

Nathan Lemoine

Curriculum Vitae

Department of Biology

Colorado State University

☎ (713) 256-7122

✉ nate.lemoine@colostate.edu

🌐 www.natelemoine.com

Research Scientist I

USDA NIFA-AFRI Postdoctoral Fellow

Education

- 2015 **PhD., Biology**, *Florida International University*, Miami, FL.
- 2010 **M.S., Marine Science**, *University of South Alabama/Dauphin Island Sea Lab*, Mobile, AL.
- 2006 **B.S., Biology/Environmental Studies**, *University of Richmond*, Richmond, VA.

Professional Experience

- 2015 – present **Research Scientist/Affiliate Faculty**, *Department of Biology, Graduate Degree Program in Ecology, Colorado State University*, Ft. Collins, CO.
- 2016 – present **Instructor**, *Department of Ecology and Evolutionary Biology, University of Colorado*, Boulder, CO.
- 2014 **NCAR Graduate Workshop on Environmental Data Analytics**, *National Center for Atmospheric Research*, Boulder, CO.
- 2014 **NIMBioS Visiting Scientist**, *University of Tennessee*, Knoxville, TN.
- 2013 – 2014 **Smithsonian Pre-Doctoral Fellow**, *Smithsonian Environmental Research Center*, Edgewater, MD.
- 2013 **Joint 2013 MBI-NIMBioS-CAMBAM Summer Graduate Workshop: Connecting Biological Data with Mathematical Models**, *University of Tennessee*, Knoxville, TN.
- 2010 – 2013 **Presidential Fellow**, *Florida International University*, Miami, FL.
- 2007 – 2010 **Graduate Research Fellow**, *Dauphin Island Sea Lab*, Mobile, AL.

Publications (Published: 22, In Press: 4, In Review: 4)

† undergraduate author

- In Review Rehm, E.M., M.B. Balsat†, **N.P. Lemoine**, J.A. Savidge. Understanding species' traits for reintroduction efforts in the presence of an invasive predator. *Journal of Applied Ecology*
- In Revision Rode, M.†, **N.P. Lemoine***, M.D. Smith. Prospective evidence for independent nitrogen and phosphorus limitation of grasshopper (*Chorthippus curtipennis*) growth in a tallgrass prairie. *PLoS One* (*corresponding author)
- In Revision **Lemoine, N.P.**, J.D. Dietrich, M.D. Smith. Climatic and environmental constraints on three aspects of flowering in three dominant tallgrass species. *Functional Ecology*

