

# JOHANNES RENKE KRAUSE

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## RESEARCH INTERESTS

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I am a coastal biogeochemist and seascape ecologist focused on coastal vegetated ecosystems. I study spatiotemporal dynamics of seagrasses, salt marshes, and mangroves using remote sensing techniques, field-based sampling, and predictive modeling. My methodological approach is grounded in a range of disciplines, including environmental chemistry, sedimentology, geospatial analysis, time-series analysis, and bioinformatics. With my research, I aim to uncover how anthropogenic impacts and natural variability affect coastal processes and biogeochemical cycles.

## EDUCATION

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Drexel University	<b>PhD Environmental Sciences</b>	2016 – 2021
University of Glasgow	<b>MSc. Marine System Science</b>	2014 – 2015
University of Tübingen	<b>BSc. Geo-Ecology</b>	2010 – 2014
University of Las Palmas	<b>Erasmus – Exchange</b>	2012 – 2013

## CURRENT PROJECTS

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**Caribbean Carbon Accounting in Seagrass (CariCAS II)** 2024-2025  
Principal Investigator on The Nature Conservancy-funded (\$80,000) project mapping seagrass meadows of the continental Caribbean coast for use in carbon stock assessments.

**Florida Coastal Everglades Long-term Ecological Research (FCE LTER)** 2023-  
Co-lead of the Vegetation Group of the NSF-funded (\$4,750,000) LTER program investigating functional traits of vegetation communities along environmental gradients in the Florida Everglades NP.

**The Blue Carbon Initiative – Global Seagrass Carbon Stocks** 2023-2025  
Research member of the International Blue Carbon Scientific Working Group and Seagrass Subgroup. PI on Conservation International-funded data synthesis and research projects focused on seagrass blue carbon.

**Seagrass Ecosystems of the South Florida Seascape** 2021-2025  
Research Professor at the Seagrass Ecosystems Research Lab (PI Dr. James Fourqurean), synthesizing and analyzing long-term seagrass monitoring, water quality, temperature, and sedimentary carbon data.

**Seed-based seagrass restoration of *Syringodium* in Florida** 2024-2025  
Exploration of *Syringodium filiforme* sexual phenology and seed bank occurrence in south Florida, and environmental drivers of flowering and seed germination in this seagrass.

## PEER REVIEWED PUBLICATIONS

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Hernández Rodríguez, C, J Collazo Reyes, DI Perez, J Gonzalez-Corredor, **JR Krause**, et al.

