

CURRICULUM VITAE

John A. Breier Jr., P.E.

Associate Professor (with tenure)

The University of Texas Rio Grande Valley
School of Earth, Environmental, and Marine Sciences
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EDUCATION

2006 Ph.D. The University of Texas at Austin, Department of Marine Science
1996 DOE Bettis Atomic Power Laboratory, Reactor Engineering School
1995 B.S. cum laude, Texas A&M University, Mechanical Engineering

PROFESSIONAL APPOINTMENTS & EXPERIENCE

2015-present Associate Professor, The University of Texas Rio Grande Valley
2015-present Adjunct Scientist, Woods Hole Oceanographic Institution
2012-2015 Associate Scientist, Woods Hole Oceanographic Institution
2008-2012 Assistant Scientist, Woods Hole Oceanographic Institution
2006-2008 NSF RIDGE2000 Postdoctoral Fellow, Woods Hole Oceanographic Institution
2006 Postdoctoral Researcher, Stanford University
2001-2006 Research Assistant, The University of Texas at Austin, Marine Science Institute
1995-2000 Officer, United States Navy Reserve, Naval Reactors, Nuclear Power Engineer

LICENSURE

Professional Engineer: Texas (135114), Massachusetts (55713)

HONORS AND AWARDS

2011 WHOI Deep Ocean Exploration Institute Fellowship
2006 NSF RIDGE 2000 Postdoctoral Fellowship
2004 E.J. Lund Fellowship in Marine Science, The University of Texas at Austin
2002 Environmental Science Institute Summer Research Fellowship, The University of Texas

RESEARCH INTERESTS

I am an engineer and environmental chemist that focuses on the development of environmental sensors and robotics and their application to water science. I study water with a focus on the interaction between chemistry and microbial life and how this interplay influences environmental nutrient flows and ecosystem productivity. I am particularly interested in how these interactions vary over time and space because understanding these patterns critically tests our understanding of how natural aquatic systems function. For this reason, most of my academic career has been focused on advancing the state of the art in environmental observation and studying challenging environmental mixing processes using advanced observing techniques. I use a variety of techniques including remotely operated and autonomous vehicles, sensor networks, and custom instrumentation. I am also interested in the development and application of ocean instrumentation and vehicles for (i) the enhanced study of Earth system processes and analogous

processes on water worlds; (ii) dynamic mixing of groundwater, freshwater, seawater, and geofluids; and (iii) chemical and energy exchange between the lithosphere and the ocean.

PROFESSIONAL AFFILIATIONS

IEEE

American Geophysical Union

American Society of Limnology and Oceanography

The Geochemical Society

PROFESSIONAL ACTIVITIES

UTRGV, College of Sciences, Research Advisory Committee Member

UTRGV, School of Earth, Environmental, and Marine Sciences, Tenure & Promotion Committee

UTRGV, School of Earth, Environmental, and Marine Sciences, Ph.D. Planning Committee

UTRGV, School of Earth, Environmental, and Marine Sciences, Bylaws Committee

NSF GEO Opportunities for Leadership in Diversity Idea Lab Workshop invited participant

NOAA Office of Exploration and Research, From surface to seafloor: Exploration of the water column, Priority Planning Workshop, participant.

JOURNAL REVIEWS

Annales de Limnologie – International Journal of Limnology

Biogeochemistry

Environmental Science & Technology

Geobiology

Geochimica Cosmochimica Acta

Geochemistry, Geophysics, Geosystems

Geophysical Research Letters

IEEE Journal of Ocean Engineering

International Journal of Offshore and Polar Engineering

Journal of Environmental Management

Limnology & Oceanography

Marine Chemistry

Nature Geoscience

Sensors

Spectroscopy Letters

PROPOSAL REVIEWS

NOAA Ocean Exploration and Research

NSF Ocean Technology and Interdisciplinary Coordination

NSF Marine Geology

NSF Hydrological Sciences

NSF Chemical Oceanography

NSF Ocean Acidification

COURSES TAUGHT

2018-2020 Instructor, UTRGV MARS5370, *In Situ* Sensing
2019 Instructor, UTRGV MARS5370, Autonomous Vehicles
2017-2020 Instructor (Team Taught), UTRGV EEMS6320, Biogeochemistry
2001-2002 Teaching Assistant, UT MNS307, Introduction to Oceanography Laboratory