- In Revision Koerner, S.E., M.D. Smith, D.E. Burkepile, N. Hanan, M.L. Avolio, S.L. Collins, A.K. Knapp, **N.P. Lemoine**, E.J. Forrestel, S. Eby, D.I. Thompson, The Grazing Consortium. Resolving variation in herbivore effects on plant biodiversity - dominance as a global mechanism. *Nature Ecology and Evolution*
- In Press **Lemoine, N.P.**, D. Doublet[†], J-P. Salminen, D.E. Burkepile, J.D. Parker. Responses of plant phenology, growth, defense, and reproduction to interactive effects of warming and insect herbivory. *Ecology*
- In Press **Lemoine, N.P.** Predation risk reverses the potential effects of warming on plant-herbivore interactions by altering the relative strengths of trait- and density-mediated interactions. *The American Naturalist*
- In Press Wilcox, K.R., Z. Shi, L.A. Gherardi, **N.P. Lemoine**, S.E. Koerner, D.L. Hoover, E. Bork, K.M. Byrne, J. Cahill Jr., S.L. Collins, S. Evans, A.K. Gilgen, P. Holub, L. Jiang, A.K. Knapp, L. Yahdjian, D. LeCain, J. Liang, P. Garcia-Palacios, J. Penuelas, W.T. Pockman, M.D. Smith, S.R. White, K. Zhu, Y. Luo. Asymmetric responses of primary productivity to climate extremes: a synthesis of grassland precipitation manipulation experiments. *Global Change Biology*
- In Press Burkepile, D.E., R.W.S. Fynn, D.I. Thompson, **N.P. Lemoine**, S.E. Koerner, S. Eby, N. Hagenah, K.R. Wilcox, S.L. Collins, K.P. Kirkman, A.K. Knapp, M.D. Smith. Herbivore size matters for productivity-richness relationships in African savannas. *Journal of Ecology*
- 2017 **Lemoine, N.P.**, D.E. Burkepile, J.D. Parker. Insect herbivores increase mortality and reduce tree seedling growth of some species in temperate forest canopy gaps. *PeerJ* 5:e3102
- 2016 **Lemoine, N.P.**, J. Sheffield, J.S. Dukes, A.K. Knapp, M.D. Smith. The Terrestrial Precipitation Analysis (TPA) web tool: a resource for characterizing long-term precipitation regimes and extremes. *Methods in Ecology and Evolution* 7:1396-1401
- 2016 Burkepile, D.E., D.I. Thompson, R.W.S. Fynn, S.E. Koerner, S. Eby, N. Govender, N. Hagenah, **N.P. Lemoine**, K.J. Matchett, K.R. Wilcox, S.L. Collins, K.P. Kirkman, A.K. Knapp, M.D. Smith. Fire frequency drives habitat selection by a diverse herbivore guild impacting top-down control of plant communities in an African savanna. *Oikos* 125:1636-1646
- 2016 Hamerlinck, G., **N.P. Lemoine**, G.R. Hood, K.C. Abbott, A.A. Forbes. Meek women with powerful daughters: effects of novel host environments and small trait differences on parasitoid wasp competition. *Oikos* 125:1516-1527
- 2016 **Lemoine, N.P.**, A. Hoffman, A. Felton, L. Baur, F. Chaves, J. Gray, Q. Yu, M.D. Smith. Underappreciated problems of low statistical power in ecological field studies. *Ecology* 97:2554-2561
- 2016 Zaneveld, J.R., D.E. Burkepile, A.A. Shantz, C.E. Pritchard, R. McMinds, J. Payet, R. Welsh, A. Simoes-Correa, **N.P. Lemoine**, S. Rosales, C. Fuchs[†], J. Maynard, R. Vega-Thurber. Overfishing and nutrient pollution interact with temperature to disrupt coral reefs down to microbial scales. *Nature Communications* 7:11833

