

## Research Interests

Figuring out how microbial life survives in “extreme” environments in the deep sea and other aquatic environments and determining the roles that those microbes play in global chemical cycles. I primarily do this through deployment of observatory experiments in the environment to track the activity of microbes coupled with DNA sequencing to figure who the microbes are and how they do what they do.

## Keywords

deep biosphere, geomicrobiology, microbial biogeochemistry, oceanic crust, marine sediment, cold seeps, methane, microbe-mineral, observatories, CORKs, FLOCS, MIMOSA

## Education

**Ph.D., Marine Sciences;** University of Georgia, May 2007; Dissertation advisor: Dr. Samantha Joye; *Dissertation title:* “Anaerobic oxidation of methane in cold seeps and gas hydrates: Responsible microorganisms, rates of activity, and interactions with other processes.”

**B.S.; Interdisciplinary Studies (Marine Geochemistry emphasis with Geology minor), Summa Cum Laude,** University of Georgia, May 2002

## Professional Experience

**Senior Research Scientist:** Bigelow Laboratory for Ocean Sciences, Maine, USA (since April 2012)

**Research Scientist:** Colby College, Maine, USA, (since May 2012)

**Adjunct Assistant Professor:** Marine Biology and Biological Oceanography, Dept. of Biological Sciences, University of Southern California (since Dec. 2009)

**Postdoctoral Research Associate:** Center for Geomicrobiology, Aarhus University, Aarhus, Denmark; lab of Prof. Dr. Bo Barker Jørgensen (Sept. 2009-March 2012)

**Postdoctoral Research Associate:** Department of Biological Sciences, University of Southern California, Los Angeles, California; lab of Dr. Katrina Edwards (April 2007-Sept. 2009)

**Graduate Research Assistant:** Department of Marine Sciences, University of Georgia, Athens, Georgia; lab of Dr. Samantha Joye (May 2002-April 2007)

**Guest Scientist:** Habitat Group, Max Planck Institute for Marine Microbiology, Bremen, Germany; lab of Prof. Dr. Antje Boetius (recurring visits from Sept. 2002-May 2006)

**Guest Scientist:** Organic Geochemistry Group, Research Center Ocean Margins, Bremen, Germany; lab of Prof. Dr. Kai-Uwe Hinrichs (recurring visits from May 2004-May 2006)

**Teaching Assistant:** Biology of the Marine Environment, University of Georgia, Athens, Georgia (Spring, 2005)

**Research Experience for Undergraduates:** Department of Marine Sciences, University of Georgia, Athens, Georgia (June 2000-May 2002)



## ACTIVE AWARDS

- NSF-OCE-0939564 (subaward); 10/1/2015 – 9/30/2021; \$928,205 total; **Center for Dark Energy Biosphere Investigations (C-DEBI) Phase 2 renewal**
- NSF-OCE-1737017; 1/1/2018 – 12/31/2020; \$455,041 total; **Microbial activity in the deep crustal biosphere**
- Sloan Foundation-G-2017-14084 (subaward); 1/1/2018 – 12/31/2019; \$20,000 total; **Deep Life Community - the Deep Carbon Observatory 2018-2019 (Sloan Foundation)**
- NSF-OCE-1450528 (subaward); 9/1/2015 – 2/28/2019; \$212,756 total; **Participation of Dr. Beth Orcutt as co-chief scientist on IODP Expedition 357**
- NSF-OCE-1450528 (subaward); 4/1/2016 – 2/28/2019; \$35,763 total; **Participation of Dr. Stephanie Carr on IODP Expedition 365**
- GOMRI-SA1517 (subaward); 1/1/2015 – 12/31/2018; \$406,628 total; **ECOGIG: Ecosystem Impacts of Oil and Gas Inputs to the Gulf of Mexico**
- CDEBI-OCE-0939564 (subaward); 12/1/2016 – 11/20/2018; \$230,000 total; *Postdoctoral Fellowship for Jacqueline Goordial: Investigations into the Diversity and Function of Active Microbial Subpopulations in Atlantis Massif oceanic crust*
- Sloan-G-2017-9881; 9/1/2017 – 7/31/2019; \$86,128 total; **Creation and editing of *Whole Earth Carbon* book for the Deep Carbon Observatory**
- NSF-OCE-1536539; 10/1/2015 – 9/30/2018; \$56,325 total; **Collaborative Research: Completing North Pond Borehole Experiments to Elucidate the Hydrology of Young, Slow-Spread Crust**

