

# *CURRICULUM VITAE*

## **Edith A. Widder**

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**PRESENT APPOINTMENT:** President and Senior Scientist  
Ocean Research & Conservation Association  
1420 Seaway Drive  
Fort Pierce, Florida 34949  
(772) 467 1600  
E-mail: ewidder@teamorca.org

**AREAS OF EXPERTISE:** Photophysiology and photoecology of marine organisms with emphasis on bioluminescence and vision. Instrumentation development and utilization of research submersibles for oceanic *in situ* light measurements. Development of bioluminescence measurements as a tool for mapping organism distribution patterns. Radiometric calibration. Development of instrumentation for environmental monitoring. Certified research pilot for single-person submersibles: *Wasp*, *Deep Rover*, and *Deep Worker*.

### **EDUCATION:**

- 1973 B.S. - *Magna cum laude* - Biology, Tufts University, Medford, Massachusetts
- 1977 M.S. - Biochemistry, University of California, Santa Barbara
- 1979 Experimental Neurobiology, Catalina Marine Science Center (Summer Program)
- 1982 Ph.D.- Neurobiology, University of California, Santa Barbara
- 1984 Certification: Scientific Research Pilot for Atmospheric Diving System Submersibles

### **ACADEMIC POSITIONS:**

President and senior scientist, **Ocean Research & Conservation Assoc.** (2005-present)  
Senior scientist and principal investigator, **Harbor Branch Oceanogr. Inst.** (1993-2005)  
Adjunct Senior Research Scientist, **Bigelow Laboratory for Ocean Sciences** (2005-present)  
Adjunct Research Professor, Earth and Planetary Sciences Dept, **Johns Hopkins Univ.** (2000-present)  
Distinguished Scientist Adjunct, **Monterey Bay Aquarium Research Institute** (1998-present)  
Professor of Biological Sciences, **Florida Institute of Technology** (1991-present)  
Affiliate Professor, Dept of Biological Science, **Florida Atlantic University** (2000-present)  
Acting Division Director, **Harbor Branch Oceanogr. Inst.** (1993-1994)  
Associate scientist and principal investigator, **Harbor Branch Oceanogr. Inst.** (1991-93)  
Assistant scientist and principal investigator, **Harbor Branch Oceanogr. Inst.** (1989-91)  
Scientific consultant for **Dynamics Technology, Inc.**, Los Angeles (1987-89)  
Assistant research biologist and co-principal investigator, **UC Santa Barbara**, Marine Science Inst. and Neuroscience Research Inst. (1985-89)

Postdoctoral research biologist, ONR bioluminescence program. **UC Santa Barbara** (1983-85)  
 Associate researcher, ONR bioluminescence program, **UC Santa Barbara** (1977-83)  
 Ph.D. dissertation research, **UC Santa Barbara** (1977-82)  
 Research associate NIH resource lab in electron probe microanalysis. **Harvard Medical School.**  
 (1973-75)  
 Laboratory assistant in phycology. Field Station of Environmental Sciences of the **University of Massachusetts.** (1968-69)

#### **AWARDS SUMMARY:**

1984-87 NORDA	"Mesoscale bioluminescence." Co-PI with J.F. Case. \$574,899.
1986-88 NSF	"Visual pigments in deep-sea crustacea." Co-PI with P. Hiller-Adams and J.F. Case. \$119,661.
1987 NORDA	"Bathypotometer characterization and intercalibration." Co-PI with J.F. Case. \$19,814.
1987-89 NORDA	"Mesoscale bioluminescence." Co-PI with J.F. Case. \$639,879.
1990-91 NSF/ONR	"Low light auto-radiometer for deep sea irradiance measurements." \$107,625.
1989-92 ONR	"Diversity of bioluminescence behaviors in coelenterates." \$250,068.
1990-92 NSF	Marine Lab Facilities. "A laboratory for the culture of oceanic and deep-sea organisms." Co-PI with C.M. Young \$47,979.
1990-91 LINK	"Stimulation and capture of deep-sea bioluminescence organisms" \$10,122.
1990-91 NOARL	"Bioluminescence potential in the West Alboran Gyre (Mediterranean Sea)." \$140,692.
1992-93 ONR	"Light as an organizational determinant in the marine environment" \$150,000.
1992 NOAA	"Investigation of Microscale Spatial Patterns of Plankton in the Gulf of Maine using a Newly Developed Bioluminescence Mapping Technique" \$113,348.
1993 ONR	"Micro-scale mapping of plankton distributions using bioluminescence" \$80,000
1992-93 NRL	"Design, Construction and Testing of a Low Cost Expendable Bathypotometer (XBP)" \$303,107.
1994-96 NSF	"UV light and vertical migrations in deep-sea crustaceans" \$214,372 + 54 days shiptime. Co-PI with T.M. Frank
1994-96 NOAA	"In situ measurements of light penetration in the ocean in relation to vertical migrations" \$11,000 + 13 days ship/sub time. Co-PI with T.M. Frank
1994-96 NSF	"3-D laser imaging and tracking electro-optical system" \$292,447 + 4 days shiptime Co-PI with D.C. Smith and F. Caimi.