STUDENTS & POSTDOCS ADVISED

Undergraduate Students:

Brianna Alanis, UTRGV undergraduate student
Javier Garcia, UTRGV undergraduate student
Mallory Ringham, WHOI Summer Student Fellow
Kevin Mori, WHOI Summer Student Fellow
Olivia Osicki, WHOI Summer Student Fellow
Kevin Guay, WHOI Summer Student Fellow
Kaitlyn McCartney, WHOI Summer Student Fellow

Graduate Students:

Brianna Alanis, UTRGV masters student, graduated 2019
Kirsten Ayers, UTRGV masters student, graduated 2019

Postdoctoral Students:

Eric Chan, UTRGV postdoctoral investigator

Undergraduate Engineering Senior Design Class Students mentored:

Katie MacKenzie, Smith College
Salomé Stulberg, Smith College
Sarah Pedicini, Smith College
Courtney Murphy, Smith College
Mara Pagano, Smith College
Leena Peters, Smith College
Emma Dalton, Smith College
Modupe Adegoke, Smith College

PARTICIPATION IN SCIENTIFIC EXPEDITIONS

2019 E/V *Nautilus*, Gorda Ridge (telepresence 2 weeks)
2019 R/V *Atlantic Explorer*, Bermuda to Woods Hole (2 weeks)
2018 E/V *Nautilus*, Loihi Seamount (telepresence 3 weeks)
2018 R/V *Atlantic Explorer*, Sargasso Sea (multiple week long cruises)
2017 R/V *Neil Armstrong*, US North Atl. shelf break (5 days, *chief scientist*)
2015 M/Y *Alucia* Bikini Atoll, Pacific Ocean (7 days)
2014 E/V *Nautilus* Mississippi and Green Canyons, Gulf of Mexico (9 days)
2013 R/V *Falkor* Mid-Cayman Rise, Caribbean (4 weeks).
2012 R/V *Atlantis* Mid-Cayman Rise, Caribbean (3 weeks).
2010 R/V *Atlantis* North Atlantic Ocean (4 weeks).
2009 R/V *Thomas G. Thompson* Lau Basin/Pacific Ocean (4 weeks).

- 2007 R/V *Atlantis* East Pacific Rise (3 weeks).
 2004 R/V *Kilo Moana* Lau Basin/Pacific Ocean (6 weeks).
 2002 R/V *Longhorn* Gulf of Mexico shelf transect (3 days).

