

SANDRA D. BROOKE

**Florida State University Coastal and Marine Laboratory
3618 Coastal Highway 98
St Teresa, FL 32358
Email: sbrooke@fsu.edu**

EDUCATION:

Ph.D. Oceanography, University of Southampton, National Oceanography Centre, UK, 2002
M.A. Marine Science, Virginia Institute of Marine Science, VA, 1996
M.Sc. Bio-aeronautics, Cranfield Institute of Technology, Bedford, UK, 1987
B.Sc. Biological Sciences (Honors), University of Essex, UK, 1987

PROFESSIONAL DEVELOPMENT:

2013-Present: Research Faculty, Florida State University Coastal and Marine Lab, FL
2011-2013 Adjunct Faculty, University of North Carolina at Wilmington, NC
2008-2013 Courtesy Research Associate, Oregon Institute of Marine Biology, OR
2008-2013 Director of Coral Conservation, Marine Conservation Institute, WA
2007-2008 Instructor of Marine Biology, University of Oregon, OR
2007-2008 Adjunct Faculty, Ocean Research and Conservation Association, FL
2006-2007 Associate Research Scientist, Florida Fish and Wildlife Institute, FL
2002-2006 Research Associate, Oregon Institute of Marine Biology, OR
1991-1993 Assistant Scientist. Standard Fruit Co. Honduras, Central America
1988-1991 Research Assoc. Natural Resources Dept., Grand Cayman
1986-1987 Research Assoc. Standard Fruit Co. Costa Rica, Central America

PUBLICATIONS:

Ross, SW, **S Brooke**, A Quattrini, M. Rhode, JC Watson (in revision) A deep-sea community, including *Lophelia pertusa* bioherms, at unusually shallow depths off northeastern Florida. Submitted to Marine Biology

Ross SW, **S Brooke**, AWJ Demopoulos, CA Kellogg, CL Morrison, MS Nizinski, M Rhode (in revision) Deep-sea coral and hardbottom ecosystems on the west Florida slope, eastern Gulf of Mexico. Submitted to Prog. in Oceanography

Larsson AI, J Järnegen, SM Strömberg, MP Dahl, T Lundälv, **S Brooke** (2014) Embryogenesis and larval biology of the cold-water coral *Lophelia pertusa*. Plos ONE 9(7): e102222

Mienis F, G Duineveld, AJ Davies, M Lavaleye, SW Ross, H Seim, J Bane, H van Haren, M Bergman, H de Haas, **S. Brooke**, T. van Weering (2014) Cold-water coral growth under extreme environmental conditions, the Cape Lookout area, NW Atlantic. Submitted to Biogeosciences 11:2543-2560

Obelcz J, D Brothers, J Chaytor, U Brink, SW. Ross, **S Brooke** (2013) High-resolution geophysical and ROV surveys of four major submarine canyons of the US mid-Atlantic margin. Deep Sea Res. II 104:106-119

Brooke S, SW Ross (2013) First observations of the cold-water coral *Lophelia pertusa* off the mid-Atlantic coast of the United States. Deep Sea Res. II 104: 245-251

Brooke S, SW Ross, JM Bane, HE Seim, CM Young (2013) Temperature tolerance of the deep-sea coral *Lophelia pertusa* from the southeastern United States. Deep Sea Research II. 92:240-248

Reed J, CM Messing, **S Brooke**, T Correa, M Brouwer, T Udouj (2013) Distribution and areal extent of deep-water coral reefs off Florida, Southeastern U.S. Jnl. Carib. Res. 47(1): 13-30

Brooke S, J Jarnegen (2013) Reproductive periodicity of the deep-water scleractinian coral, *Lophelia pertusa* from the Trondheim Fjord, Norway. Mar. Biol.160:139-153

