

# Melissa Pastore

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## EDUCATION

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**The University of Minnesota**, St. Paul, MN

Ph.D. in Ecology, Evolution, and Behavior, August 2020

Cumulative GPA: 4.00

Dissertation title: Impacts of global changes on leaf-level physiology of plant functional groups and ecosystem carbon storage

Advisors: Drs. Sarah Hobbie and Peter Reich

**Villanova University**, Villanova, PA

M.S. in Biology, Sep. 2015

Cumulative GPA: 3.97

Thesis title: Nitrogen retention and greenhouse gas mitigation of a brackish marsh under global change

Advisor: Dr. Adam Langley

**The Pennsylvania State University**, University Park, PA

B.S. in Biology, Ecology Option, May 2013

Cumulative GPA: 3.67

## PROFESSIONAL APPOINTMENTS

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<b>Research Ecologist</b> , USDA Forest Service Northern Research Station, Forest Inventory and Analysis	April 2023 – present
<b>Research Assistant</b> , University of New Hampshire	March 2023 – April 2023
<b>Postdoctoral Associate</b> , University of Vermont Rubenstein School of Environment and Natural Resources Gund Institute for Environment	Sep. 2020 – March 2023
<b>Graduate Research/Teaching Assistant</b> , University of Minnesota	Aug. 2015 – Aug. 2020
<b>Graduate Research/Teaching Assistant</b> , Villanova University	Aug. 2013 – Aug. 2015

## PUBLICATIONS

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**Pastore, MA**, Classen, AT, Frey, SD, English, ME, Rand, K, Adair, EC. Soil microbial legacies influence freeze-thaw responses of soil. *Functional Ecology* (IF: 6.282). (2023).

<https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2435.14273>.

Hudson, AR, Peters, DPC, Blair, JM, Childers, DL, Doran, PT, Geil, K, Gooseff, M, Gross, KL, Haddad, NM, **Pastore, MA**, Rudgers, JA, Sala, O, Seabloom, EW, Shaver, G. Cross-site comparisons of dryland response to climate change in the US Long-Term Ecological Research network. *BioScience* (IF: 11.566). biab134 (2022). <https://doi.org/10.1093/biosci/biab134>.

**Pastore, MA**. Bringing the underground to the surface: Climate change stressors negatively affect plant growth, with contrasting above and belowground physiological responses. *Plant, Cell & Environment* (IF: 7.947). 45: 2267-2270 (2022). <https://onlinelibrary.wiley.com/doi/abs/10.1111/pce.14379>.

**Pastore, MA**, Adair, EC, Classen, AT, D'Amato, AW, Foster, JR. Cold-air pools as microrefugia for ecosystem functions in the face of climate change. *Ecology* (IF: 6.433). 103: e3717 (2022). <https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/ecy.3717>.