PUBLICATIONS

1. **Breier**, J.A., Jakuba, M.V., Saito, M.A., Dick, G.J., Grim, S.L., Chan, E.W., McIlvin, M.R., Moran, D.M., Alanis, B.A., Allen, A.E., Dupont, C.L., Johnson, R., 2020, Robotic oceanography: Revealing ocean scale biochemical structure with a deep-diving vertical profiling autonomous vehicle, *Science Robotics*, accepted.
2. Zhou, Z., Liua, Y., Pana, J., Cron, B.R., Toner, B.M., Anantharaman, K., **Breier**, J.A., Dick, G.J., Li, M., 2020, Gammaproteobacteria mediating utilization of methyl-, sulfur- and petroleum organic compounds in deep ocean hydrothermal plumes, *The ISME Journal*, doi:10.1038/s41396-020-00745-5
3. Cron, B.R., Sheik, C.S., Kafantaris, F.C.A., Druschel, G.K., Seewald, J.S., German, C.R., Dick, G.J., **Breier**, J.A. and Toner, B.M., 2019. Dynamic biogeochemistry of the particulate sulfur pool in a buoyant deep-sea hydrothermal plume. *ACS Earth and Space Chemistry*, 4(2), pp.168-182.
4. Chan, E.W., Shiller, A.M., Joung, D.J., Arrington, E.C., Valentine, D.L., Redmond, M.C., **Breier**, J.A., Socolofsky, S.A. and Kessler, J.D., 2019. Investigations of Aerobic Methane Oxidation in Two Marine Seep Environments: Part 1—Chemical Kinetics. *Journal of Geophysical Research: Oceans*, 124(12), pp.8852-8868.
5. Chan, E.W., Shiller, A.M., Joung, D.J., Arrington, E.C., Valentine, D.L., Redmond, M.C., **Breier**, J.A., Socolofsky, S.A. and Kessler, J.D., 2019. Investigations of Aerobic Methane Oxidation in Two Marine Seep Environments: Part 1—Chemical Kinetics. *Journal of Geophysical Research: Oceans*, 124(12), pp.8852-8868.
6. Leonte, M., Wang, B., Socolofsky, S.A., Mau, S., **Breier**, J.A. and Kessler, J.D., 2018. Using Carbon Isotope Fractionation to Constrain the Extent of Methane Dissolution Into the Water Column Surrounding a Natural Hydrocarbon Gas Seep in the Northern Gulf of Mexico. *Geochemistry, Geophysics, Geosystems*, 19(11), pp.4459-4475.
7. Valentine, D., Fisher, G., Pizarro, O., Kaiser, C., Yoerger, D., **Breier**, J., and J. Tarn, 2016, Autonomous marine robotic technology reveals an expansive benthic bacterial community relevant to regional nitrogen biogeochemistry, *Environmental Science & Technology*, 50 (20), pp 11057–11065, doi:10.1021/acs.est.6b03584.
8. Wang, B., Socolofsky, S.A., **Breier**, J.A., Seewald, J.S., 2016, Observations of bubbles in natural seep flares at MC 118 and GC 600 using in situ quantitative imaging. *Journal of Geophysical Research: Oceans*, 121(4), pp.2203-2230
9. Socolofsky, S.A., Lavery, A., Kessler, J., Wang, B., **Breier**, J.A., Leonte, M., Chan, E., Raineault, N.A., 2016, Fate and Transport of Gas Bubbles from Sleeping Dragon Seep in the Northern Gulf of Mexico. *Oceanography* 29(1), 26–27.
10. Breier, C. F., Pike, S. M., Sebesta, F., Tradd, K., **Breier**, J. A., Buesseler, K. O. 2016, New applications of KNiFC-PAN resin for broad scale monitoring of radiocesium following the Fukushima Dai-ichi nuclear disaster, *Journal of Radioanalytical and Nuclear Chemistry*, 307(3), 2193-2200.
11. Li, M., Baker, B.J., Anantharaman, K., Jain, S., **Breier**, J.A., G.J. Dick, 2015, Genomic and