## PAST AWARDS

- NASA-NNA13AA92A (subaward); 6/1/2016 – 12/31/2017; \$155,915 total; **Life Underground NASA Astrobiology Institute**
- Sloan Foundation-G-2015-14084 (subaward); 1/1/2016 – 12/31/2017; \$34,720 total; **Deep Life Community - the Deep Carbon Observatory 2016-2018 (Sloan Foundation)**
- NSF- PLR-1416961; 9/1/2014 – 8/30/2017; \$154,760 total; **Collaborative Research: Year-round autonomous sampling of methane in Arctic Lakes**
- NSF-OCE-1233226; 8/15/2012 – 7/31/2015; \$182,306 total; **IODP Expedition 336 Objective Research: The deep biosphere of young and oxic oceanic crust**
- CDEBI-52989260 (subaward); 12/01/2012 – 12/31/2014; \$49,995 total; **The Dorado Outcrop low-temperature ridge flank environment**
- NSF-OCE-0652315 (subaward); 11/01/2012 – 10/13/2013; \$8,828 total; **The Adopt A Microbe Project subaward from the Consortium for Ocean Leadership**
- CDEBI-157591 (subaward); 4/01/2012 – 9/30/2013; \$49,919 total; **Primary productivity in young, oxic oceanic crust: Rates of activity and autotrophic groups in subsurface and seafloor-exposed basalts from North Pond, Mid-Atlantic Ridge**

## Datasets

- **BCO-DMO:** <https://www.bco-dmo.org/person/565799>
- **Arctic Data Center:** <https://arcticdata.io/catalog/#view/urn:uuid:9629aaed-874a-45e2-b07e-30356795b1c4>
- **GRIIDC/Gulf of Mexico Research Initiative:** *search for “MIMOSA” at* <https://data.gulfresearchinitiative.org/data-discovery>



## Honors, Professional Service, Education and Outreach

- Honors:
  - 2018 Kavli Frontiers of Science Fellow
  - 2017 Charlie & Marie Fish distinguished lecturer, University of Rhode Island
  - 2014 Distinguished Lecturer for the U.S. Science Support Program for the Ocean Drilling Program
- Committee/Program/Society/Scientific Service:
  - Center for Dark Energy Biosphere Investigations (C-DEBI), Senior Scientist (since 2015)
  - Deep Carbon Observatory "Task Force 2020" (May 2016–present)
  - U.S. Advisory Committee for Scientific Ocean Drilling (USAC; Sept. 2012–Sept. 2015)
  - Session co-organizer for AGU Fall conferences (2016, 2014, 2012, 2011, 2008, 2007)
  - Workshop co-organizer: 2018 Ocean Worlds 3 meeting, 2014 IODP-MI workshop on deep biosphere research
- Reviewer/Editor:
  - Lead editor for in-progress edited volume on “Whole Earth Carbon: Past to Present” with Cambridge University Press on behalf of the Deep Carbon Observatory.
  - Lead editor for 2017 special issue in *Frontiers in Microbiology* on “[Recent Advances in Geomicrobiology of Ocean Crust](#)”
  - Recent *ad hoc* reviews for journals: *Nature Geoscience*, *PNAS*, *Science*, *The ISME Journal*, *Deep Sea Research*, *Environmental Microbiology*, *Frontiers in Extreme Microbiology*, *Geobiology*, *Geophysical Instruments*, *Limnology & Oceanography*, *Organic Geochemistry*
- Education & outreach with the Integrated Ocean Drilling Program, Ocean Leadership and C-DEBI:
  - Professional Development webinar on preparing proposals and budgets, jointly sponsored by C-DEBI and the Consortium for Ocean Leadership, June 15, 2017:  
<http://www.darkenergybiosphere.org/outputs-resources/professional-development-webinar-series/>
  - Lead developer of “Adopt A Microbe” education and outreach project,
    - Used during three different expeditions: <http://aam.darkenergybiosphere.org>
    - Funding from Consortium for Ocean Leadership to develop middle-school curriculum
    - 2017 collaboration with the Girl Scouts of Maine
  - Participant in numerous ship-to-shore videoconferences