## PUBLICATIONS (Continued)

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- Pastore, MA**, Hobbie, SH, Reich, PB. Sensitivity of grassland carbon pools to plant diversity, elevated CO<sub>2</sub>, and soil nitrogen addition over 19 years. *Proceedings of the National Academy of Sciences* (IF: 12.779). 118: e2016965118 (2021). <https://www.pnas.org/content/118/17/e2016965118>.
- Reich, PB, Hobbie, SH, Lee, TD, Rich, R, **Pastore, MA**, Worm, K. Synergistic effects of four climate change drivers on terrestrial carbon cycling. *Nature Geoscience* (IF: 21.531). 13: 787-793 (2020). <https://www.nature.com/articles/s41561-020-00657-1>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. Interactive effects of elevated CO<sub>2</sub>, warming, reduced rainfall, and increased nitrogen on leaf gas exchange in five perennial grassland species. *Plant, Cell & Environment* (IF: 7.947). 43: 1862-1878 (2020). <https://onlinelibrary.wiley.com/doi/abs/10.1111/pce.13783?af=R>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. Strong photosynthetic acclimation and enhanced water-use efficiency in grassland functional groups persist over 21 years of CO<sub>2</sub> enrichment, independent of nitrogen supply. *Global Change Biology* (IF: 8.555). 25: 3031-3044 (2019). <https://onlinelibrary.wiley.com/doi/10.1111/gcb.14714>.
- Reich, PB, Hobbie, SH, Lee, TD, **Pastore, MA**. Unexpected reversal of C<sub>3</sub> vs C<sub>4</sub> grass response to elevated CO<sub>2</sub> during a 20-year field experiment. *Science* (IF: 63.714). 360: 317-320 (2018). <http://science.sciencemag.org/content/360/6386/317.abstract>.
- Science* published two technical comments that address the above Reich et al. 2018 article. Each appears with a response from Reich, Hobbie, Lee, and **Pastore** in *Science* 361: eeau8982 and eaau1300 (2018). <http://science.sciencemag.org/content/361/6407/eeau8982>.  
<http://science.sciencemag.org/content/361/6402/eaau1300>.
- Pastore, MA**, Megonigal, JP, Langley, JA. Elevated CO<sub>2</sub> and nitrogen addition accelerate net carbon gain in a brackish marsh. *Biogeochemistry* (IF: 4.812). 133: 73-87 (2017). <https://link.springer.com/article/10.1007/s10533-017-0312-2>.
- Pastore, MA**, Megonigal, JP, Langley, JA. Elevated CO<sub>2</sub> promotes long-term nitrogen accumulation only in combination with nitrogen addition. *Global Change Biology* (IF: 13.211). 22: 391-403 (2016). <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.13112>.
- McCormack, ML, Gaines, KL, **Pastore, MA**, Eissenstat, DM. Early season root production in relation to leaf production among six diverse temperate tree species. *Plant and Soil* (IF: 4.993). 389: 121-129 (2015). <https://link.springer.com/article/10.1007/s11104-014-2347-7>.
- Pastore, MA**. The impact of nitrogen eutrophication on Caribbean coral reefs: a review. *CONCEPT*. 37 (2014). <https://concept.journals.villanova.edu/article/view/1725>.

## PRESENTATIONS AND POSTERS

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### *Invited Seminars and Symposia:*

- National Carbon Convos/Carbon 101; hosted by USFS R&D and NFS. Sep. 26, 2023. Monthly Webinar.
- Northeast Network of Mountain Observatories. June 22, 2023. Monthly Webinar.
- University of New Hampshire, April 6, 2023. Earth Systems Research Center Spring Lunch Seminar.
- INSPIRES Teacher Professional Learning Program, March 20, 2023. Guest Webinar.
- Connecticut Agricultural Experiment Station, Dec. 19, 2022. CAES Seminar.
- University of Michigan, March 16, 2022. Departmental Seminar.
- Bloomsburg University, Nov. 19, 2021. Departmental Seminar.
- University of Massachusetts Amherst, Nov. 8, 2021. Departmental Seminar.
- Yale University, April 14, 2021. Departmental Seminar.
- University of North Carolina Wilmington, March 25, 2021. Departmental Seminar.
- Effects of sulfate geoengineering on ecosystems. Ecosystem Responses to Solar Radiation Management and Sulfate Geoengineering Interdisciplinary Symposium, St. Paul, MN. Nov. 1, 2019. Panelist.

## PRESENTATIONS AND POSTERS (Continued)

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### *Conference Presentations:*