- Norse EA, **S Brooke**, WWL Cheung, MR Clark, I Ekeland, R Froese, KM Gjerde, RL Haedrich, SS Heppell, T Morato, LE Morgan, D Pauly, R Sumaila, R Watson (2012) Sustainability of deep-sea fisheries. *Marine Policy* (36): 307-320
- Schroeder WW, **S Brooke** (2011) Habitat-forming deep-water scleractinian corals in the Gulf of Mexico. In: *Gulf of Mexico Origin, Waters, and Biota* (Eds. C Holmes and N Buster): Volume 3, Geology. pp 355-366. Texas A&M University Press, College Station, Texas
- Morrison CM, SW Ross, MS. Nizinski, **S Brooke**, J Jarnegren, R Waller, RL Johnson, TL King (2011) Genetic discontinuity between regional populations of *Lophelia pertusa* in the north Atlantic ocean. *Conserv. Genet.* 12:713-729
- Gulick S, **S Brooke**, J Ardron (2011) The Biology of the Sargasso Sea: A Preliminary Review. Sargasso Sea Alliance Science Report Series, No 4, 18 pp. ISBN 978-0-9847520-5-8
- Brooke S**, CM Young (2009) Direct measurements of *in situ* survival and growth of *Lophelia pertusa* in the northern Gulf of Mexico. *Marine Ecology Progress Series* 397:153-161
- Brooke S**, Holmes M, Young CM (2009) Effects of sediment on two morphotypes of *Lophelia pertusa* from the Gulf of Mexico. *Marine Ecology Progress Series* 390: 137–144
- Brooke S**, CM Young (2009) Where do embryos of *Riftia pachyptila* develop? Pressure tolerances, temperature tolerances and buoyancy during embryonic dispersal. *Deep Sea Research II* 56: 1599-1606
- Brooke S** (2009) *Lophelia* Oases. In *Encyclopedia of Islands* (Eds RG Gillespie and DA Clague) University of California Press p564-567
- Messing C, JK Reed, **S Brooke**, SW Ross (2008) Ch 27: Deep water coral reefs of the United States. In *Coral Reefs of the USA* (Eds. B Riegl and R Dodge) Volume 1: 763-788
- Brooke S**, CM Young, M Holmes (2007) Chapter 6: Biological Characterization and Studies, In: *Characterization of Northern Gulf of Mexico deepwater hard bottom communities with emphasis on Lophelia coral*. Final report to U.S.D.I., Minerals Management Service, Gulf of Mexico Region. OCS Study 2007-044: p119-147
- Brooke S**, WW Schroeder (2007) Chapter 7: State of deep coral ecosystems in the Gulf of Mexico region: Texas to the Florida Straits In: *The State of Deep Coral Ecosystems of the United States* (Eds. SE Lumsden, TF Hourigan, and AW Bruckner), NOAA Technical Memorandum NOS-CRCP-3, Silver Spring MD: p 271-306
- Brooke S**, R. Stone (2007) Reproduction of Hydrocorals (order stlyasterina) from the Aleutian Islands, Alaska. *Bulletin of Marine Science* 81(3): 519-532
- Staudigel H, SR Hart, A Pile, BE Bailey, ET Baker, **S Brooke**, DP Connelly, L Haucke, CR German, I Hudson, D Jones, AAP Koppers, J Kontera, R Lee, TW Pietsch, BM. Tebo, AS Templeton, R Zierenberg, CM Young (2006) Vailulu'u Seamount, Samoa: Life and death on an active submarine volcano. *Proceedings of the National Academy of Sciences* 103(17):6448-6453
- Tyler P, CM Young, E Dolan, SM Arellano, **S Brooke**, M Baker (2006) Gametogenic periodicity in the chemosynthetic cold-seep mussel *Bathymodiolus childressi*. *Marine Biology* 150 (5): 829-840
- Etnoyer PJ, SD Cairns, JA Sanchez, JK Reed, JV Lopez, WW Schroder, **S Brooke**, L Watling, A Baco-Taylor, GC Williams, A Lindner, SC France, AW Bruckner (2006) Deep-Sea Coral Collection Protocols. NOAA Technical Memorandum NMFS-OPR-28. 53 pp.
- Brooke S**, CC Koenig, AN Shepard (2006) *Oculina* banks restoration project: description and preliminary assessment. *Proceedings 57th Gulf and Carib. Fisheries Institute*: 607-620
- Koenig CC, AN Shepard, JK Reed, FC Coleman, **S Brooke**, J Brusher, KM Scanlon (2005) Habitat and fish populations in the deep-sea *Oculina* coral Ecosystem of the western Atlantic. *American Fisheries Society Symposium* 41: 795-805
- Schroeder WW, **S Brooke**, JB Olson, B Phaneuf, JJ McDonough III, P Etnoyer (2005) Occurrence of deep-water *Lophelia pertusa* and *Madrepora oculata* in the Gulf of Mexico. Pp 297-307, In: *Deep-water Corals and Ecosystems* (Eds. A Freiwald and JM Roberts), Springer-Verlag, Berlin Heidelberg
- Brooke S**, CM Young (2005) Embryogenesis and larval biology of the ahermatypic scleractinian *Oculina varicosa* *Marine Biology* 146(4): 665-675