## Mentoring

- **Postdoctoral Scientists:**
  - Stephanie Carr, Sep 2013 – Aug 2017. *C-DEBI Postdoctoral Fellow 2013-2015, NSF Postdoctoral Fellow 2015-2017. Now an Assistant Professor at Hartwick College.*
  - Jacqueline Goordial, Dec 2016 - present. *C-DEBI Postdoctoral Fellow 2016-2017.*
  - Rose Jones, Aug 2016 - present.
  - Jessica Labonté, Feb 2015 - July 2016. *Now an Assistant Professor at Texas A&M University, Galveston.*
- **Ph.D. students:**
  - Gustavo Ramirez, University of Southern California, Oct 2014–Oct 2016. Co-advisor and committee member. *Now a C-DEBI Postdoctoral Fellow at University of Rhode Island.*
- **Masters students:**
  - Mitchell Bergstresser, Simon Fraser University, Sept 2015 - present. Co-advisor and committee member.
  - Siham De Goeyse, IGP France, April 2017-August 2017. Hosted internship.
  - Aurelien Lecouevre, Universite Occidental Britania, France, Jan 2015-June 2015. Hosted internship.
- **Undergraduate students:**
  - Briana Adams, Texas A&M University, Corpus Christi, 2014 Summer NSF-REU intern.
  - Elenia Lin, Colby College, 2016 Colby-At-Bigelow fall semester intern
  - Jin Mei MacMahon, Colorado College, 2016 Summer NSF-REU intern
  - Allison Sharrar, University of Michigan, 2014 Summer NSF-REU intern
  - Francisco Spaulding-Astudillo, University of Chicago, 2015 Summer NSF-REU intern
  - Matthew Weiser, Occidental College, 2017 Summer NSF-REU intern