- Foster, J., **Pastore, MA**, Rand, K, English, M, Finnerty, C, Adair, EC, Classen, A, King, D, Lutz, D, Nelson, S, D'Amato, A. Climatology of cold-air pooling for montane watersheds and forests of the Northeastern US from MODIS data. International Association for Landscape Ecology-North America Annual Meeting, Riverside, CA. March 2023. <https://www.ialena.org/program2023.html>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Worm, K, Reich, PB. Species richness impacts total soil carbon more than 19 years of CO<sub>2</sub> enrichment or soil nitrogen addition. Ecological Society of America, Virtual. August 2020. <https://eco.confex.com/eco/2020/meetingapp.cgi/Paper/87690>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. Photosynthesis over 21 of elevated CO<sub>2</sub> and nitrogen addition in four plant functional groups. Cedar Creek Ecosystem Science Reserve Symposium, St. Paul, MN. March 2019.
- Pastore, MA**, Megonigal, JP, Langley, JA. Ecosystem nitrogen retention in response to 8 years of exposure to elevated CO<sub>2</sub> and nitrogen pollution. Ecological Society of America, Baltimore, MD. July 2015. <https://eco.confex.com/eco/2015/webprogram/Paper56260.html>.
- Pastore, MA**, Megonigal, JP, Langley, JA. Nitrogen pollution reduced <sup>15</sup>N retention in a brackish marsh. Smithsonian Environmental Research Center's Global Change Symposium, Bryn Mawr, PA. February 2015.
- Pastore, MA**, Megonigal, JP, Langley, JA. Rising CO<sub>2</sub> levels and nitrogen pollution may affect the fate of nitrogen in marsh ecosystems. Smithsonian Environmental Research Center's Global Change Symposium, Edgewater, MD. February 2014.

### *Conference Posters:*

- Pastore, MA**, Classen, AT, Adair, EC, D'Amato, AW, English, ME, Foster, JR, Rand, K, Adair, EC. Effects of cold-air pooling microclimates on species composition in New England Forests. Forest Ecosystem Monitoring Cooperative, Burlington, Vermont. December 2022.
- Pastore, MA**, Classen, AT, Adair, EC, AT, D'Amato, AW, English, ME, Foster, JR, Rand, K, Adair, EC. The influence of cold-air pooling on species composition and ecosystem function in New England forests. Ecological Society of America, Montréal, Canada. August 2022.
- Pastore, MA**, Classen, AT, Adair, EC, English, ME, Frey, SD, Rand, K, Adair, EC. Freeze-thaw responses of soil microbial communities from contrasting elevations. Ecological Society of America, Virtual. August 2021.
- Hudson, A, Peters, D, Avolio, ML, Blair, J, Childers, DL, Collins, SL, Doran, PT, Evans, SE, Gooseff, MN, Grimm, NB, Knapp, A, Litvak, ME, **Pastore, MA**, Rudgers, J, Sala, O, Seabloom, EW, Shaver, GR, Haddad, N. A multi-site synthesis of impacts of multi-year extreme events on dryland ecosystem resilience. American Geophysical Union, Virtual. December 2020. <https://ui.adsabs.harvard.edu/abs/2020AGUFMSY044..08H/abstract>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. The influence of climate change and environmental factors on leaf gas exchange responses to elevated CO<sub>2</sub> in five perennial grassland species. American Geophysical Union, San Francisco, CA. December 2019. <https://ui.adsabs.harvard.edu/abs/2019AGUFM.B13H2606P/abstract>.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. Photosynthetic responses of 14 grassland species to 21 years of free-air CO<sub>2</sub> enrichment and nitrogen addition. Long-Term Ecological Research All Scientists' Meeting, Asilomar, CA. October 2018.
- Pastore, MA**, Lee, TD, Hobbie, SH, Reich, PB. Photosynthetic responses of 14 grassland species to 20 years of free-air CO<sub>2</sub> enrichment and nitrogen addition. Ecological Society of America, New Orleans, LA. August 2018. <https://eco.confex.com/eco/2018/meetingapp.cgi/Paper/73595>.
- Pastore, MA**, Megonigal, JP, Langley, JA. Net greenhouse gas footprint of a brackish marsh under elevated CO<sub>2</sub> and nitrogen addition. Natural Resources Association of Graduate Students, St. Paul, MN. April 2016.
- Pastore, MA**, Megonigal, JP, Langley, JA. <sup>15</sup>N label retention in a tidal marsh in response to elevated CO<sub>2</sub> and nitrogen addition. Society of Wetland Scientists, Providence, RI. June 2015.

