**Clayton E. Cressler**

|  |  |
| --- | --- |
| School of Biological Sciences | Phone: 402-890-7300 |
| University of Nebraska | Email: ccressler2@unl.edu |
| Lincoln, NE 68588-0118 | http://cressler.weebly.com |

**Research Interests**

* Ecology and evolution of infectious disease
* Mathematical epidemiology
* Theoretical ecology
* Life history theory

**Education**

|  |  |
| --- | --- |
| Ph. D. (2011) | Ecology & Evolutionary Biology  University of Michigan (Advisor: Dr. Aaron King) |
| B. S. (2003) | Mathematics  Hope College, Holland, MI |

**Employment**

|  |  |
| --- | --- |
| 2015-present | Assistant Professor, School of Biological Sciences, University of Nebraska |
| 2014-2015 | Coleman Postdoctoral Fellow, Dept. of Mathematics and Statistics, Queen’s University, Kingston, ON (Dr. Troy Day) |
| 2012-2014 | NSF Postdoctoral Fellow in Biology, Dept. of Biology, Queen’s University, Kingston, ON (Dr. Bill Nelson and Dr. Troy Day) |
| 2011 | Senate Advisory Research Council Postdoctoral Fellow, Dept. of Biology, Queen’s University, Kingston, ON (Dr. Bill Nelson) |
| 2005-2010 | Graduate Research Assistant and Graduate Teaching Assistant, Dept. of Ecology and Evolutionary Biology, University of Michigan *(Dr. Aaron King)* |
| 2003-2005 | Graduate Research Assistant, Dept. of Ecology and Evolutionary Biology, University of Tennessee (Dr. Lou Gross) |

**Awards and Distinctions**

|  |  |
| --- | --- |
| 2014 | Coleman Postdoctoral Fellowship, Queen’s University |
| 2011 | NSF Postdoctoral Research Fellowhip in Biology: Intersections of Biology and Mathematics |
| 2010 | Senate Advisory Research Council Postdoctoral Fellowship, Queen’s University |
| 2008 | Lotka Award for Outstanding Theory Poster, Ecological Society of America |

**Publications**

*In press (\* denotes corresponding author)*

Hite, J. L. and **C. E. Cressler\*.** 2018*.* Resource-driven changes to host population stability alter the evolution of virulence and transmission. *Philosophical Transactions of the Royal Society B* **373**: 20170087.

Budischak, S. A., C. B. Hansen, Q. Caudron, R. Garnier, T. R. Kartzinel, I. Pelczer, **C. E. Cressler**, A. van Leeuwen, and A. L. Graham. *In press*. Feeding immunity: physiological and behavioral responses to infection and resource limitation. *Frontiers in Immunology* **8**: 1914.

**Cressler, C. E**.\*, S. P. A. M. Bengtson, and W. A. Nelson. 2017. Unexpected non-genetic individual heterogeneity and trait covariance in Daphnia and its consequences for ecological and evolutionary dynamics. *American Naturalist* **190**: E13-E27.

Walker, J. G., A. Hurford, J. Cable, A. R. Ellison, S. J. Price, and **C. E. Cressler\***. 2017. Host allometry influences the evolution of parasite host-generalism: theory and meta-analysis. *Philosophical Transactions of the Royal Society B* **372**: 20160089.

**Cressler, C. E.\*,** D. V. McLeod, C. Rozins, J. van den Hoogen, and T. Day.2016. The adaptive evolution of virulence: a review of theoretical predictions and empirical tests. *Parasitology* **143**: 915-930*.*

**Cressler, C. E.\***, M. A. Butler, and A. A. King. 2015*.* Detecting adaptive evolution in phylogenetic comparative analysis using the Ornstein-Uhlenbeck model. *Systematic Biology* **64**: 953-968.

**Cressler, C. E.\***, A. L. Graham, and T. Day. 2015*.* Evolution of hosts paying manifold costs of defense. *Proceedings of the Royal Society B* **282**: 20150065.

**Cressler, C. E.\***, W. A. Nelson, T. Day, and E. McCauley. 2014. Starvation reveals the cause of infection-induced castration and gigantism. *Proceedings of the Royal Society B.* **281**: 20141087.

**Cressler, C. E.\***, W. A. Nelson, T. Day, and E. McCauley. 2014. Disentangling the interaction among host resources, the immune system, and pathogens. *Ecology Letters* **17**: 284-293.

Peacor, S. D. and **C. E. Cressler**. 2012. The implications of adaptive prey behavior for ecological communities: a review of current theory. In: *Evolution and Ecology of Trait-Mediated Indirect Interactions: Linking Evolution, Community, and Ecosystem* (eds. T. Ohgushi, O. Schmitz, and R. D. Holt). Cambridge University Press.

**Cressler, C. E.\***, A. A. King, and E. E. Werner. 2010. Interactions between behavioral and life-history trade-offs in the evolution of integrated predator-defense plasticity. *American Naturalist* **176**: 276-288.