## Field Experience – total 35 cruises / 566 days at sea

- Mid-Atlantic Ridge, R/V *Atlantis* cruise AT39-01 with ROV *Jason II*, 10/2/17-11/1/17; **co-chief scientist**
- Northern Gulf of Mexico, R/V *Point Sur* cruise PS17-05, 9/11/16-9/16/16
- Mackenzie River delta Arctic lakes, Northwest Territories, Canada, 08/10/16-08/16/16
- Mackenzie River delta Arctic lakes, Northwest Territories, Canada, 03/17/16-03/23/16
- Northern Gulf of Mexico, R/V *Pelican* cruise PE16-18, 3/1/16-3/2/16
- Atlantis Massif, RRS *James Cook* IODP Expedition 357, 10/26/15-12/11/15; **co-chief scientist**
- Mackenzie River delta Arctic lakes, Northwest Territories, Canada, 07/29/15–8/10/15
- Northern Gulf of Mexico, R/V *Pelican* cruise PE15-20, 3/25/15–3/30/15; **chief scientist**
- Dorado Outcrop, R/V *Atlantis* cruise AT26-24 with HOV *Alvin*, 11/30/14–12/12/14
- Juan de Fuca Ridge flank, R/V *Atlantis* cruise AT26-18 with HOV *Alvin*, 08/10/14–08/24/14
- Northern Gulf of Mexico, R/V *Pelican* cruise PE14-14, 3/6/14–3/13/14; **chief scientist**
- Dorado Outcrop, R/V *Atlantis* cruise AT26-09 with ROV *Jason II* and AUV *Sentry*, 12/7/13–12/23/13
- Northern Gulf of Mexico, R/V *Pelican* cruise PE 14-09, 10/10/13–10/14/13; **chief scientist**
- Juan de Fuca Ridge flank, R/V *Atlantis* cruise AT26-03 with ROV *Jason II*, 07/13/2013–07/26/2013
- Northern Gulf of Mexico, E/V *Nautilus* cruise NA027 with ROV *Hercules*, 06/17/2013–06/20/2013
- N. Gulf of Mexico, R/V *Pelican* cruise PE 13-21, 03/06/13–03/10/13
- N. Gulf of Mexico, R/V *Falkor* cruise Fk006-b, 11/05/12–11/19/12; **co-chief scientist**
- Mid-Atlantic Ridge, R/V *Maria S. Merian* (Germany) cruise MSM20-5 with ROV *Jason II*, 04/11/12–5/10/12
- Mid-Atlantic Ridge, D/V *JOIDES Resolution* IODP Expedition 336, 09/17/11–11/16/11
- Juan de Fuca Ridge flank, R/V *Atlantis* cruise AT18-07 with ROV *Jason-II* (Woods Hole Oceanographic Institution), 06/29/2011–07/14/2011
- Aarhus Bay, RV *Tyra* (Aarhus University), 11/11/2010; 05/05/11; 05/10/2011; 08/31/2011
- Juan de Fuca Ridge flank, D/V *JOIDES Resolution* IODP Expedition 327, 07/2010–09/2010
- Aarhus Bay, *Susannah A*, 05/05/2010–05/06/2010
- Loihi Seamount, R/V *Kilo Moana* (University of Hawaii) cruise KM09-23 with ROV *DSL/Jason* (Woods Hole Oceanographic Institution), 10/2009
- Juan de Fuca ridge and ridge flank, R/V *Atlantis* cruise AT15-51 with HOV *Alvin* (Woods Hole Oceanographic Institution), 08/2009–09/2009
- Loihi Seamount, R/V *Thompson* (University of Washington) cruise TN-225 with ROV *Jason* (Woods Hole Oceanographic Institution), 09/2008–10/2008
- Juan de Fuca ridge and ridge flank, R/V *Atlantis* cruises AT15-34/35 with HOV *Alvin* (Woods Hole Oceanographic Institution), 07/2008–08/2008
- Juan de Fuca ridge flank, R/V *Atlantis* cruise AT15-23 with HOV *Alvin* (Woods Hole Oceanographic Institution), 09/2007–10/2007
- Western Gulf of Mexico, R/V *Seward Johnson I* (Harbor Branch Oceanographic Institute), 11/2004–12/2004.
- San Pedro Basin, R/V *SeaWatch* (University of Southern California), 06/30/2004.
- Monterey Canyon cold seeps, R/V *Point Lobos* with ROV *Ventana* (Monterey Bay Aquarium Research Institute), 06/28/2004
- Northern and southern Gulf of Mexico cold seeps, R/V *SONNE* cruise SO-174 (Reedereigemeinschaft Forschungsschiffahrt GmbH, Germany), 10/2003–11/2003.
- North Sea cold seeps, R/V *Heincke* (Reedereigemeinschaft Forschungsschiffahrt GmbH, Germany), 10/2002
- Northern Gulf of Mexico cold seeps, R/V *Seward Johnson II* with *Johnson SeaLink* submersible (Harbor Branch Oceanographic Institute), 07/2002
- Northern Gulf of Mexico cold seeps, R/V *Seward Johnson I* with *Johnson SeaLink* submersible (Harbor Branch Oceanographic Institute), 07/2001
- Mono Lake, California, summers 1999, 2000



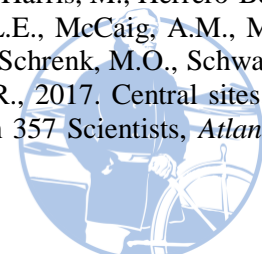
## Publications (h-index = 23)

Online citation index: <http://scholar.google.com/citations?user=vIfK3d4AAAAJ>

ORCID ID: <http://orcid.org/0000-0002-6233-3578>

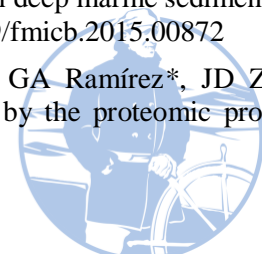
\* denotes student advisee; <sup>s</sup> denotes postdoctoral advisee