## INVITED WORKSHOPS

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- MRI EDCC WG & GEO Mountains UHOP Workshop 2023. The measurement of elevation dependent climate change: The Unified High Elevation Observation Platform (UHOP). Bern, Switzerland (virtual). June 26, 2023.
- NSF Biodiversity on a Changing Planet (BoCP-Design) Workshop. Climate change and ecosystem functioning: reducing critical uncertainties about ecosystem acclimation. Park City, UT (virtual). May 22-25, 2023.
- DOE Oak Ridge National Laboratory Workshop. Integrated Ecosystem Experiments to Advance Earth System Predictability. Oak Ridge, TN (virtual). March 21-24, 2022.

## POPULAR PRESS AND MEDIA

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### *Invited authorship:*

- Pastore, MA.** “What’s happening beneath our feet when it comes to climate change?” *Functional Ecologists*. *Functional Ecology*. Web blog post. (Feb. 2023). <https://functionalecologists.com/2023/02/28/melissa-pastore-whats-happening-beneath-our-feet-when-it-comes-to-climate-change/>.
- Pastore, MA.** “Marshes: Pollution Sponges of the Future.” *Shorelines*. The Smithsonian Environmental Research Center. Web blog post. (Aug. 2014). <https://sercblog.si.edu/marshes-pollution-sponges-of-the-future/>.

### *Interviews:*

- Interviewed by Samia Bouzid. “Are valleys sheltered from climate change?” *SciShow* (7.53M subscribers). YouTube production. January 10, 2023. <https://www.youtube.com/watch?v=lq2qEUDo97w>.
- Interviewed by Deane Morrison. “Grassland Biodiversity Emerges as Key Factor in Climate Crisis.” *Office of the Vice President for Research Inquiry Blog and Newsletter*. University of Minnesota. Web blog post, Newsletter. May 22, 2021. <https://research.umn.edu/inquiry/post/grassland-biodiversity-emerges-key-factor-climate-crisis>.
- Interviewed by Roland Pease. *BBC World Service: Science in Action*. Radio. April 26, 2018. <https://www.bbc.co.uk/programmes/w3cswmp8> (begins 07:48).
- Interviewed by Volker Mrasek. *Deutschlandfunk* and *Westdeutscher Rundfunk* (German Public Radio). Radio. April 20, 2018. <https://www1.wdr.de/mediathek/audio/wdr5/wdr5-leonardo-top-themen/audio-co-schadet-auch-pflanzen-100.html>. [https://www.deutschlandfunk.de/ueberraschender-klimaeffekt-pflanzen-reagieren-auf-mehr-co2.676.de.html?dram:article\\_id=416145](https://www.deutschlandfunk.de/ueberraschender-klimaeffekt-pflanzen-reagieren-auf-mehr-co2.676.de.html?dram:article_id=416145).

## FELLOWSHIPS AND GRANTS

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### *University of Minnesota:*

Philip C. Hamm Graduate Scholarship in the Plant Sciences	2020
Darby and Geri Nelson Environmental Scholar Award	2019
College of Biological Sciences Travel Grant	2019
Donald and Elizabeth Lawrence Research Scholarship	2018
Carol H. and Wayne A. Pletcher Graduate Fellowship	2018
College of Graduate Students Travel Grant Award	2019, 2018
Howard Hughes Medical Institute Diversity & Inclusion Teaching Fellowship	2018, 2017
EEB Graduate Travel Award	2019, 2018, 2017
EEB Research Grant	2018, 2017, 2016
EEB Program Summer Fellowship	2018, 2017, 2016

### *Villanova University:*

Biology Graduate Fellowship	2015
Biology Summer Research Fellowship	2015, 2014
Graduate Student Summer Research Fellowship	2014