*In review*

van Leeuwen, A., S. Budischak, A. L. Graham, and **C. E. Cressler**. Critical chronicity: Acute and chronic infections emerge in a single within-host model due to resource manipulation by parasites. *Ecology Letters.*

Luhring, T. M., J. M. Vavra, **C. E. Cressler**, and J. P. DeLong. Predators modify the thermal dependence of life-history trade-offs. *Global Change Biology.*

**Research Grants**

**Cressler, C. E.** University of Nebraska Research Council Faculty Seed Grant ($9,971, Effort: 100%)

**Cressler, C. E.** Coleman Postdoctoral Fellowship, Queen’s University ($84,000, Effort: 100%)

**Cressler, C. E.** “Studying life history evolution in response to predators and resources using an integrated theoretical-empirical approach with *Daphnia*.” National Science Foundation Postdoctoral Research Fellowship in Biology: Intersections of Biology and Mathematics ($123,000, Effort: 100%)

**Cressler, C. E.** SARC Postdoctoral Fellowship, Queen’s University ($35,000, Effort: 100%)

**Invited Seminars**

*2017*

Department of Ecology & Evolutionary Biology, University of Toronto, Toronto, ON

Cary Institute of Ecosystem Studies, Millbrook, NY 12545

Museum of Parasitology, University of Nebraska, Lincoln, NE

*2016*

Department of Mathematics, University of Nebraska, Lincoln, NE

*2015*

Faculty of Natural Sciences, Biological and Environmental Sciences Research, University of Stirling, Stirling, UK

Dept. of Ecology & Evolutionary Biology, Princeton University, Princeton, NJ

Dept. of Biological Sciences, SUNY Albany, Albany, NY

School of Biological Sciences, University of Nebraska, Lincoln, NE

*2014 and earlier*

Dept. of Biology, Queen’s University, Kingston, ON (2014)

Dept. of Biology, Queen’s University, Kingston, ON (2012)

Dept. of Biology, Hope College, Holland, MI (2011)

Dept. of Mathematics, Hope College, Holland, MI (2011)

Dept. of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, MI (2010)

Center for the Study of Complex Systems, University of Michigan, Ann Arbor, MI (2009)

**Presentations at National and International Meetings**

**C. E. Cressler**. 2017. “Host allometry and the evolution of parasite host-generalism.” Ecological Society of America, Portland OR. (contributed talk)

R. Cooper, K. Stava, J. Vavra, and **C. E. Cressler**. 2017. “Manipulating the microbiota of *Daphnia magna* to understand the effects of individual bacterial groups.” Ecological Society of America, Portland OR. (poster)

J. L. Hite and **C. E. Cressler**. 2017. “Linking within and between-host processes to predict why, how, and when resources affect parasite evolution.” Ecological Society of America, Portland, OR. (contributed talk)

T. M. Luhring, **C. E. Cressler**, J. Vavra, and J. P. DeLong. 2017. “Interactions between predation risk and temperature affect death, fecundity, and individual growth rates, leading to changes in population growth rate thermal performance curves (TPCs).” Ecological Society of America, Portland, OR. (contributed talk)

J. L. Hite and **C. E. Cressler**. 2017. “Harnessing mathematical models to predict why,

how, and when host resources affect parasite evolution.” Ecology and Evolution of Infectious Disease, Santa Barbara, CA. (invited talk)

van Leeuwen, A., **C. E. Cressler**, S. Budischak, and A. L. Graham. 2016. “The within-host interaction between parasites and immune response explains tolerance and resistance in a dynamic energy budget model.” Ecology and Evolution of Infectious Disease, Ithaca, NY. (invited talk)

**Cressler, C. E.** 2014. “Disentangling the interaction among energy, immunity, and pathogens.” Canadian Mathematical Society, Hamilton, ON. (invited talk)

**Cressler, C. E.** , W. A. Nelson, T. Day, and E. McCauley. 2014. “Starvation reveals within-host parasite energetics in a system characterized by castration and gigantism.” Ecology and Evolution of Infectious Disease, Ft. Collins, CO. (poster)

**Cressler, C. E.** and W. A. Nelson. 2013. “Life history (co)variation from an energy budget perspective.” Ecological Society of America, Minneapolis, MN. (contributed talk)

**Cressler, C. E.**, W. A. Nelson, T. Day, and E. McCauley. 2013. “Parasite-induced gigantism: host defense or parasite offense?” Ecology and Evolution of Infectious Disease, State College, PA. (poster)

**Cressler, C. E.**, W. A. Nelson, T. Day, and E. McCauley. 2012. “The fiercest of competitors: how energy antagonism between pathogens and the immune system affects within-host dynamics.” Joint Congress on Evolutionary Biology, Ottawa, ON. (contributed talk)

**Cressler, C. E.**, W. A. Nelson, T. Day, and E. McCauley. 2012. “Who steals from whom? How does energy antagonism between the host immune system and pathogens influence within-host dynamics and the response of host illness to food abundance?” Ecology and Evolution of Infectious Disease, Ann Arbor, MI. (poster)