- transcriptomic evidence for scavenging of diverse organic compounds by widespread deep-sea archaea, *Nature Communications* 6, Article number: 8933, doi:10.1038/ncomms9933.
12. Estapa, M.L., **Breier**, J.A. and German, C.R., 2015. Particle dynamics in the rising plume at Piccard Hydrothermal Field, Mid-Cayman Rise. *Geochemistry, Geophysics, Geosystems*, 16(8), pp.2762-2774.
 13. Govindarajan, A.F., J. Pineda, M. Purcell, J.A. **Breier**, 2015, Species- and stage-specific barnacle larval distributions obtained from AUV sampling and genetic analysis in Buzzards Bay, Massachusetts, USA, *Journal of Experimental Marine Biology and Ecology*, 472, 158-165, <http://dx.doi.org/10.1016/j.jembe.2015.07.012>.
 14. Anantharaman, K., J.A. **Breier**, G.J. Dick, 2015. Metagenomic resolution of microbial functions in deep-sea hydrothermal plumes across the Eastern Lau Spreading Center. *The ISME Journal*, doi:10.1038/ismej.2015.81.
 15. Reed, D.C., **Breier**, J.A., Jiang, J., Anantharaman, K., Klausmeier, C.A., Toner, B.M., Hancock, C., Speer, K., Thurnherr, A.M., Dick, G.J., Predicting the response of the deep-ocean microbiome to geochemical perturbations by hydrothermal vents, *The ISME journal*, 2015, doi:10.1038/ismej.2015.4
 16. Sheik, C.S., Anantharaman, K., **Breier**, J.A., Sylvan, J.B., Edwards, K.J., Dick, G.J., 2015, Spatially resolved sampling reveals dynamics of microbial community assembly in rising hydrothermal plumes across a back-arc basin, *The ISME Journal*, 9(6), pp.1434-1445
 17. Toner, B.M., German, C.R., Dick, G.J., **Breier**, J.A., 2015, Deciphering the complex chemistry of deep-ocean particles using complementary synchrotron x-ray microscope and microprobe instruments, *Accounts of Chemical Research*, 49(1), pp.128-137
 18. Scott, J. J., **Breier**, J. A., Luther III, G. W., Emerson, D. Microbial iron mats at the Mid-Atlantic Ridge and evidence that Zetaproteobacteria may be restricted to iron-oxidizing marine systems, *PLoS One*, 2015, 10.1371/journal.pone.0119284.
 19. Bennett, S. A., Dover, C. V., **Breier**, J. A., Coleman, M. Effect of depth and vent fluid composition on the carbon sources at two neighboring deep-sea hydrothermal vent fields (Mid-Cayman Rise), *Deep-Sea Research Part I*, 2015, 104, 122-133.
 20. **Breier**, J.A., Sheik, C.S., Gomez-Ibanez, D., Sayre-McCord, R.T., Sanger, R., Rauch, Colemam, C.M., Bennett, S.A., Cron, B.R., Li, M., German, C.R., Toner, B.M., Dick, G.J., A large volume particulate and water multi-sampler with in situ preservation for microbial and biogeochemical studies, *Deep Sea Research Part I: Oceanographic Research Papers*, published online 6 September 2014, doi:10.1016/j.dsr.2014.08.008.
 21. Jiang, H., **Breier**, J., Physical controls on mixing and transport within rising submarine hydrothermal plumes: A numerical simulation study, *Deep Sea Research Part I: Oceanographic Research Papers*, published online 27 June 2014, doi:10.1016/j.dsr.2014.06.006.
 22. Anantharaman, K. Duhaime, M.B., **Breier**, J.A., Wendt, K., Toner, B.M., Dick, G.J., 2014. Sulfur oxidation genes in diverse deep-sea viruses, *Science*, published online 1 May 2014 doi:10.1126/science.1252229.
 23. Li, M., Toner, B., Baker, B., **Breier**, J., Sheik, C., Dick, G., 2014. Microbial iron uptake as a mechanism for dispersing iron from deep-sea hydrothermal vents, *Nature Communications*, 5: 3192, doi:10.1038/ncomms4192.
 24. Anantharaman, K., **Breier**, J.A., Sheik, C.S., Dick, G.J., 2013. Evidence for hydrogen

oxidation and metabolic plasticity in widespread deep-sea sulfur-oxidizing bacteria. *Proceedings of the National Academy of Sciences* 110, 330-335, doi:10.1073/PNAS.1215340110.