- Olson JB, **S Brooke**, B Phaneuf, WW Schroeder (2004) An evaluation of the Innovator ROV as a tool for deep-water coral research. Proceedings of the Underwater Intervention 2004 Conference, CD-ROM Reference: Feb. 18, E-3 NOAA, E32
- Brooke S**, CM Young (2003) Reproductive ecology of a deep-water scleractinian coral, *Oculina varicosa* Continental Shelf Research 23: 847-858
- Kristensen RM, **S Brooke** (2002) Chapter 8: Phylum Loricifera In: Atlas of Marine Invertebrate Larvae (Eds. CM Young, M Sewell and M Rice) Academic Press, London. P 179-188
- Eckelbarger KJ, CM Young, E Ramirez, **S Brooke** and P Tyler (2001) Gametogenesis, spawning behavior, and early development in the "iceworm" *Hesiocaeca methanicola* (Polychaeta: Hesionidae) from methane hydrates in the Gulf of Mexico. Marine Biology 138:761-775

RESEARCH GRANTS:

- Habitat characterization and vulnerability assessment of coral and sponge reefs in the northeastern Gulf of Mexico. S. Brooke **NOAA Coral Reef Conservation Program \$62,650 (2014-2015)**
- Role of environmental cues in driving variability of reproductive periodicity in North Atlantic deep-water corals. S. Brooke, JM Roberts **Marine Alliance Science Technology Scotland \$20,500 (2012-2013)**
- Extreme corals 2011 – habitat characterization and video analysis. SW Ross, S Brooke. **NOAA DSCRTPeep Sea Coral Research and Technology Program \$95,000 (2011-2012)**
- Atlantic Deepwater Canyons Study. S Brooke, SW Ross. **BOEMRE \$3,000,000 (2010-2014)**. Insights into the sensitivity of cold-water communities to drilling mud: enhancing diagnosis and decision-making with emphasis on *Lophelia*. S. Brooke. **Norwegian Research Council \$15,000 (2010-2011)**
- Extreme corals 2010 – exploration of deep coral habitat in the SEUS. SW Ross, S Brooke. **NOAA Deep Sea Coral Research and Technology Program \$115,000 (2010-2011)**
- Lophelia* II: Reproductive biology. S. Brooke. **USGS Continuing Ecological Research on Deep-sea Corals \$28,000 (2010-11)**
- Benthic-pelagic coupling in deep coral ecosystems. T Frank, S Brooke, T Sutton, A Remsen. **NOAA CIOERT \$80,389 (2010)**
- South Atlantic information resources: data search and literature synthesis. S Brooke. **Research Planning Inc. \$11,000 (2009-11)**
- The Linkage Between Pelagic and Benthic Ecosystems. T Frank, S Brooke, T Sutton, A Remsen. **NOAA CIOERT \$84,369 (2009-2010)**
- Recovery potential of damaged deep-water *Oculina* habitat and fish populations: the effect of human intervention. C Koenig, S Brooke. **NURC \$40,000, 11 days ship/technical divers (2008)**
- Florida's deep-water oases: Exploration and characterization of deep reef ecosystems. C Messing, S Brooke. **NOAA OE \$262,000 (2007)**
- Mapping and characterization of deep sea coral ecosystems off the coast of Florida. S Brooke **NOAA OE \$101,571, 14 days ship/submersible (2004)**
- Reproduction and larval biology of deep-water hydrocorals from the Aleutian Islands. S Brooke **NMFS Alaska \$12,000 (2004)**
- Characterization of northern Gulf of Mexico deepwater hard-bottom communities with emphasis on *Lophelia* coral. CM Young, S Brooke. **MMS \$229,848 (2003-2006)**
- Reproduction and larval biology of deep-water hydrocorals from the Aleutian Islands. S Brooke **NMFS Alaska \$10,000 (2003)**
- The occurrence and ecology of deep-water corals and associated communities in the Gulf of Mexico. W Schroeder, S Brooke, J Olson. **NOAA OE, 7 days ship/ROV (2003)**
- Maintenance of critical fish spawning habitat: reproduction of the Ivory Tree Coral, *Oculina varicosa*. S Brooke. **MARFIN \$68,396 (1999-2001)**

