

# Joseph K. Brown, Ph.D.

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## Professional summary

I am a plant ecologist with a Ph.D. in Integrative Life Sciences, blending extensive research expertise with a passion for innovative teaching. My professional experiences have fueled my commitment to creating engaging, hands-on learning environments for students invested in understanding the connections between humans and natural systems. I integrate fieldwork, project-based inquiry, and active learning strategies to inspire critical thinking and problem-solving, empowering diverse student communities to excel in ecological and integrative sciences. I use my research specialties in plant community and ecosystem function, data science, climate change, and probabilistic analysis to drive inquiry-based learning in the classroom and recruit students for undergraduate research opportunities.

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## Work and Education

### Science positions

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| 2022 - current | Postdoctoral Researcher, PNNL – Joint Global Change Research Institute, College Park, MD |
| 2021 - 2022    | Visiting Assistant Professor, Minnesota State University – Mankato, Mankato, MN          |

### Education

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| 2016 - 2021 | Ph.D., Integrative Life Sciences. Virginia Commonwealth University, Richmond, VA<br><b>GPA:</b> 3.9<br><b>Dissertation:</b> <i>Plant Communities In Dynamic Systems: How Disturbance Influences Coastal Plant Community Structure And Function</i><br><b>Advisor:</b> Julie Zinnert, Ph.D. |
| 2014 - 2016 | Master of Science, Biology. Virginia Commonwealth University, Richmond, VA<br><b>GPA:</b> 4.0<br><b>Thesis:</b> <i>Emergent Interactions Influence Functional Traits and Success of Dune Building Ecosystem Engineers</i><br><b>Advisor:</b> Julie Zinnert, Ph.D. and Don Young, Ph.D.     |
| 2009 - 2013 | Bachelor of Science, Biology. Virginia Commonwealth University, Richmond, VA   |

## **Publications**

\*\*Denotes high school author

### **Accepted**

10. **Brown, J.K.** Barrier Islands: Terrestrial ecosystems in the ocean. *In revision. Encyclopedia of Ecology 3rd Edition.*
9. **Brown, J.K.**, K. Dorheim, D. Mu\*\*, A. Snyder, C. Tebaldi, and B.P. Bond-Lamberty. *In revision.* The effect of different climate sensitivity priors on projected climate: A probabilistic analysis. *Geophysical Research Letters.*
8. **Brown, J.K.**, L. Pressburger, A. Snyder, K. Dorheim, S.J. Smith, C. Tebaldi, B.P. Bond-Lamberty. Matilda v1.0: An R package for probabilistic climate projections using a reduced complexity climate model. Submitted to *PLOS Climate* **3**(5) DOI: <https://doi.org/10.1371/journal.pclm.0000295>
7. **Brown, J.K.**, A. Moulton, J.C. Zinnert. 2022. Plant community re-organization and increased productivity due to multi-year nutrient enrichment of a coastal grassland. *PLOS One* **17**(7) DOI: <https://doi.org/10.1371/journal.pone.0270798>
6. **Brown, J.K.**, J.C. Zinnert. 2021. Trait-based investigation reveals patterns of community response to nutrient enrichment in coastal mesic grassland. *Diversity* **13**(1):19 DOI: <https://doi.org/10.3390/d13010019>
5. **Brown, J.K.**, J.C. Zinnert. 2020. Topography and disturbance influence trait-based community composition and productivity of adjacent habitats in a coastal system. *Ecosphere* **11**(5) DOI: <https://doi.org/10.1002/ecs2.3139>
4. Stallins, J.A., L.C. Hsu, J.C. Zinnert, **J.K. Brown**. 2020. How bottom-up and top-down controls shape dune topographic variability along the U.S. Virginia barrier island coast and the inference of dune dynamical properties. *Journal of Coastal Conservation* **24**(30) DOI: <https://doi.org/10.1007/s11852-020-00747-7>
3. Goldstein, E.B., E.V. Mullins, R.G. Biel, **J.K. Brown**, S.D. Hacker, K.R. Jay, R.S. Mostow, P. Ruggiero, J.C. Zinnert, L.J. Moore. 2018. Literature-based latitudinal distribution and possible range shifts of two US east coast dune grass species (*Uniola paniculata* and *Ammophila breviligulata*). *PeerJ* DOI: <https://doi.org/10.7717/peerj.4932>
2. **Brown, J.K.**, J.C. Zinnert. 2018. Mechanisms of surviving burial: Interspecific differences of similar species drives survival after sand deposition. *Ecosphere* **9**(3) DOI: <https://doi.org/10.1002/ecs2.2162>
1. **Brown, J.K.**, J.C. Zinnert, D.R. Young. 2018. Emergent interactions influence functional traits and success of dune building ecosystem engineers. *Journal of Plant Ecology* **11**(4) DOI: <https://doi.org/10.1093/jpe/rtx033> **\*Editor's Choice\***

### **In prep**

1. **Brown, J.K.**, J.A. Stallins, T.E. Miller, J.C. Zinnert. Scale dependency of barrier island elevation and stability as drivers of plant community composition and structure.