25. Peterson, R.N., **Breier**, J.A., Harmon, L.R., Brusa, J., Hutchins, P.R., 2013. Development of a sparging chamber for field radon analysis. *Journal of Radioanalytical and Nuclear Chemistry* 298, 1347-1357, doi:10.1007/s10967-013-2589-5.
26. **Breier**, J.A., Gomez-Ibanez, D., Reddington, E., Huber, J.A., Emerson, D., 2012. A precision multi-sampler for deep-sea hydrothermal microbial mat studies. *Deep Sea Research Part I: Oceanographic Research Papers* 70, 83-90, doi:/10.1016/J.DSR.2012.10.006.
27. **Breier**, J.A., B.M. Toner, S.C. Fakra, M.A. Marcus, S.N. White, A.M. Thurnherr, and C.R. German, 2012, Sulfur, sulfides, oxides, and organic matter aggregated in submarine hydrothermal plumes at 9° 50' N East Pacific Rise, *Geochimica Cosmochimica Acta* 88, 216-236, doi:10.1016/J.GCA.2012.04.003.
28. Holden, J.F., J.A. **Breier**, K.L. Rogers, M.D. Schulte, and B.M. Toner, 2012, Biogeochemical processes at hydrothermal vents: Microbes and minerals, bioenergetics, and carbon fluxes. *Oceanography* 25(1), 196–208, doi:/10.5670/OCEANOGRAPHY.2012.18.
29. **Breier**, J.A., C.F. Breier, and H.N. Edmonds, 2010, Seasonal dynamics of dissolved Ra isotopes in the semi-arid bays of south Texas, *Marine Chemistry*, 122, 39-50, doi:/10.1016/J.MARCHEM.2010.08.008,
30. **Breier**, J.A., S.N. White, and C.R. German, 2010, Mineral–microbe interactions in deep-sea hydrothermal systems: a challenge for Raman spectroscopy, *Philosophical Transactions of the Royal Society A*, 368, 3067-3086, doi:10.1098/RSTA.2010.0024.
31. **Breier**, J.A., C.R. German, and S.N. White, 2009, Mineral phase analysis of deep-sea hydrothermal particulates by a Raman spectroscopy expert algorithm: Towards autonomous in situ exploration and experimentation, *Geochemistry, Geophysics, and Geosystems*, 10, Q05T05, doi:/10.1029/2008GC002314.
32. **Breier**, J.A., N. Nidzieko, S. Monismith, W. Moore, and A. Paytan, 2009, Tidally regulated chemical fluxes across the sediment–water interface in Elkhorn Slough, California: Evidence from a coupled geochemical and hydrodynamic approach, *Limnology & Oceanography*, 54(6), 1964-1980, doi:/10.4319/LO.2009.54.6.1964
33. **Breier**, J.A., C.R. Rauch, K. McCartney, B.M. Toner, S. Fakra, S.N. White, and C.R. German, 2009, A suspended-particle rosette multi-sampler for discrete biogeochemical sampling in low-particle-density waters, *Deep Sea Research I*, 56, 1579-1589, doi:/10.1016/J.DSR.2009.04.005.
34. **Breier**, J.A. and H.N. Edmonds, 2007, High ²²⁶Ra and ²²⁸Ra activities in Nueces Bay, Texas indicate large submarine saline discharges, *Marine Chemistry*, 103, 131-145, doi:/10.1016/J.MARCHEM.2006.06.015
35. **Breier**, J.A., C.F. Breier, and H.N. Edmonds, 2005, Detecting submarine groundwater discharge with synoptic surveys of sediment resistivity, radium, and salinity, *Geophysical Research Letters*, 32, L23612, doi:/10.1029/2005GL024639.

BOOK CHAPTERS

1. Saito, M. A., **Breier**, C., Jakuba, M., McIlvin, M., Moran, D. In *The Chemistry of Microbiomes*, Envisioning a chemical metaproteomics capability for biochemical research and diagnosis of global ocean microbiomes, National Academies Press, 2017; pp 29-36.

CONFERENCE PAPERS

1. Jakuba, M.V., **Breier**, J.A., Gómez-Ibáñez, D., Tradd, K., and M. A. Saito, 2018, *Clio: An Autonomous Vertical Sampling Vehicle for Global Ocean Biogeochemical Mapping*, *IEEE/OES Autonomous Underwater Vehicle Workshop (AUV)*, Porto, Portugal, 2018, doi: 10.1109/AUV.2018.8729797.
2. Yoerger, D. R., Curran, M., Fujii, J., German, C. R., Gomez-Ibanez, D., Govindarajan, A. F., Howland, J. C., Llopiz, J. K., Wiebe, P. H., Hobson, B. W., Katija, K., Risi, M., Robison, B. H., Wilkinson, C. J., Rock, S. M., **Breier**, J. A., 2018, *Mesobot: An Autonomous Underwater Vehicle for Tracking and Sampling Midwater Targets*; *IEEE/OES Autonomous Underwater Vehicle Workshop (AUV)*, Porto, Portugal, 2018, 10.1109/AUV.2018.8729822.
3. **Breier**, J. A., C. G. Rauch, and C. R. German, 2007, A suspended particle rosette sampler for investigating hydrothermal plumes, *OCEANS 2007 IEEE Press*, Vancouver, Canada.
4. **Breier** J. A., 2006, The impact of groundwater flows on estuaries, In *Aquifers of the Gulf Coast of Texas*, *Report 365*, Texas Water Development Board, Austin, Texas, pp. 165-172.