62. Reese BK, Zinke LA, Sobol MS, LaRowe DE, **Orcutt BN**, Zhang X, Jaekel U, Wang F, Dittmar T, Defforey D, Tully B, Paytan A, Sylvan J, Amend JP, Edwards KJ, Girguis P. 2017. Nitrogen cycling potential of active bacteria within oligotrophic sediment of the Mid-Atlantic Ridge flank. *Geomicrobiology Journal* DOI: 10.1080/01490451.2017.1392649
61. **Orcutt, BN**, Bergenthal M, Freudenthal T, Smith D, Lilley MD, Schnieders L, Green S, Früh-Green GL. 2017. Contamination tracer testing with seabed drills: IODP Expedition 357. *Scientific Drilling* 5: 1-8, doi: 10.5194/sd-5-1-2017
60. Wheat CW, Fisher AT, McManus J, Hulme SM, **BN Orcutt**. 2017. Cool seafloor hydrothermal springs reveal large global geochemical fluxes. *Earth and Planetary Science Letters* 476: 179-188. doi: 10.1016/j.epsl.2017.07.049.
59. Labonté<sup>s</sup> JM, Lever MA, Edwards KJ, **Orcutt BN**. 2017. Influence of igneous basement on deep sediment microbial diversity on the eastern Juan de Fuca Ridge flank. *Frontiers in Microbiology* 8: 1434. doi: 10.3389/fmicb.2017.01434
58. **Orcutt BN**, Sylvan JB, Santelli CM. 2017. Editorial: Recent Advances in Geomicrobiology of Ocean Crust. *Frontiers in Microbiology* 8: 1368. doi: 10.3389/fmicb.2017.01368
57. **Orcutt BN**, Lapham LL, Delaney J, Sarode N, Marshall K, Whaley-Martin K, Slater G, Wheat CG, Girguis P, 2017. Microbial response to oil enrichment in Gulf of Mexico sediment measured using a novel long-term benthic lander system. *Elementa Science of the Anthropocene*. 5:18. doi:10.1525/elementa.129
56. Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the Expedition 357 Scientists, 2017. Supplementary material, <http://dx.doi.org/10.14379/iodp.proc.357supp.2017>. Supplement to Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the Expedition 357 Scientists, *Atlantis Massif Serpentinization and Life*. Proceedings of the International Ocean Discovery Program, 357: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.357.2017>
55. Früh-Green, G.L., **Orcutt, B.N.**, Green, S.L., Cotterill, C., Morgan, S., Akizawa, N., Bayrakci, G., Behrmann, J.-H., Boschi, C., Brazelton, W.J., Cannat, M., Dunkel, K.G., Escartin, J., Harris, M., Herrero-Bervera, E., Hesse, K., John, B.E., Lang, S.Q., Lilley, M.D., Liu, H.-Q., Mayhew, L.E., McCaig, A.M., Menez, B., Morono, Y., Quéméneur, M., Rouméjon, S., Sandaruwan Ratnayake, A., Schrenk, M.O., Schwarzenbach, E.M., Twing, K.I., Weis, D., Whattam, S.A., Williams, M., and Zhao, R., 2017. Northern sites. In Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the Expedition 357 Scientists, *Atlantis Massif Serpentinization and Life*. Proceedings of the International Ocean Discovery Program, 357: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.357.106.2017>
54. Früh-Green, G.L., **Orcutt, B.N.**, Green, S.L., Cotterill, C., Morgan, S., Akizawa, N., Bayrakci, G., Behrmann, J.-H., Boschi, C., Brazelton, W.J., Cannat, M., Dunkel, K.G., Escartin, J., Harris, M., Herrero-Bervera, E., Hesse, K., John, B.E., Lang, S.Q., Lilley, M.D., Liu, H.-Q., Mayhew, L.E., McCaig, A.M., Menez, B., Morono, Y., Quéméneur, M., Rouméjon, S., Sandaruwan Ratnayake, A., Schrenk, M.O., Schwarzenbach, E.M., Twing, K.I., Weis, D., Whattam, S.A., Williams, M., and Zhao, R., 2017. Western sites. In Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the Expedition 357 Scientists, *Atlantis Massif Serpentinization and Life*. Proceedings of the International Ocean Discovery Program, 357: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.357.105.2017>
53. Früh-Green, G.L., **Orcutt, B.N.**, Green, S.L., Cotterill, C., Morgan, S., Akizawa, N., Bayrakci, G., Behrmann, J.-H., Boschi, C., Brazelton, W.J., Cannat, M., Dunkel, K.G., Escartin, J., Harris, M., Herrero-Bervera, E., Hesse, K., John, B.E., Lang, S.Q., Lilley, M.D., Liu, H.-Q., Mayhew, L.E., McCaig, A.M., Menez, B., Morono, Y., Quéméneur, M., Rouméjon, S., Sandaruwan Ratnayake, A., Schrenk, M.O., Schwarzenbach, E.M., Twing, K.I., Weis, D., Whattam, S.A., Williams, M., and Zhao, R., 2017. Central sites. In Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the Expedition 357 Scientists, *Atlantis Massif*