- 2016 **Lemoine, N.P.**, A.A. Shantz. Increased temperature causes protein-limitation by reducing nitrogen digestion efficiency in the ectothermic herbivore *Spodoptera exigua* (Lepidoptera: Noctuidae). *Physiological Entomology* 41:143-151
- 2016 **Lemoine, N.P.**, D.E. Burkepile, J.D. Parker. Quantifying differences between native and introduced species. *Trends in Ecology and Evolution* 31(5):372-381
- 2016 Shantz, A.A., **N.P. Lemoine**, D.E. Burkepile. Nutrient loading alters the performance of key nutrient exchange mutualisms. *Ecology Letters* 19(1):20-28 **Faculty of 1000 Recommendation**
- 2015 **Lemoine, N.P.**, J. Capdevielle[†], J.D. Parker. Effects of *in situ* climate warming on larval monarch (*Danaus plexippus*) development. *PeerJ* 3:e1293
- 2015 **Lemoine, N.P.**, J. Shue, B. Verrico[†], D. Erickson, W.J. Kress, J.D. Parker. Phylogenetic relatedness and leaf functional traits, not introduced status, influence community assembly. *Ecology* 96(10):2605-2612
- 2015 **Lemoine, N.P.** Climate change may alter monarch spring migration and summer breeding ground distributions. *PLoS One* 10:e0118614
- 2014 Cook-Patton, S.C, L. Maynard[†], **N.P. Lemoine**, J. Shue, J.D. Parker. Cascading effects of a highly specialized beech-aphid-fungus interaction on forest regeneration. *PeerJ* 2:e442
- 2014 **Lemoine, N.P.**, D.E. Burkepile, J.D. Parker. Variable effects of temperature on insect herbivory. *PeerJ* 2:e376 **Featured Article**
- 2014 **Lemoine, N.P.**, S.T. Giery, D.E. Burkepile. Differing consumer stoichiometric constraints across ecosystems. *Oecologia* 174:1367-1376
- 2013 **Lemoine, N.P.**, W.A. Drews[†], D.E. Burkepile, J.D. Parker. Temperature alters feeding behavior of a generalist herbivore. *Oikos* 122:1669-1678
- 2013 Giery, S.T., **N.P. Lemoine**, C.M. Hammerschlag-Peyer, R. Abbey-Lee, C.A. Layman. Bidirectional trophic linkages couple a canopy and understory foodweb. *Functional Ecology* 27(6):1436-1441
- 2013 Parker, J.D, M.E. Torchin, R.A. Hufbauer, **N.P. Lemoine**, C. Alba, D.M. Blumenthal, O. Bossdorf, J.E. Byers, A.M. Dunn, R.W. Heckman, M. Hejda, V. Jarosik, A. Kanarek, L.B. Martin, S.E. Perkins, P. Pysek, K. Schierenbeck, C. Schloeder, R. van Klinken, K.J. Vaughn, W. Williams, L. Wolfe. Do invasive species perform better in their new ranges? *Ecology* 94(5):985-994 **Faculty of 1000 Recommendation**
- 2013 Burkepile, D.E., J. Allgeier, A. Shantz, C.E. Pritchard, **N.P. Lemoine**, L. Bhatti, C.A. Layman. Carnivorous fishes as vectors of nutrients on coral reefs: the role of nutrient supply in facilitating seaweed abundance. *Scientific Reports* 3:1493
- 2012 **Lemoine, N.P** and D.E. Burkepile. Temperature-induced mismatches between metabolism and consumption reduce consumer fitness. *Ecology* 93(11):2483-2489

- 2012 **Lemoine, N.P.** and J.F. Valentine. Structurally complex habitats provided by *Acropora palmata* alter ecosystem processes on a patch reef in the Florida Keys National Marine Sanctuary. *Coral Reefs* 31(3):779-786
- 2007 **Lemoine N.P.**[†], N. Buell[†], A.L. Hill, M.S. Hill. Assessing the utility of sponge microbial symbiont communities as models to study global climate change: a case study with *Halichondria bowerbanki*. In: Custdio, M. R., G. Lbo-Hajdu, E. Hajdu, and G. Muricy (eds.). *Porifera Research: Biodiversity, Innovation, and Sustainability*, Srie Livros 28. Museu Nacional, Rio de Janeiro. pp:419-425

[†] undergraduate author

Grants and Fellowships (Total Funding Received: \$411,604)

Pending

- 2017 **NSF BIO DEB**, *Ecosystems*, Predicting the effects of extreme drought on insect herbivore control of grassland ecosystem function.
Lead PI
- 2017 **NSF BIO DEB**, *Ecosystems*, Recovery of ecosystem function after severe drought: the importance of abiotic and biotic post-drought legacies.
Co-PI

Current

- 2015 **USDA NIFA-AFRI**, *Postdoctoral Fellowship*, **\$149,704**, Predicting effects of increased climate variability on consumer regulation of ecosystem function in US rangelands.
PI

Past

- 2015 **National Institute for Mathematical and Biological Synthesis (NIMBioS)**, *Postdoctoral Fellowship*, **\$107,000**, A new statistical framework for assessing community assembly mechanisms. **Offered but declined.**
PI
- 2014 **Florida International University**, *Dissertation Year Fellowship*, **\$16,600.**
- 2014 **Florida International University**, *Dissertation Evidence Acquisition Grant*, **\$8,300**,
PI.
- 2013 **Smithsonian Environmental Research Center**, *Graduate Fellowship*, **\$15,500.**
Will global change disrupt trophic transfer in marsh ecosystems?
- 2013 **National Science Foundation**, *Doctoral Dissertation Improvement Grant*, **\$15,294**,
Assessing the effects of climate change on biotic interactions structuring herbivore communities..
PI
- 2010 **Florida International University**, *Presidential Fellowship*, **\$75,000.**
- 2007 **University of South Alabama**, *Graduate Research Fellowship*, **\$32,000.**
- 2007 **Dauphin Island Sea Lab**, *Exxon-Mobile Research Fellowship*, **\$2,000.**
- 2006 **University of Richmond**, *Student Travel Grant*, **\$1,000.**