- Influence of Environmental Factors on pH Buffering, Productivity, and Blue Carbon Storage in Contrasting *Thalassia testudinum* Seagrass Meadows in La Parguera, Puerto Rico. *Estuaries and Coasts*, in review
- Duffy, E, W Appeltrans, A Benson, R Connolly, **JR Krause**, et al. Measuring and reporting on seagrass as an Essential Ocean Variable for science and sustainable development. *BioScience*, in review
- Fourqurean, JW, **JR Krause**, SA Manuel, KA Coates, PE Worboys, et al. 2025. Seagrass organic carbon stocks are not correlated with seagrass abundance at local scale, but loss of seagrasses does lead to decrease in surficial sediment organic carbon at the seascape scale in Bermuda. *Estuaries and Coasts* 48:110. doi:10.1007/s12237-025-01550-z
- Krause JR**, C Cameron, A Arias-Ortiz, M Cifuentes-Jara, S Crooks et al. 2025. Global seagrass carbon stock variability and emissions from seagrass loss. *Nature Communications* 16. doi:10.1038/s41467-025-59204-4
- Janousek, CN, **JR Krause**, JZ Drexler, KJ Buffington, K Poppe et al. 2025. Multi-scale drivers of variability in blue carbon stocks along the Pacific coast of North America. *Global Biogeochemical Cycles* 39. doi:10.1029/2024GB008239
- Krause JR**, A Roden, H Briceño, JW Fourqurean. 2025. Climate oscillations drive nutrient availability and seagrass abundance at a regional scale, *Limnology & Oceanography* doi:10.1002/lno.12787
- Fourqurean, JW, JE Campbell, OK Rhoades, CJ Munson, **JR Krause**, et al. 2023. Seagrass Abundance Predicts Surficial Soil Organic Carbon Stocks Across the Range of *Thalassia testudinum* in the Western North Atlantic. *Estuaries and Coasts*. doi:10.1007/s12237-023-01210-0
- Krause JR**, AJ Oczkowski, EB Watson, 2023. Improved mapping of coastal salt marsh habitat change at Barnegat Bay (NJ, USA) using object-based image analysis of high-resolution aerial imagery. *Remote Sensing Applications: Society and Environment* 29. doi:10.1016/j.rsase.2022.100910
- Raposa KB, K Wasson, A Woolfolk, C Endris, **JR Krause**, et al. 2023. Evaluating thin-layer sediment placement as a tool for enhancing tidal marsh resilience: a coordinated experiment across eight U.S. National Estuarine Research Reserves. *Estuaries and Coasts*. doi:10.1007/s12237-022-01161-y
- Krause JR**, CC Lopes, SS Wilson, JN Boyer, HO Briceño, JW Fourqurean, 2023. Status and trajectories of soft-bottom benthic communities of the south Florida seascape revealed by 25 years of seagrass and water quality monitoring. *Estuaries and Coasts*. doi:10.1007/s12237-022-01158-7
- Krause JR**, ME Gannon, AJ Oczkowski, MJ Schwartz, LK Champlin, et al. 2022. Tidal Flushing Rather Than Non-Point Source Nitrogen Pollution Drives Nutrient Dynamics in a Putatively Eutrophic Estuary. *Water* 15(1). doi:10.3390/w15010015
- Krause JR**, A Hinojosa-Corona, AB Gray, JC Herguera, J McDonnell, MV Schaefer, SC Ying, EB Watson, 2022. Beyond habitat boundaries: organic matter cycling requires a system-wide approach for accurate blue carbon accounting. *Limnology & Oceanography*. doi:10.1002/lno.12071
- Thomsen AS, **JR Krause**, M Appiano, KE Tanner, C Endris et al., 2022. Monitoring vegetation dynamics at a tidal marsh restoration site: integrating field methods, remote sensing and modeling. *Estuaries and Coasts*. (45): 523-538. doi:10.1007/s12237-021-00977-4
- Krause JR**, A Hinojosa-Corona, EB Watson, 2021. Emerging sensor platforms allow for seagrass extent mapping in a turbid estuary, from the meadow to ecosystem scale. *Remote Sensing* 13 (18): 3681. <https://doi.org/10.3390/rs13183681>
- Watson, EB, A Hinojosa-Corona, **JR Krause**, JC Herguera, J McDonnell, KR Villegas

- Manríquez, ME Gannon, AB Gray, 2020. Lagoon biogeochemical processing is reflected in spatial patterns of sediment stable isotopic ratios. *Journal of Marine Science and Engineering*. (8): 874. <https://doi.org/10.3390/jmse8110874>
- Krause JR**, EB Watson, C Wigand, N Maher, 2020. Are tidal salt marshes exposed to nutrient pollution more vulnerable to sea level rise? *Wetlands* (40):1539-1548. doi: 10.1007/s13157-019-01254-8
- Powell EB, **JR Krause**, EB Watson, 2020. Pond excavation reduces coastal wetland carbon dioxide assimilation. *JGR: Biogeosciences* (125). doi.org/10.1029/2019JG005187

#### OTHER PUBLICATIONS

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- Krause JR**, JW Fourqurean 2025. Caribbean Carbon Accounting in Seagrass. Final report.
- Krause JR**, 2024. Seagrass Organic Carbon Stocks of Chrouy Pros Bay, Cambodia. Final Project Report.
- JW Fourqurean, JE Campbell, **JR Krause** et al. 2024. Caricas Partner's Practical Field and Laboratory Guide. Center for Coastal Oceans Research Faculty Publications. 32. [digitalcommons.fiu.edu/merc\\_fac/32](https://digitalcommons.fiu.edu/merc_fac/32)
- Krause JR**, JW Fourqurean, 2022. Investigator's Annual Report, Dry Tortugas National Park
- Krause JR**, 2021. Changes in Salt Marsh Extent from 1995 to 2015 at Barnegat Bay, New Jersey. Technical Report submitted to the Barnegat Bay Partnership under EPA award #RARE2062
- Krause JR**, 2021. Elemental cycling in blue carbon habitats: Investigations from the molecular to ecosystem scale. PhD Thesis.
- Krause JR**, 2020. Hester Marsh Salinity Report. Elkhorn Slough Technical Report Series 2020: 1.
- Krause JR**, 2016. Diurnal variation of *in situ* photosynthesis and calcification rates in the coralline algae *Sporolithon* in the Red Sea. MSc Thesis.
- Krause JR**, 2014. Untersuchung der Sedimente und Epifauna nord-westlich von Eiderstedt. BSc Thesis.