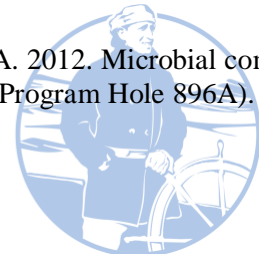


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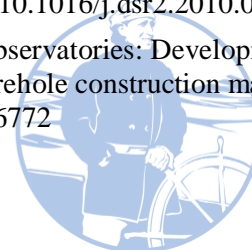
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49. Ramirez GA\*, CL Hoffman, MD Lee\*, RA Lesniewski, RA Barco, A Garber, BM Toner, CG Wheat, KJ Edwards, **BN Orcutt**, 2016. Marine microbial induced corrosion monitored at Santa Catalina Island, California. *Frontiers in Microbiology* 7: 1679. DOI: 10.3389/fmicb.2016.01679
48. Früh-Green, GL, **BN Orcutt**, S Green, C Cotterill, and the Expedition 357 Scientists, 2016. *Expedition 357 Preliminary Report: Atlantis Massif Serpentinization and Life*. International Ocean Discovery Program. <http://dx.doi.org/10.14379/iodp.pr.357.2016>
47. Zhang X, J Fang, W Bach, KJ Edwards, **BN Orcutt**, F Wang. 2016. Nitrogen stimulates the growth of subsurface basalt-associated microorganisms at the western flank of the Mid-Atlantic Ridge. *Frontiers in Microbiology* 7: 633. DOI: 10.3389/fmicb.2016.00633.
46. Baquiran JP<sup>S</sup>, GA Ramirez\*, AG Haddad, BM Toner, S Hulme, CG Wheat, KJ Edwards, **B Orcutt**. 2016. Temperature and redox effect on mineral colonization in Juan de Fuca Ridge flank subsurface crustal fluids. *Frontiers in Microbiology* 7:396. DOI: 10.3389/fmicb.2016.00396
45. Lee MD\*, NG Walworth, JB Sylvan, KJ Edwards, **BN Orcutt**. 2015. Microbial communities of seafloor basalts at Dorado Outcrop reflect level of alteration and highlight global lithic clades. *Frontiers in Microbiology* 6: 1470. DOI: 10.3389/fmicb.2015.01470.
44. **Orcutt BN**, JB Sylvan, D Rogers, J Delaney, RW Lee, PR Girguis. 2015. Carbon fixation by basalt-hosted microbial communities. *Frontiers in Microbiology* 6: 904. DOI: 10.3389/fmicb.2015.00904
43. Carr SA<sup>S</sup>, **BN Orcutt**, K Mandernack, J Spear. 2015. Abundant Atribacteria in deep marine sediment from the Adelie Basin, Antarctica. *Frontiers in Microbiology* 6: 872. DOI: 10.3389/fmicb.2015.00872
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- obligate iron-oxidizing chemolithoautotroph. *Applied Environmental Microbiology*. 81: 5927-5937. DOI: 10.1128/AEM.01374-15
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  40. **Orcutt BN**. 2015. Biological Oceanography: Life in the Deepest Depths. *Nature Geoscience* 8: 258-259. DOI: 10.1038/ngeo2378
  39. **Orcutt BN**, Cetinić I. 2015. Women in oceanography: Continuing challenges. *Oceanography* 27(4): 5-13. DOI: 10.5760/oceanog.2014.106
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