## Software

1. **Brown, J.K.**, B.P. Bond-Lamberty, L. Pressburger, Melat Ghebreselassie\*\*. 2024. matilda: A Probabilistic Framework for the Hector Simple Climate Model. R package version 1.0.0. <https://github.com/JGCRI/matilda>

## Teaching experience

### Instructor of Record

#### Minnesota State University, Mankato

- 2022 (spring) Plant Ecology (BIOL 443/543)
- 2022 (spring) General Biology II Lab (BIOL 106)
- 2021 (fall) General Biology II Lecture and Lab (BIOL 106)
- 2021 (fall) Flora of Minnesota (BIOL 442/542)

### Graduate Teaching Appointments

#### Virginia Commonwealth University, Richmond, VA

- 2021 (spring) Biology Lab II (BIOZ 152)
- 2020 (fall) Quantitative Ecology (BIOL 606)
- 2020 (fall) Ecology Lab (BIOZ 317)
- 2018-19 Biology Lab II (BIOZ 152)
- 2014-15 Biology Lab II (BIOZ 152)

## Mentor Experience

### Research mentor:

- 2024 Mentor of PNNL High School Research Intern  
Student: Melat Ghebreselassie  
Project: Assessing climate model parameter sensitivity using Bayesian inference
- 2023 Mentor of PNNL High School Research Intern  
Student: Derek Mu  
Project: Propagating uncertainty in ECS to probabilistic projections of future warming
- 2017 Mentor of VCU funded Environmental Scholars undergraduate  
Student: Caroline Baucom  
Project: Intraspecific functional trait changes in response to nutrient addition
- 2017 Mentor of NSF funded REU at VCR LTER  
Student: Edward Long  
Project: Root traits across barrier island plant communities
- 2016 Mentor of NSF funded REU at VCR LTER  
Student: Grace Holmes
- 2015 Mentor of NSF funded REU at VCR LTER  
Student: Taylor Price

### **Committee member:**

- 2021-2022 Allison Squires, Minnesota State University, Mankato  
Thesis: Seasonal Resource Allocation and Accumulated Degree Day Estimation for Cuban Bulrush (*Oxyarum cubense*) in the Southeastern U.S.
- 2023-2025 Anne Sciolino, Virginia Commonwealth University  
Thesis: Interspecies and Intraspecies Facilitative and Competitive Interactions Among Dune Grasses

### **Presentations**

\*Denotes undergraduate author

\*\*Denotes high school author

### **Conferences and Workshops**

21. **Brown, J.K.**, L. Pressburger, A. Snyder, K. Dorheim, S.J. Smith, C. Tebaldi, B.P. Bond-Lamberty. Matilda v1.0: Integrating parameter uncertainty and ensemble weighting with Hector for probabilistic climate projections. Department of Energy EESM PI Meeting 2024. Bethesda, MD. August 7 (poster).
20. M. Ghebreselassie\*\*, **J.K. Brown**, B.P. Bond-Lamberty. Using ocean carbon uptake observation data for uncertainty estimation of the Hector simple climate model. 2024 PNNL High School Program Academic Year Symposium. Online. May 20 (oral).
19. **Brown, J.K.**, K. Dorheim, A. Snyder, C. Tebaldi, D. Mu\*\*, B.P. Bond-Lamberty. 2023. Bridging the gap from evidence to projections: Assessing the influence of equilibrium climate sensitivity uncertainty on probabilistic temperature projections. American Geophysical Union Annual Meeting. San Francisco, CA. December 13 (poster).
18. Mu, D.\*\* , **J.K. Brown**. B.P. Bond-Lamberty. 2023. Propagating uncertainty in equilibrium climate sensitivity to probabilistic climate projections of future warming. PNNL High School Research Intern Seminar. Online. August 24 (oral).
17. **Brown, J.K.**, L. Pressburger, B. Bond-Lamberty. 2022. Matilda v0.1: Developing a probabilistic framework for the Hector simple climate model. YouR\_WEB Mini-Conference. Richland, WA. February 24 (oral).
16. **Brown, J.K.**, J.C. Zinnert. 2021. How does barrier island shape and disturbance response impact island plant communities? Virginia Coast Reserve LTER All Scientist Meeting. Online. January 4 (poster).
15. **Brown, J.K.**, J.C. Zinnert. 2020. Functional traits inform mechanisms of plant community changes that emerge from nutrient enrichment in a coastal mesic grassland. Ecological Society of America. Online. August 5 (poster).
14. **Brown, J.K.**, J.C. Zinnert. 2019. Nutrient enrichment drives feedbacks between functional diversity and productivity in a coastal system. Ecological Society of America. Louisville, KY. August 13 (oral).
13. **Brown, J.K.**, A. Kirschner, B. Nettleton, J.C. Zinnert. 2018. Cross-scale

connections explain disturbance response on Virginia Coast Reserve barrier island system. Long Term Ecological Research All Scientists Meeting. Pacific Grove, CA. October 2 (poster).