#### GRANTS AND CONTRACTS AT FIU

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|---|------------------------|
| Caribbean Carbon Accounting in Seagrass (\$93,500)  | The Nature Conservancy |
| JR Krause, JW Fourqurean (PI)   | 01/01/24-03/31/25      |
| <i>To facilitate conservation of critical seagrass ecosystems and their inclusion in policy and financial frameworks for climate mitigation, reliable estimates of both seagrass extent and their carbon storage at national to regional scales are needed. We established a collaborative seagrass blue carbon monitoring network covering sites across the entire Caribbean. To better understand the full climate mitigation potential of Caribbean seagrass, we will expand existing Insular Caribbean seagrass maps to the entire Caribbean Basin, leveraging TNC's partnership with Planet, to calculate a more accurate assessment of these valuable carbon stocks in this globally important region. The impacts of these new maps will be considerable, catalyzing new actions, from conservation to restoration to payments for ecosystem services and potentially securing and enhancing the critical role of seagrass in global climate mitigation.</i> |                        |
| Continuation of seagrass monitoring in FKNMS (\$577,000)  | EPA                    |
| JW Fourqurean, JR Krause (coPI)   | 10/01/23-09/30/25      |
| <i>The program was designed to address the following objectives: 1) Define the present distribution of benthic communities within the FKNMS, 2) Provide high-quality, quantitative data on the status of the seagrasses within the FKNMS, 3) Quantify the importance of seagrass primary production in the FKNMS, 4) Define the baseline conditions for the seagrass communities, 5) Determine relationships between water</i>  |                        |

quality & benthic community status, and 6) Detect trends in the distribution and status of the benthic communities.

- Seagrass Carbon Stocks (\$97,053) Conservation Int'l  
 JW Fourqurean, JR Krause (coPI) 10/01/23-09/30/25  
*This project involves the creation and analysis of a quality assured, quality controlled database of global seagrass carbon stocks for the International Blue Carbon Scientific Working Group. Data analysis results in the dissemination of findings through peer-reviewed publications and presentations at international meetings.*
- Dry Tortugas National Park Seagrass Communities (\$35,000) NPS  
 JW Fourqurean, JR Krause (PI) 10/01/23-03/31/25  
*The goal of this project is to continue evaluating the long-term ecological status and trends of seagrass communities in Dry Tortugas National Park. This information is essential for effective stewardship of seagrass communities within the park, providing insight on recovery trajectories of seagrass communities post-hurricane disturbance and the potential arrival of the invasive seagrass *Halophila stipulacea*.*
- Seagrass Blue Carbon Stocks in Chruoy Pros Bay, Cambodia (\$29,000) Fauna & Flora Int'l  
 JR Krause (PI) 04/20/24-07/24/24  
*Investigation of sedimentary organic carbon stocks and provenance in seagrass meadows of Chruoy Pros Bay in Cambodia. This first assessment of seagrass blue carbon in the country will provide valuable information for the future development of nature-based climate solutions in Cambodia.*
- Seed-based seagrass restoration of *Syringodium* in Florida (\$199,846) FL DEP  
 JW Fourqurean, JR Krause (coPI) 08/01/24-12/31/25  
*In this project, we review the history of seagrass restoration in the state, and then assess the suitability of fast-growing, early successional seagrass *Syringodium filiforme* for seed-based restoration.*

#### OTHER GRANTS, AWARDS & HONORS

2024	International Seagrass Biology Workshop Fellowship	
2023	U.S. Carbon Program Leadership Award	\$1200
2020	Society of Wetland Scientists Student Research Grant	\$2000
2020	The Wetland Foundation Field Travel Grant	\$1000
2018, 2019	Geological Society of America Graduate Student Research Grant	\$5000
2019	American Philosophical Society Lewis & Clark Field Scholar	\$1000
2019	Association of American Geographers Marcus Fund	\$2000
2018-2019	William L. McLean III Fellowship	\$30,000
2018-2019	Claudio Elia Memorial Fellowship	\$10,000
2015	The Gilchrist Trust, Small Grant	\$2000
2015	The Royal Geographical Society, Small Grant	\$5000
2015	Glasgow Natural History Society, Small Grant	\$1000

#### GRADUATE TEACHING ASSISTANCESHIPS

GEO 312	<b>Sedimentology and Stratigraphy</b>	Fall 2020
GEO T480 /680	<b>Remote Sensing</b>	Winter 2020
ENVS 212	<b>Evolution</b>	4 Terms 2016 - 8
ENVS 558	<b>Marine Field Methods</b>	Summer 2017
ENVS T380 /580	<b>Restoration Ecology</b>	Summer 2018, 2020