- 2005 **University of Richmond**, *Robert F. Smart Research Fellowship*, \$4,000.
2005 **University of Richmond**, *Research Grant*, \$500.

Teaching

- 2016 – 2017 **EBIO 4410/5410 - Biometry**, *University of Colorado*.
2016 **ECOL 592 - Principles of Data Visualization Using R and ggplot2**, *Colorado State University*.
2016 **Ecology 600 - Community Ecology**, *Colorado State University*.
2015 **Introduction to Bayesian Data Analyses Workshop**, *Colorado State University*.
2014–2015 **Introduction to R for Ecologists Workshop**, *Florida International University*.
2012 – 2014 **Data Management and Introduction to Statistics**, *Smithsonian Environmental Research Center*.
2011 **Biology 1011L: General Biology II Lab**, *Florida International University*.
2011 **Biological Oceanography 3043L: Marine Biology and Oceanography Lab**, *Florida International University*.
2010 **Biology 3043L: Ecology Lab**, *Florida International University*.

Software

- 2015 – present **Lead developer of *EcoPy: A Python module for multivariate data analysis***.
2015 – present **Lead developer of the *Terrestrial Precipitation Analysis* package**.

Presentations

- 2016 **International Joint Project Meeting**, *Erguna, China*.
Assessing the impact of invertebrate herbivores on grassland ecosystem function **Invited Speaker**
- 2015 **CSU Megalab**, *Fort Collins, CO*.
Phylogenetic relatedness and leaf functional traits, not introduced status, influence community assembly **Invited Speaker**
- 2015 **CSU Forest and Rangeland Stewardship**, *Fort Collins, CO*.
Climate warming effects on plant-insect interactions **Invited Speaker**
- 2015 **Ecological Society of America**, *Baltimore, MD*.
Warming alters fitness trade-offs in *Oenothera biennis* caused by herbivory
- 2015 **FIU Graduate Student Symposium**, *Miami, FL*.
Warming modifies tolerance to herbivory in *Oenothera biennis* **Best Presentation**
- 2014 **Evolution**, *Raleigh, NC*.
Evolutionary history and traits, not invasive status, influence community assembly
- 2014 **FIU Graduate Student Symposium**, *Miami, FL*.
Phenotypic plasticity and population subsidies reverse competitive outcomes
- 2013 **Entomological Society of America**, *Austin, TX*.
Climate change modifies interactions between invasive herbivores and native plants **Invited Speaker**

- 2013 **Ecological Society of America**, *Minneapolis, MN*.
Temperature alters feeding behavior of a generalist herbivore
- 2013 **Benthic Ecology Meeting**, *Savannah, GA*.
Temperature-induced mismatches between metabolism and consumption reduce consumer fitness
- 2012 **Smithsonian Environmental Research Center**, *Edgewater, MD*.
Effects of climate change on plant-herbivore interactions
- 2012 **FIU Graduate Student Symposium**, *Miami, FL*.
Deviations from the assumptions of the Metabolic Theory of Ecology lead to contrasting predictions
- 2010 **Benthic Ecology Meeting**, *Wilmington, NC*.
Successional trajectories of food web reorganizations on Caribbean coral reefs

Outreach

- 2013 **Family Day Public Open House**, *Smithsonian Environmental Research Center*.
- 2013 **Challenge for Elementary, Middle, and High School Students Essay Judge**, *Fairchild Tropical Botanical Garden*.
- 2011 **Partnership in Academic Communities of At-Risk High School Students in Math and Science**, *Florida International University*.