## TEACHING AND MENTORING

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- Biol 3004/3004H: Foundations of Biol. II**, Univ. of Minn. Fall 2019
- Independent instructor for two ecotoxicology-focused sections per semester Spring 2019, Fall 2018, Spring 2017, Fall 2016
  - ~50 undergraduate students per semester
  - Course structured as working research lab
  - Mentored ~10 undergraduate student-led research projects per semester
  - Trained students how to read primary literature, develop novel ideas, design/carry out experiments, troubleshoot, perform statistics, create figures, write scientific papers, and create/present scientific posters
- EEB 4609W/5609: Ecosystem Ecology**, Univ. of Minn. Fall 2017
- Independent instructor for one undergraduate and one graduate discussion section
  - ~25 students
  - Guided students in writing scientific review papers and research grant proposals
  - Assisted instructor (Dr. Sarah Hobbie) during lecture section
- Biol 1961/1961H: Foundations of Biol. I**, Univ. of Minn. Spring 2016, Fall 2015
- Independent instructor for one ecotoxicology-focused lab section per semester
  - ~25 undergraduate students per semester
  - Trained students in basic lab skills, formulating novel scientific questions, experimental design, statistics, and writing research proposals
- Bio 2105: General Biology**, Villanova University Spring 2015
- Independent instructor for two lab sections
  - ~50 undergraduate students
- MSE 2204: Human Physiology**, Villanova University Spring 2014
- Assistant to instructor (Dr. Phil Stephens) for two lab sections
  - ~40 undergraduate students
- Bio 3055: Animal Physiology**, Villanova University Spring 2014, Fall 2013
- Assistant to instructor (Dr. Phil Stephens) for two lab sections per semester
  - ~40 undergraduate students per semester
- Biol 427: Evolution**, Penn State University Fall 2012
- Assistant to instructor (Dr. Blair Hedges)
  - ~150 primarily undergraduate students
  - Created exams

### *Guest Lectures:*

October 12, 2020. University of Vermont. Ecosystem Ecology (Instructor: Carol Adair).

April 20, 2020. Macalester University. Ecosystem Ecology (Instructor: Christine O'Connell).

### *Mentorship:*

Carissa Finnerty, Undergraduate student at the University of Vermont/Rubenstein Perennial Intern (2022)

Anna Sherman, Undergraduate student at the University of Vermont/Rubenstein Perennial Intern (2021)

Dara Coker, Undergrad. student at the Univ. of Wisconsin-Eau Claire/Cedar Creek Intern (2018-2020)

Claire Houlihan, Undergraduate student at the University of Minnesota (2016-2018)

Kelsey Ward, Undergraduate student at the University of Minnesota (2016-2018)

Valerie Gehn, Undergrad. student at the Univ. of Wisconsin-Eau Claire/Cedar Creek Intern (2017)

Graham Caron, High school student at Minnetonka High School (2017)

Amanda Donaldson, NASA Innovations in Climate Education-Tribal Gida (Our Earth Lodge) REU student (2016)

Susan Webster, NASA Innovations in Climate Education-Tribal Gida (Our Earth Lodge) REU student (2016)

Allen J. Butterfield, NASA Innovations in Climate Education-Tribal Gida (Our Earth Lodge) REU student (2016)

Emmanuel Okematti, Undergraduate student at the University of Minnesota (2016)

Isaac Johnson, Undergraduate student at the University of Minnesota (2016)

## **OUTREACH AND SERVICE, PROFESSIONAL DEVELOPMENT, AND HONORS**

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### ***Outreach and Service:***

**Journal Review:** Ecology, Ecology Letters, Plant, Cell & Environment, Journal of Ecology, Ecological Applications, Oikos, Ecosystems, Climatic Change, Ecosphere, Biogeochemistry, Biogeosciences, American Journal of Botany, Plant and Soil, AoB Plants, Journal of Geophysical Research Biogeosciences, Archives of Agronomy and Soil Science, Flora, Global Ecology and Conservation, Agricultural and Forest Meteorology, Science of the Total Environment, Resources, Conservation, & Recycling, CONCEPT Interdisciplinary Journal of Graduate Studies

**Voice-over Talent for ‘The Thinking Project’ Nonprofit Group for K-12 Educators** 2021 – present  
*Narrating video lessons for K-12 students using Inquiry-Based Stress Reduction (thethinkingproject.org)*

**University of Minnesota Ecology Science Fair** 2021  
*Served as judge for grade 4-12 student-driven investigations in ecology*

**Cedar Creek Ecosystem Science Reserve Outreach** 2016 – 2019  
*Led talks, field tours, and outreach activities for K-12 and beyond*

