - Students took turns leading paper discussions.
  - Each student gave two 15 presentations on their project each semester.
  - Organized local lab field trips to give undergraduates the opportunity to see plant diseases in nature.
- Organized the First Annual International Undergraduate Research Symposium' in Chuisa Pesio, Italy
  - Colleagues and Staff of the Natural Park and Floristic center attended.
  - Four student talks (3 in English, 1 in Italian).

## **Science Outreach**

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### **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

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**NSF External reviewer** **2016-2017**

- Prepared two external reviews on NSF proposals

**Peer reviewer**

- Evolution, Ecology, Journal of Ecology, New Phytologist, Oecologia, Okios, PLoS Pathogens, Proc. R. Soc. B. The American Naturalist, Virus evolution

**Fundraising Committee Member**, University of Minnesota **2010**

**Noon-Seminar Committee Member**, University of Minnesota **2007-2009**

## Affiliations / Memberships

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Society for the Study of Evolution **2010-present**

Mycological Society of America **2011-present**

## References

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### **Janis Antonovics**

Research Professor of Biology

University of Virginia

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

434- 243-5076

Postdoctoral advisor

### **Georgiana May**

Professor of Ecology and Evolution

University of Minnesota

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

612-624-6777

Ph.D. 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