**Cressler, C. E.**, W. A. Nelson, T. Day, and E. McCauley. 2011. “A dynamic energy budget perspective on resistance, tolerance, and virulence.” Ecology and Evolution of Infectious Disease, Santa Barbara, CA. (poster)

**Cressler, C. E.**, A. A. King, and M. A. Butler. 2010. “Can you trust evolutionary parameters estimated by complex phylogenetic comparative methods?” Evolution Joint Meeting, Portland, OR. (contributed talk)

**Cressler, C. E.** 2009. “Competition and predation have interactive effects on behavior and life history.” Ecological Society of America, Albuquerque, NM. (poster)

**Cressler, C. E.**, A. A. King, and E. E. Werner. 2008. “Foraging-predation risk trade-off governs the evolution of inducible defenses.” Ecological Society of America, Milwaukee, WI. (poster)

**Teaching Experience**

*At University of Nebraska*

Evolution in Health and Disease, BIOS 497/897 (Spring 2016, 2017, 2018)

Fundamentals of Biology II, LIFE 121 (Fall 2016, 2017)

*At Queen’s University*

Calculus for Engineers, APSC 172 (Spring 2015)

Mathematical Modeling in Biology, BIOM 300 (Fall 2014)

**Professional Service**

*School of Biological Sciences Service*

* SBS Curriculum Committee (2018- )
* SBS Special Funds Committee (2016-2018)
* SBS Teaching Evaluation Ad-hoc Committee (2016)

*University Service*

* Co-Facilitator of workshop on “Strategies for Large-enrollment Classrooms” at UNL’s Spring Teaching and Learning Symposium (2017)
* “Experienced” Faculty Panel at New Faculty Orientation (2016)

*Professional Service*

* Review Editor, *Frontiers in Population and Evolutionary Dynamics*
* Steering Committee, NSF RCN “Infectious Disease Evolution Across Scales”
* Organized the NSF-sponsored workshop, “Immunity Across Scales” at the University of Glasgow, May 26-28, 2018 (30 participants from US, UK, EU, and Australia)

*Reviewing*

Ad-hoc reviewer for:

* NSF Population and Community Ecology Cluster
* NSF Evolutionary Processes Cluster

Journal reviewer:

2018

*American Naturalist* (2), *Evolution, Frontiers Ecology & Evolution, Nature Communications*

2017

*American Naturalist, Animal Behaviour, Global Change Biology, Journal of Theoretical Biology* (2)*, Frontiers Ecology and Evolution, Nature Communications, Philosophical Transactions of the Royal Society B, PLOS Biology*

2016

*American Naturalist, Evolutionary Ecology, Journal of Animal Ecology* (2)*, Journal of Theoretical Biology, Methods in Ecology and Evolution, Oecologia, Philosophical Transactions of the Royal Society B, PLOS Biology*

Pre-2016

*Ecology*, *Ecology Letters*, *Evolution*, *Evolutionary Ecology, Functional Ecology*, *Oikos, Parasitology*, *Proceedings of the Royal Society B*, *Trends in Parasitology*

Professional Society Memberships: *American Society of Naturalists, Ecological*

*Society of America*

**Professional Development**

*Research Workshops and Working Groups*

* Macroecology of Infectious Disease Research Coordination Network (October 2017, March 2018)
* Pathogen Transmission Working Group, British Ecological Society, Parasite and Pathogen Ecology Special Interest Group (Sept. 2015)
* RAPIDD Workshop on Simulation-based Inference Using Mechanistic Models, University of Michigan, Ann Arbor, MI (June 2012)

*Teaching Workshops*

* Summer Institutes on Scientific Teaching (June 5-10, 2017)
* UNL ARISE Learning by Design program (Fall 2015)
* SGS 901: Teaching and Learning in Higher Education, Centre for Teaching and Learning, Queen's University (Spring 2014)

**Mentoring**

*Postdoctoral Fellows*

|  |  |
| --- | --- |
| Jessica Hite | The effect of parasite evolution on ecological dynamics (UNL Program of Excellence Fellow, August 2016-present) |

*Graduate Students*

|  |  |
| --- | --- |
| Reilly Cooper | Role of the *Daphnia* microbiota in health and disease (Ph. D., August 2016-present) |
| Alaina Pfenning | Patterns in host-parasite interaction in ecological and evolutionary time (Ph. D., August 2017-present) |

*Graduate Committee Membership*

|  |  |
| --- | --- |
| Sebastian Botero | (Ph. D., S. Gardner, UNL School of Biological Sciences) |
| Justin Buchanan | Energetic mechanisms underlying fitness consequences of immune responses (Ph. D., K. Montooth, UNL School of Biological Sciences) |
| David McMorris | (Ph. D., G. Ledder, UNL Dept. of Mathematics) |
| Miranda Salsbery | (Ph. D., J. DeLong, UNL School of Biological Sciences) |

*Undergraduates*

|  |  |
| --- | --- |
| Elise Wordekemper | Honors Thesis: Pathogen evolution in exponentially and non-exponentially growing populations. (current) |
| Kaitlyn Stava | UCARE: Effect of diet on the microbiome composition and life history of *Daphnia magna* (Summer 2016-present) |