FUNDED RESEARCH (>\$5 million to date in competitive grant funding)

1. NSF Chemical Oceanography, (Santoro, Saito, **Breier**, Jakuba, 11/01/2019 - 10/31/2022, \$308,612 to Breier) Collaborative Research: Underexplored Connections between Nitrogen and Trace Metal Cycling in Oxygen Minimum Zones Mediated by Metalloenzyme Inventories.
2. NSF Chemical Oceanography, (German, **Breier**, Fitzsimmons, Toner, Xu, 4/4/2019 – 4/3/2021, \$299,820 to Breier) Collaborative Research: Hydrothermal Estuaries: What Sets the Hydrothermal Flux of Fe and Mn to the Oceans?
3. NASA, Planetary Science and Technology Through Analog Research program, (Lim, Huber, Nawotniak, German, Shock, Deans, Lees, Cohen, Raineault, Bell, Gold, **Breier**; 09/01/2017 – 08/31/2019, \$233,875 to Breier), Systematic Underwater Biogeochemical Science and Exploration Analog.
4. U.S Fish & Wildlife/ Texas Parks and Wildlife (**Breier** and Campbell; 10/01/2017 – 09/31/2018, \$238,536 not including cost share), Establishing a harmful algal bloom and plankton community composition observing time-series in the Lower Laguna Madre at Brazos Santiago Pass.
5. NSF Ocean Technology and Interdisciplinary Coordination, (Yoerger, **Breier**, Rock, Robison, OCE-1636510, 01/01/2017 – 12/31/2019, \$185,296 to Breier) Collaborative Research: Mesobot: a robot for investigating the ocean interior
6. NSF Chemical Oceanography, (Saito, **Breier**, Jakuba, Johnson, OCE-1658067, 04/01/2017 – 3/31/2020, \$310,114 to Breier) Collaborative research: High resolution nitrogen transformation processes at the Bermuda Atlantic Timeseries.
7. NOAA-EPP, (FAMU lead, UTRGV component 09/01/2016 – 08/31/21, \$2,374,137, UTRGV: Hicks, Cintra, **Breier**, Fierro Cabo, Temby), Center for Marine and Coastal Ecosystems Consortium.
8. DOD, HBCU/MI Instrumentation, (**Breier**, Hicks, and Kline, 09/01/2016 – 08/31/2021, \$452,029) A waveglider for studies of biofouling and ocean primary productivity.
9. The Texas OneGulf Consortium, (**Breier**, Hicks, 05/01/2016 – 10/31/2016, \$105,255) LLM-PEM: A Predictive Ecological Model for the Lower Laguna Madre.

10. The Gulf of Mexico Research Initiative, (Ledwell, Lavery, **Breier**, Seewald, Texas A&M University System-02-S120017/S130208/S1402, 9/1/2011 - 12/31/2015, \$1,612,595 total; \$199,306 to Breier) Tracer Release Experiment in the Gulf of Mexico.
11. NSF Ocean Technology and Interdisciplinary Coordination, (**Breier**, Jakuba & Saito, OCE-1333212, 08/12/2013 – 08/12/2016, \$1,308,601 total; \$1,084,195 to Breier) Collaborative Research: An autonomous vertical sampling vehicle for global ocean biogeochemical mapping.
12. The Gordon and Betty Moore Foundation, (Dick, **Breier**, Toner, Jiang, Schloss, Andersson, Klausmeier, 10/19/2010 – 03/01/2014, \$381,210 total to Breier), Unveiling the microbiology that underpins deep-sea biogeochemistry
13. The Gordon and Betty Moore Foundation, (**Breier**, 11/01/2010 – 08/31/2013, \$253,781), Developing a particulate sampling and in situ preservation system for high spatial and temporal resolution studies of microbial and biogeochemical processes.
14. NSF Ocean Technology and Interdisciplinary Coordination, (Petersen, **Breier**, Singh, OCE-1028990, 09/01/2010 – 08/31/2014 with 1 year no cost extension, \$878,007 total; \$696,402 to Breier, 1 year no cost extension) Collaborative Research: Development of a submersible, autonomous Rn-222 survey system.
15. NSF RIDGE2000, (**Breier**, Jiang, Toner, Dick, OCE-1038055, 09/15/2010 – 09/16/2013, \$771,644 total; \$328,197 to Breier), Collaborative Research: Integrating geochemistry, microbiology, and hydrodynamics: A model for trace element transport and fate in hydrothermal plumes.
16. NSF Ocean Technology and Interdisciplinary Coordination, (**Breier & Emerson**, OCE-0926805, 10/01/2009 – 09/30/2012, with 1 year no cost extension, \$292,354 to Breier)) Collaborative Research: High resolution Microbial Mat Sampler for operation with deep submergence vehicles.