#### TECHNICAL SKILLS

Languages:	German (native), English (full professional) Spanish (professional working)
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Programming languages: R, Python  
Software: ArcGIS, eCognition Developer, ENVI, Metashape, Qiime2, Inkscape, MS Office suite  
Diving: AAUS Scientific Diver, European Scientific Diver, Swedish S30 (IDSA level 1), ACUC Rescue Diver, Nitrox, Deep Diver  
Licences: Clean FL driving licence with 4-wheel & trailering experience  
PA, FL boating licences  
FAA Part 107 Unmanned Aircraft Systems (UAV) pilot license

## INVITED PRESENTATIONS

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- 2024 Regional-scale drivers of seagrass carbon stocks, from Florida to the Greater Caribbean. **Seminar** for Nature Coast Currents Webinar Series (online)
- 2024 Organic carbon cycling in seagrass systems – reducing uncertainties to aid conservation and climate policy. **Seminar** for Marine Science at Florida International University, Miami, FL
- 2024 Seagrass monitoring in the FKNMS. **Talk** at the Florida Keys National Marine Sanctuary WQPP Steering Committee, Marathon, FL
- 2024 Not all seagrasses are the same: Variability in Caribbean seagrass systems and their potential for blue carbon. **Seminar** for Tropical Restoration Network (online)
- 2024 Global Seagrass Blue Carbon Stocks Assessment: Seagrass Carbon Stocks Paper. **Talk** at International Blue Carbon Scientific Working Group 16<sup>th</sup> Annual Meeting, Cape Town, South Africa
- 2023 Blue carbon in seagrass systems. **Seminar** at School for Field Studies, South Caicos, Turks and Caicos
- 2023 Global seagrass carbon stocks database. **Talk** at International Blue Carbon Scientific Working Group 15<sup>th</sup> Annual Meeting, Singapore
- 2023 Press and pulse dynamics drive seagrass variability in the south Florida seascape: Lessons from Florida Bay and beyond. **Seminar** for Florida Coastal Everglades LTER Brown Bag Seminar Series (online)
- 2023 Nitrogen isoscapes as water quality indicators at Barnegat Bay, New Jersey. **Talk** at Barnegat Bay Partnership STAC Meeting (online)
- 2022 Are eutrophication and poor water quality threats to New Jersey’s tidal wetlands? **Seminar** for the New Jersey DEP (online)
- 2022 20 Years of Barnegat Bay Salt Marsh Change Revealed by High-resolution Image Analysis. **Talk** at Barnegat Bay Partnership STAC Meeting (online)
- 2021 Spatial Dynamics of Seagrass and Blue Carbon at Bahía de San Quintín. **Seminar** at CICESE, Seminario de la División de Ciencias de la Tierra, Mexico
- 2019 Blue Carbon in seagrass and salt marsh habitats of a hypersaline lagoon. **Seminar** at Drexel University’s Department of Biodiversity, Earth and Environmental Sciences, Philadelphia, PA

## CONTRIBUTED PRESENTATIONS

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- 2025 Global seagrass carbon stock variability and emissions from seagrass loss. **Talk** at ASLO Aquatic Sciences Meeting, Charlotte, NC
- 2024 Diverging trends of coastal ecosystem extent and condition: Lessons from global seagrass monitoring highlight the need for coordinated data collection at multiple scales of observation. **Talk** at ISBW15 & WSC2024, Napoli, Italy
- 2023 Climate oscillations drive nutrient availability and seagrass abundance across the South Florida seascape. **Talk** at CERF Biennial Meeting, Portland, OR