12. **Brown, J.K.**, J.C. Zinnert. 2018. Nutrient addition affects coastal grassland productivity and species dominance. Ecological Society of America Conference. New Orleans, LA. August 8 (oral).
11. Baucom, C.M.\* , **J.K. Brown**, J.C. Zinnert. 2018. Trait variation in response to nutrient fertilization. Virginia Commonwealth University Undergraduate Research Symposium. Richmond, VA. April 25 (poster).
10. Long, E.A.\* , **J.K. Brown**, J.C. Zinnert. 2018. Belowground functional trait distribution across coastal communities. Virginia Commonwealth Undergraduate Research Symposium. Richmond, VA. April 25 (poster).
9. **Brown, J.K.**, J.C. Zinnert. 2018. Using community patterns to investigate coastal resilience in a changing climate. Virginia Sea Grant Graduate Research Symposium. Glen Allen, VA. February 9 (poster).
8. Baucom, C.M.\* , **J.K. Brown**, J.C. Zinnert. 2018. Trait variation in response to nutrient fertilization. Integrative Life Sciences Research Symposium. Richmond, VA. February 8 (poster).
7. **Brown, J.K.**, J.C. Zinnert. 2018. Using community patterns to investigate coastal resilience in a changing climate. Integrative Life Sciences Research Symposium. Richmond, VA. February 8 (poster).
6. **Brown, J.K.**, J.C. Zinnert. 2017. Importance of species composition to inform trait-based approaches of community assembly along an environmental stress gradient. Ecological Society of America Conference. Portland, OR. August 9 (oral).
5. **Brown, J.K.**, J.C. Zinnert, D.R. Young. 2017. Resource allocation drives variable mechanisms of survival after sand deposition. Association of Southeastern Biologists Annual Conference. Montgomery, AL. March 28 (oral)
4. **Brown, J.K.**, J.C. Zinnert, D.R. Young. 2016. Emergent interactions influence functional traits and success of dune building ecosystem engineers. Gordon Research Conference: Multiscale Plant Vascular Biology. Newry, ME. June 27 (poster).
3. **Brown, J.K.**, J.C. Zinnert, D.R. Young. 2016. Competition affects functional trait responses of dune grasses to abiotic stressors. 15<sup>th</sup> William and Mary Graduate Research Symposium. Williamsburg, VA. March 18 (oral).
2. **Brown, J.K.**, A.L. Harris, J.C. Zinnert, D.R. Young. 2015. Physiological and functional traits of dune building grasses influence topographic structure. Long Term Ecological Research All Scientists Meeting. Estes Park, CO. August 30 (poster).
1. Zinnert, J.C., **J.K. Brown**, A.L. Harris, J.A. Thompson, D.R. Young. 2015. Functional traits explain ecosystem engineering in dune building grasses. Ecological Society of America Conference. Baltimore, MD. August 11 (poster).

### Invited presentations

5. **Brown, J.K.** K. Dorheim, M. Ghebreselassie\*\*, D. Mu\*\*, A. Snyder, S. Smith, C. Tebaldi, and B. Bond-Lamberty. 2024. Unlocking new potential in simple climate modeling with parametric uncertainty and ensemble meritocracy. VCU Biology Seminar Series. Richmond, VA (oral).
4. **Brown, J.K.** 2024. Matilda V1.0 quick start. Joint Global Change Research Institute — GCAM

Annual Meeting 2024 (workshop).

3. **Brown, J.K.** 2024. Introduction to Hector usage. Joint Global Change Research Institute — GCAM Annual Meeting 2024 (workshop).
2. **Brown, J.K.** 2021. Disturbance impacts on coastal plant community structure and function. Minnesota State University – Mankato Biological Sciences Research Seminar. Mankato, MN (oral).
1. **Brown, J.K., J.C. Zinnert.** 2018. Stress and disturbance mediate community assembly processes in coastal ecosystems. Ecological responses to global change in Southeastern coastal ecosystems symposium. ASB Conference. Myrtle Beach, SC (oral).