CONFERENCE ABSTRACTS

1. Chan, E.W., **Breier**, J. A., German, C., Huber, J.A., Kobs-Nawotniak, S., Shock, E., Raineault, N., Hauer, M., Krasnosky, K., Sylva, S., Hu, S.K., Smith, A.R., Milesi, V.P., and Lim, D.S.S., Going the last kilometer: Overcoming challenges to discovering life-supporting gradients on Ocean Worlds, presented at 2020 *AGU Ocean Sciences*.
2. Medley, C., **Breier**, J. A., Jakuba, M., Chan, E.W., Johnson, R.J., Montgomery, Q.W., Lopez, P., and Saito, M., Comparison of HPLC derived phytoplankton pigments from autonomously collected samples and CTD methods to evaluate the integration of autonomous vehicles as platforms for enhancing ocean time-series programs, presented at 2020 *AGU Ocean Sciences*.
3. Jakuba, M., **Breier**, J. A., Saito, M., and Johnson, R.J., *Clio*: Toward routine operations for a fast vertical profiling vehicle designed for global ocean biogeochemical mapping, presented at 2020 *AGU Ocean Sciences*.
4. Yoerger, D., Curran, M., Fuji, J., Gomez-Ibanez, D., Govindarajan, A., Howland, J., Llopiz, J., Wiebe, P., Hobson, B., Katija, K., Risi, M., Robinson, B., Rock, S., **Breier**, J.A., and Wilkinson, C.J. At-sea testing of the Mesobot midwater robot, presented at 2020 *AGU Ocean Sciences*.
5. Saito, M., McIlvin, M., Chan, E., Moran, D., Searle, B., Cohen, N., Kellog, M.M., Chmiel, R., Lopez, P., Pacheco, F., Anderson, Z., Johnson, R.J., Jakuba, M., and **Breier**, J.A.,

Gradients in functional capabilities in the Sargasso Sea as determined by metaproteomes collected by the biogeochemical AUV Clio, presented at 2020 *AGU Ocean Sciences*.