TEACHING AND SUPERVISORY EXPERIENCE:

Courses developed

2008 University of Oregon upper level undergraduate Marine Biology, plus lab: 4 credits

Teaching assistantships

1997, 1999 Deep Sea Biology, Harbor Branch Oceanographic Institution. Graduate course.

2002 Marine Ecology, Harbor Branch Oceanographic Institution. Undergraduate course

2002 Marine Biodiversity, Harbor Branch Oceanographic Institution. Undergraduate course

Students

Present: Committee member and co-supervisor, M.Sc Marine Biology, UNCW

2010: Committee member and co-supervisor, Ph.D Marine Biology, University of Oregon.

2008: Committee member and co-supervisor, M.Sc Marine Biology, NOVA Southeastern

2006: Committee member and co-supervisor, M.Sc Marine Biology, University of Oregon

2005: Supervisor for an undergraduate student

2000, 2001: Co-chief scientist on NSF Bridge to Science minority educational cruises

Other

2006 Project manager and team supervisor for the Coral Research and Monitoring Program at the Fish and Wildlife Research Institute, Florida.

2007, 2008: I presented and facilitated during a NOAA workshop for local educators

EXPERIENCE WITH UNDERSEA TECHNOLOGIES:

Saturation diver in Aquarius Underwater Habitat (UNCW/NURC), Key Largo, Fl.

R/V Edwin Link and R/V Seward Johnson (HBOI) with *JSL* submersibles (~25 cruises: Bahamas, Gulf of Mexico, South Atlantic Bight). Ten cruises as Chief or Co-Chief Scientist

R/V Atlantis (WHOI) with DSV *Alvin* submersible (Five cruises: East Pacific Rise), three as Co-PI. Four *Alvin* dives, two as chief observer.

R/V Sea Diver and R/V Edwin Link (HBOI). Four educational cruises, two as co-Chief Scientist, using HBOI Rescue ROV, CTD/Niskin bottle array and MOCNESS.

R/V Sea Diver using the *Clelia* submersible as Chief Scientist.

R/V Chapman (NOAA), R/V Oregon (NOAA) and R/V Ferrell (NOAA), using *Phantom* ROV

R/V K.O.K. (HURL) using *Pisces* submersible. 4 submersible dives as chief observer.

NOAA Ship Ron Brown using the SONSUB *Innovator* ROV as Co-Chief Scientist

NOAA Ship Ron Brown using the *Jason* ROV (two cruise as co-Chief Scientist

R/V Arctic Sunrise using the *Deepworker* submersible as Co-Chief Scientist

NOAA Ship Nancy Foster multibeam mapping deep water canyons Co-Chief Scientist

NOAA Ship Nancy Foster using ROV Kraken II in deep water canyons. Co-Chief Scientist

CERTIFICATIONS AND PERTINENT SKILLS:

AAUS Scientific Diver (current) with >1000 dives (many >100ft)

BSAC qualified sports diver (1988). Nitrox certified (1995), VIMS dive team member (1994-1996), NOAA diver certified to 130ft (1995), Aquarius saturation diver (1995), HBOI dive team (1997-2002), FWC dive team (2006-2007), FSU scientific diver (2013-present)

Pediatric First Responder (2003-2005), EMT-B (1993-1995), Emergency Vehicle Operator (1994).

INVITED POSITIONS:

Coral Scientific and Statistical Committee, Gulf of Mexico Fishery Management Council (2013-present)

Conservation Seat for the Olympic Coast National Marine Sanctuary Advisory Council (Jan 2012 - 2013)

Coral Advisory Panel for the South Atlantic Fisheries Management Council (2005-present)

Organizing Committee for the 10th Deep Sea Biology Symposium (2003)

St Lucie Conservation Alliance Board Member (2000-2001)