**Midwest Coordinator for Science-Informed Leadership** 2017 – 2018  
*Communicated with constituents, organized resources enabling citizens to contact their senators*

**EEB Department Orientation Handbook Developer** 2017 – 2018  
*Developed orientation handbook and resource list for incoming graduate students*

**EEB Department Graduate Student President** 2016 – 2017  
*Organized and oversaw graduate student meetings and departmental events*

**Cedar Creek “Weaving Our Communities” Together REU Mentor** 2016  
*Mentored research projects of Native undergraduates (funded through NASA NICE-T grant)*

**Gida (Our Earth Lodge) STEM Camps** 2016  
*Led science lessons and experiments with K-12 Native (Ojibwe) students, connected lessons to Indigenous culture*

**Chelsea Heights Elementary Science Fair Mentor** 2016  
*Taught students experimental design and scientific method, helped students perform experiments and create figures*

**EEB Department Seminar Facilitator at the University of Minnesota** 2015 – 2016

**Mifflinburg Intermediate School Outreach** 2014 – 2015  
*Designed and led science lessons and experiments for 5<sup>th</sup> grade science education*

### ***Professional Development:***

*Introduction to R for Biologists (baseR) course, Utah State U./U. of Vermont/NCTC* 2022  
*URGE (Unlearning Racism in the Geosciences) Program* 2021  
*Teaching in Higher Education course, University of Minnesota* 2020  
*Designing and Delivering Online Learning Certification at Univ. of Minn.* 2020  
*Institute on the Environment’s Boreas Leadership Program at Univ. of Minn.* 2015 – 2020  
*Emerge Bioscience Career Workshop Program* 2019  
*Howard Hughes Medical Institute Diversity and Inclusion Training* 2017 – 2018  
*College of Biological Sciences Classroom Writing Instruction Workshop* 2015

### ***Honors:***

Society of Wetland Scientists Annual Meeting Poster Presentation Award 2015

## **PROFESSIONAL MEMBERSHIPS**

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American Geophysical Union 2019, 2023  
Ecological Society of America 2015 – 2022  
Society of Wetland Scientists 2015 – 2016

## REFERENCES

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**Dr. Sarah Hobbie, *Professor***

Ecology, Evolution, and Behavior Department  
University of Minnesota  
1479 Gortner Ave.  
St. Paul, MN 55108  
(612) 625-6269  
shobbie@umn.edu  
Relationship: Ph.D. Advisor

**Dr. Peter Reich, *Professor***

Forest Resources Department  
University of Minnesota  
1479 Gortner Ave.  
St. Paul, MN 55108  
(612) 624-4270  
preich@umn.edu  
Relationship: Ph.D. Advisor

**Dr. Aimée Classen, *Professor***

Ecology and Evolutionary Biology Department  
University of Michigan  
500 S. State St.  
Ann Arbor, MI 48109  
(734) 763-4461  
aclassen@umich.edu  
Relationship: Postdoctoral Advisor

**Dr. Anthony D'Amato, *Professor***

Rubenstein School of Environment and Nat. Resources  
University of Vermont  
148 S. Prospect St.  
Burlington, VT 05401  
(802) 656-8030  
anthony.damato@uvm.edu  
Relationship: Postdoctoral Advisor

**Dr. Carol Adair, *Associate Professor***

Rubenstein School of Environment and Nat. Resources  
University of Vermont  
148 S. Prospect St.  
Burlington, VT 05401  
(802) 656-2907  
Carol.Adair@uvm.edu  
Relationship: Postdoctoral Advisor

**Dr. Tali Lee, *Professor***

Biology Department  
University of Wisconsin-Eau Claire  
346 Phillips Science Hall  
Eau Claire, WI 54701  
(715) 836-5087  
leetd@uwec.edu  
Relationship: Collaborator/Ph.D. Committee Member

**Dr. Adam Langley, *Associate Professor***

Biology Department  
Villanova University  
800 E. Lancaster Ave.  
Villanova, PA 19085  
(610) 519-3102  
adam.langley@villanova.edu  
Relationship: M.S. Advisor