Media / Press Coverage

- 2016 **The EEB & Flow**, *The problematic effect of small effects*, <http://evol-eco.blogspot.ca/2016/09/the-problematic-effect-of-small-effects.html>.
- 2016 **Colorado State University - SOURCE**, *Are invaders 'different'? Nope, says CSU biologist*, <http://source.colostate.edu/are-invaders-different-nope-says-csu-biologist/>.
- 2015 **Smithsonian Science News**, *Warming temperatures may mean more monarch generations in some areas of North America*, <http://smithsonianscience.si.edu/2015/08/warming-temperatures-may-mean-more-monarch-generations-in-some-areas-of-north-america/>.
- 2014 **PeerJ**, *Interview with an Author*, <http://blog.peerj.com/post/85650418408/interview-with-an-author-nathan-lemoine>.

Professional Service

Peer Review (30 total reviews)

Reviewer for the following journals, *Acta Physiologiae Plantarum* (1), *Biological Invasions* (5), *BMC Ecology* (1), *Ecology* (5), *Ecosphere* (1), *Ecology Letters* (3), *Journal of Animal Ecology* (1), *Journal of Ecology* (2), *NeoBiota* (1), *New Phytologist* (1), *Oecologia* (3), *Oikos* (2), *PLoS One* (1), *Plant Ecology* (2), *Proceedings of the Royal Society - B* (1).

Number of reviews in parentheses

Invited Working Groups

- 2016 **ILTER Community Responses to Resource Experiments: Communities to Ecosystems**, *Lead PIs: Kimberly LaPierre and Meghan Avolio*, Role: Quantitative Ecologist.
- 2015-2016 **Drought-Net**, *Lead PI: Melinda Smith*, Role: Data Manager / Quantitative Ecologist.
- 2015 – 2016 **Grazing Consortium**, *Lead PI: Sally Koerner*, Role: Quantitative Ecologist.
- 2015 – 2016 **ILTER Community Responses to Resource Experiments**, *Lead PIs: Kimberly LaPierre and Meghan Avolio*, Role: Quantitative Ecologist.
- 2015 – 2016 **iDiv Evolution of Stability**, *Lead PIs: Dylan Craven and Will Pearse*, Role: Quantitative Ecologist.
- [Undergraduate Mentoring \(6 co-authors\)](#)
- 2015 – 2017 **Abigail Lock**, *Colorado State University*, Undergraduate Intern.
- 2015 – 2017 **Megan Coyle**, *Colorado State University*, Undergraduate Intern.
- 2016 – 2017 **Tarun Multhineni**, *Colorado State University*, Web Development Intern.
- 2016 – 2017 **Kiloaulani Kaawa-Gonzalez**, *Colorado State University*, Undergraduate Intern.
- 2016 **Madison Rode**[†], *Colorado State University*, REU.
- 2016 **Jeremy Tabke**, *Colorado State University*, Undergraduate Intern.
- 2015 **Erica Duda**, *Colorado State University*, Undergraduate Intern.
- 2015 **Brianna Magbual**, *Colorado State University*, Undergraduate Intern.
- 2014 **Megan Palmer**, *Smithsonian Environmental Research Center*, REU.
- 2014 **Jillian Capdevielle**, *Smithsonian Environmental Research Center*, Undergraduate Intern.
- 2014 **Dejeanne Doublet**[†], *Smithsonian Environmental Research Center*, REU.
- 2013 **Lauren Maynard**[†], *Smithsonian Environmental Research Center*, REU.
- 2012 **Willem Drews**[†], *Smithsonian Environmental Research Center*, Undergraduate Intern.
- 2012 **Brittany Verrico**[†], *Smithsonian Environmental Research Center*, REU.
- 2011 **Joseph Barger**, *Florida International University*, Undergraduate Intern.
- 2011 **Amaury Marquez**, *Florida International University*, Undergraduate Intern.