6. **Breier**, J.A., Jakuba, M., Saito, M., Chan, E., Mcilvin, M., Moran, D., Alanis, B., and Johnson, R., Revealing ocean biochemical structure with high-resolution sampling from an autonomous underwater profiling vehicle: *Clio*, presented at 2019 *ASLO Aquatic Sciences Meeting*
7. Chan, E. and **Breier**, J. A., Toward synoptic and coordinated autonomous aerial and surface drone observations of estuarine biogeochemistry, presented at 2019 *ASLO Aquatic Sciences Meeting*
8. Smith, A.R., Alanis, B., **Breier**, J.A., Chan, E., German, C., Nawotniak, S.K., Lo'ihī Seamount: a window to ocean worlds, presented at 2019 *Astrobiology Science Conference Meeting*
9. Saito, M., McIlvin, M., Moran, D., Chan, E., Alanis, B., Lopez, P., Hawco, N., Lomas, M., Bates, N., Sedwick, P., Johnson, R., Jakuba, M., **Breier**, J.A., Metaproteomic characterization of seasonal dynamics at the bermuda atlantic time series using the biogeochemical AUV Clio, presented at 2019 *ASLO Aquatic Sciences Meeting*
10. **Breier**, J. (*invited*), Overcoming Barriers in Time and Space: Reimagining the Possible with Robotic Oceanography, 2018 *Gordon Research Conference Marine Microbes*.
11. **Breier**, J. A., Jakuba, M., Saito, M.A., Dick, G., Gomez-Ibanez, D., Tradd, K., Grim, S.L., Chmiel, R., McIlvin, M.R., Noble, A.E., Alanis, B., Kellogg, M.M., Garcia, J., *Clio* a vertical sampling AUV for next-generation ocean sectional studies, 2018 *AGU Ocean Sciences*.
12. German, C. R., Lim, D. S. S., **Breier**, J. A., Huber, J. A., Nawotniak, S. K., Shock, E., Raineault, N., Time series study of hydrothermal venting at Lō'ihī seamount following the 2018 Kilauea eruption, presented at 2018 *AGU Fall Meeting*.
13. Yoerger, D., **Breier**, J. A., Curran, M., Fujii, J., German, C., Gomez-Ibanez, D., Govindarajan, A., Hobson, B., Howland, J., Katija, K., Llopiz, J., Pontbriand, C., Risi, M., Robinson, B., Rock, S., Wiebe, P., Mesobot: An Autonomous Underwater Vehicle For Tracking And Sampling Midwater Targets, 2018 *AGU Ocean Sciences*.
14. Govindarajan, A. F., Copley, N., **Breier**, J., Wares, J. P., Bucklin, A., Metagenetic zooplankton analyses to explore water column biodiversity, Abstract 29701, presented at 2017 *ASLO Aquatic Sciences Meeting*
15. **Breier**, J. A., Peterson, R., Bailey, J., Gomez-Ibanez, D., A submersible dissolved radon detection system for submarine groundwater discharge studies, Abstract 29827, presented at 2017 *ASLO Aquatic Sciences Meeting*
16. Yoerger, D. R., **Breier**, J. A., German, C. R., Govindarajan, A. F., Katija, K., Llopiz, J. K., Robison, B. H., Rock, S. M., Wiebe, P. H., Mesobot: a new autonomous robot for midwater research and exploration, Abstract 29991, presented at 2017 *ASLO Aquatic Sciences Meeting*
17. **Breier**, J.A., Seewald, J.S., Sylva, S.P., Wang, B., Socolofsky, S.A., 2016, Dissolved gas distribution within Gulf of Mexico natural deep-sea methane plumes, presented at the 2016 *Gulf Oil Spill Conference*
18. **Breier**, J.A., Estapa, M.L., German, C.R., 2016, Iron partitioning between the dissolved and particulate phase within a rising hydrothermal plume: Beebe Vents, Piccard Hydrothermal Field, Mid-Cayman Rise, Abstract CT23A-08, presented at 2016 *AGU Ocean Sciences Meeting*
19. Wang, B., Jun, I., Hutschenreuter, K., Socolofsky, S., Kessler, J., Lavery, A., **Breier**, J.,

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1. **Breier**, J.A., H.N. Edmonds, and T.A. Villareal, 2004, Submarine groundwater discharge and associated nutrient fluxes to the Corpus Christi Bay system, *Report 2002483416*, 54 pp., Texas Water Development Board, Austin, TX.

GENERAL INTEREST PUBLICATIONS (non-peer reviewed)

1. Evans, S., Birch, J., **Breier**, J., Jakuba, M., Saito, M., J. Robidart, 2019, Ocean robots uncover microbial secrets, *Microbiology Today*, February issue.

INVITED SEMINARS

1. Gordon Research Conference, Italy, July, 2018
2. Texas A&M University, College Station, September, 2016.
3. The University of Texas at Austin, Marine Science Institute, November, 2015.
4. The University of Texas Pan American, Biological Sciences, October, 2014.
5. Nautilus Science Communication Workshop, University of Rhode Island, 2014, Gulf Integrated Spill Research: SEEP 2014 Expedition.
6. Deep Ocean Exploration Institute, Woods Hole Oceanographic Institution, Board of Trustees Meeting 2012, Exploring the Limits of Life: Chemosynthesis in the Deep Sea.
7. Woods Hole Oceanographic Institution, Applied Ocean Physics & Engineering, April, 2008. Forward Deployed Suspended Particle Sampling and In Situ Analysis.
8. The University of New Hampshire, Earth Sciences Department, March 30, 2007. Quantifying porewater and surface water exchange with Ra isotopes: a complete hydrology of a shallow estuary.
9. Aquifers of the Gulf Coast of Texas Conference, Texas Water Development Board, 2006. The impact of groundwater flows on estuaries.
10. The University of Texas at Austin, Environmental Science Institute, October 25, 2002. The Dynamics of groundwater inflow and coastal nutrient supply: A study of Nueces Bay, Texas

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