- 2023 Burial flux estimates from sediment cores suggest carbonate production partially offsets blue carbon potential of seagrass meadows across South Florida seascape. **Talk** at ASLO Aquatic Sciences Meeting in Palma de Mallorca, Spain
- 2023 Hurricane impacts on seagrasses of the South Florida seascape. **Talk** at Florida Coastal Everglades LTER All Scientist Meeting, Miami, FL
- 2022 Seagrass trend detection across monitoring tiers: Lessons from global monitoring programs. **Talk** at C-GRASS workshop, Smithsonian Environmental Research Center, Edgewater, MD
- 2022 Disturbance Alters the Mangrove-Associated Sediment Microbiome in an Urban Tropical Estuary. **Poster** at Ocean Sciences Meeting (online)
- 2021 Emerging sensor platforms support seagrass mapping in a turbid estuary, from meadow to ecosystem scale. **Poster** at CERF Biennial Meeting (online)
- 2020 Integrating acoustic and optical remote sensing for SAV mapping in a turbid estuary. **Poster** at Ocean Sciences Meeting in San Diego, CA
- 2020 The Role of Eutrophication in Coastal Wetland Fragmentation in Barnegat Bay, New Jersey. **Poster** at Restore America's Estuaries 2020 National Coastal and Estuarine Summit, Providence, RI
- 2019 A model-data synthesis of the status and trends of New Jersey's coastal wetlands for sea level rise planning. **Poster** at NJ Sea Grant Consortium
- 2019 Integrating acoustic and optical remote sensing allows for SAV mapping in a turbid estuary. **Poster** at CERF Biennial Meeting in Mobile, AL
- 2019 Blue Carbon in an Eastern Pacific reverse estuary: organic matter cycling links salt marshes and seagrass beds. **Talk** at ASLO Aquatic Sciences Meeting in San Juan, PR
- 2019 Integrating remote sensing techniques for seagrass mapping in Baja California. **Poster** at Drexel International Research Symposium, Philadelphia, PA
- 2018 Blue Carbon in an Eastern Pacific reverse estuary: organic matter cycling links salt marshes and seagrass beds. **Talk** at AGU Fall Meeting Washington, DC
- 2018 Comparison of organic matter sources and carbon burial rates in tidal salt marshes and seagrass beds of Bahía de San Quintín, Mexico. **Talk** at ASLO Summer Meeting Victoria, BC (Canada)
- 2018 Assessment of blue carbon stocks and storage in seagrass meadows of Bahía San Quintín, México. **Talk** at SWS Summer Meeting Denver, CO
- 2018 Assessment of blue carbon stocks and storage in seagrass meadows of Bahía San Quintín, México. **Poster** at Drexel International Research Showcase
- 2018 Strategies for the Energy Transition in COP23 Countries. **Talk** at Climate Action Panel, Drexel University, PA
- 2018 Are nutrient polluted wetlands more vulnerable to sea level rise? **Poster** at Delaware Wetlands Conference 2018, Wilmington DE
- 2017 Assessment of blue carbon stocks and storage in seagrass meadows of Bahía San Quintín, México. **Poster** at Coastal and Estuarine Research Federation 2017 Conference, Providence RI
- 2017 **Observer** at UN Framework Convent for Climate Change Conference COP23, Bonn (Germany)
- 2015 The diurnal variation of in situ photosynthesis and calcification rates in the coralline algae *Lithophyllum kotschyannum* in the Red Sea. **Seminar** at University of Glasgow School of Earth Sciences Postgraduate Seminar, Glasgow SCO

#### RELEVANT EXPERIENCE

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- 2024 – **Assistant Research Professor**, Florida International University, Miami, US
- 2021 – 2024 **Postdoctoral Associate**, Florida International University, Miami, US

2017 – 2021 **Graduate Research Associate**, Academy Natural Sciences, Philadelphia, US  
2015 – 2016 **Freelance Science Editor**, Cactus Communications, UK  
2013 – 2014 **Research Assistant**, Marine Geology Lab, University of Kiel, GER  
2011 – 2012 **Research Assistant**, Paleoclimatology Lab, University of Tübingen, GER  
2009 – 2010 **Volunteer [Peace Corps Analog]**, German Development Service, Philippines

#### SERVICE

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2024 Session co-chair of ‘Seagrass session’ at International Blue Carbon Scientific Working Group Meeting 2024 in Cape Town, South Africa  
2024 FIU Coastlines & Oceans Division Awards Committee  
2022-2024 FIU Postdoctoral Advisory Board  
2021 Travel Award Committee - Joint Aquatic Sciences Meeting (CERF)  
2020-2021 Intersectional Nondiscrimination and Inclusion committee  
2018-2019 VP, Biology Graduate Student Association  
2017- Reviewer for Nature Communications Earth and Environment; Science of the Total Environment; Limnology & Oceanography; Coastal, Estuarine, Shelf Science; Remote Sensing; Marine Biodiversity; Marine Environmental Research; Wetlands; Geocarto International; Anthropocene Coasts; Remote Sensing Applications: Society and Environment; Hydrological Processes; Landscape Ecology; Bulletin of Marine Science

#### PROFESSIONAL AFFILIATIONS

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2018 – present Association for the Sciences of Limnology and Oceanography (ASLO)  
2017 – present Coastal and Estuarine Research Federation (CERF)  
2017 – 2019 American Geophysical Union (AGU)  
2017 – 2020 Society of Wetland Scientists (SWS)