## **Service and Honors**

### **Service**

1. **Planning committee member for the 2024 GCAM (Global Change Analysis Model) Annual Meeting**

Organized and scheduled online workshops and technical presentations. All workshops are now sustainably hosted on MSD-LIVE.

2. **Contributed peer-review for the following journals:**

*Écoscience* | *Ecosphere* | *Ecology and Evolution* | *Scientific Reports* | *Plant and Soil* | *Journal of Ecology* | *Oecologia*

3. **Limited-Term Employee (LTE) Seminar Co-coordinator**

Plan and recruit monthly LTE (post-bachelor, post-masters, post-doctorate) speakers to present recent work.

4. **Limited-Term & Full-Time Equivalent Employee Lunch Chat Coordinator**

Coordinate lunchtime meetings to connect LTEs with FTEs to discuss career development.

5. **Lead organizer for Organized Oral Session at ESA 2018**

Session title – A Coastal Perspective: The Role of Vegetation in Response and Resilience of Coastal Ecosystems to Extreme Events.

Lead writer of session proposal and session justification.

Led recruitment of 10 speakers from around the country.

6. **Student representative on multiple promotion and tenure committees**

Derek Johnson, 2015 | Gregory Walsh, 2017 | Karen Kester, 2019

7. **Attendee at annual Global Nutrient Network meeting in Minneapolis, MN, 2017**

8. **Graduate representative at NSF mid-term site review of VCR LTER, Oyster, VA, 2015**

Presented the importance of ecological connectivity between dune and swale plant communities.

**9. Poster Judge, Long Term Ecological Research All Scientists Meeting, Estes Park, CO 2015**

Judged seven posters at the annual meeting of all LTER sites.

**10. Five-year service award recipient at VCU**

Recognized for providing service to VCU through on-campus employment for 5 years.

## **Honors**

**2018 Outstanding Biology PhD Student in Ecology**

Presented by VCU College of Humanities and Sciences

**2017 Attendee at AAAS Catalyzing Advocacy in Science and Engineering Workshop**

Nominated and selected through VCU College of Humanities and Sciences

**2016 Outstanding Biology Masters Student in Ecology**

Presented by VCU College of Humanities and Sciences

## **Funding**

**Total since 2016: \$7,250**

**2020 Integrative Life Sciences Graduate Student Funding to ESA 2020**

Total amount awarded: \$700 – Virtual due to COVID-19

**2019 ESA Student Section Student Travel Award**

Total amount awarded: \$150

**2019 ESA Southeast Chapter Student Travel Award**

Total amount awarded: \$300

**2019 Integrative Life Sciences Graduate Student Funding to ESA 2019**

Total amount awarded: \$700

**2018 VCU Graduate School Travel Grant**

Total amount awarded: \$300

**2018 Integrative Life Sciences Graduate Student Funding to ESA 2018**

Total amount awarded: \$1,000

**2018 Open Access Publishing Fund – VCU Libraries**

Total amount awarded: \$1,000

**2017 VCU Graduate School Travel Grant**

Total amount awarded: \$300

**2017 Integrative Life Sciences Graduate Student Funding to ESA 2017**

Total amount awarded: \$1,000

**2016 NSF Student Travel Grant to Gordon Research Conference**

Total amount awarded: \$1,500

**2016 VCU Graduate School Travel Grant**

Total amount awarded: \$300

**2009-13 Undergraduate: Mary Kay-Moore Scholarship for Young Adults with Cancer**

Total amount over four years: \$4,750.

## Outreach and Community Involvement

### Outreach Events

**1. How trees help us!**

Science outreach presentation event for kindergarten classes at Cople Elementary School, Hague, VA.

**2. Participant at VCR “See What Scientists See” @ At Altitude Photography, Cape Charles, VA**

Local outreach event where scientists and the public discuss how they perceive aerial photos of coastal Virginia.

**3. Contributor to NSF Long-Term Ecological Research ASM “Reflections” video**

Participated as a student contributor to comment about connections and synthesis of the LTER network.

**4. Student representative for congressional meetings through AAAS CASE Workshop, 2017.**

I participated in meetings with staffers of Virginia congressional offices to advocate for science research.

**5. Virginia Oyster Shell Recycling, VCU Richmond, VA, 2015.**

Collected and recycled oyster shells from local restaurants in the Richmond area.

### Organizations with Scientific Community

2018-2020 **Student Liaison Coordinator** for the ESA Student Section 2020

2018-2019 **ESA Southeast Chapter Student Liaison**

2018-2019 **Vice President** of the Society for Ecological Restoration @ VCU

2017-2018 **President** of the Society for Ecological Restoration @ VCU

2017-2018 **Leadership Member** of the National Science Policy Group @ VCU

2016-2017 **Secretary** of the Society for Ecological Restoration @ VCU.