1995-97 NOAA “Investigations of the impact of light penetration and water column stratification on the community structure in the Gulf of Maine/Georges Bank.” \$41,300 + 20 days ship/sub time. Co-PI with T.M. Frank

1997 ONR “HIDEX-BP Calibrations” \$24,987

1997 ONR “Feasibility study for a compact, multi-purpose bioluminescence detector.” \$54,000

1998-01 NSF “Proximate factors affecting vertical migrations in mesopelagic organisms.” \$329,230 + 80 days shiptime Co-PI with T.M. Frank

1999 NatlGeoSoc “The language of light: An investigation of the meaning of coelenterate bioluminescent displays.” \$24,750

1999 ONR “Radiometric and biological calibration of photodiode-based bioluminescence detector.” \$55,191

2000 MBARI “Impact of artificial white light on assessments of marine organism abundance and diversity.” \$4,175 plus 8 days ship/ROV time

2000-01 ONR “Investigation of processes and factors regulating the generation, maintenance and breakdown of bioluminescent thin layers.” \$232,158+ 10 days ship/submersible time.

2000 JHU “Frame design, construction and testing for connection between Holocamera and HBOI’s JSL.” \$5,000

2001-02 ONR “Design and construction of the next generation of HIDEX Bathyphotometer.” \$500,000

2001 – 02 MBARI “The nature and function of benthic bioluminescence” \$9,920 + 5 days machinist time, 8 days support engineering, 4 days tech marine ops and 4 days ship/ROV time.

2002 NOAA “Exploration of vision and bioluminescence in the deep-sea benthos.” \$30,000 + 14 days ship/submersible time. Co-PI with T.M. Frank

2002-03 NSF “A redesign and enhancement of the Low Light Auto-Radiometer (LoLAR) for deep-sea irradiance measurements.” \$201,717

2002-04 ONR “Bioluminescence truth data measurement.” \$1,818,000

2002-03 MBARI “Nature and function of benthic bioluminescence” \$8,096 + 8 days ship/ROV time

2003-04 ONR “Advanced underwater imaging” Co-PI with Jerry Neely \$1,651,573

2003-04 MBARI “Investigation of unobtrusive observational techniques” \$9,696 + 8 days ship/ROV time

2004-05 ONR “Bioluminescence truth data measurement: Phase 3” \$845,000

2004 NOAA “Operation Deep-Scope: Characterization of deep-sea biological communities using advanced optical techniques.” \$33,673 +12 days ship/submersible time.

2005-07 NSF “Development of ‘Eye-in-the-Sea’ (EITS), an unobtrusive camera system using far-red illumination for remote in-situ observation.” \$595,405

2004-05 MBARI “Investigation of unobtrusive observational techniques” \$10,256 + 8 days ship/ROV time

2005 NOAA “Operation Deep-Scope II” \$44,705 +14 days ship/submersible time.

2005-06 ONR “Bioluminescence truth data measurement Phase 4” \$422,500

2005-06 MBARI “Investigation of unobtrusive observational techniques” \$8576 + 7 days ship/ROV time  
 2006-07 ONR “Bioluminescence truth data measurement Phase 5” \$431,100  
 2007-2010 ONR “Monitoring bloom dynamics of a common coastal bioluminescent ctenophore.” \$288,817  
 2007-2008 FI Fish & Wildlife “Kilroy as Marine Conservation Change Agent” \$500,000

**PROFESSIONAL HONORS:**

Inducted into **Women Diver’s Hall of Fame** March 2005  
**Wings Worldquest Sea Award** March 2006  
 Named a **MacArthur Fellow** by the John D. and Catherine T. MacArthur Foundation September 2006  
**Aspen Environment Forum Fellow**, March 2008  
 Named **Environmentalist of the Year** by the Conservation Alliance of St. Lucie County Florida May 2009  
 Loggerhead Marine Life Center **2009 Blue Friend of the Year**

**PROFESSIONAL SOCIETIES:**

American Academy of Underwater Sciences  
 American Association for the Advancement of Science  
 American Society of Limnology and Oceanography  
 Explorers Club  
 International Society for Bioluminescence and Chemiluminescence, Councilor  
 Marine Technology Society Journal, Editorial Board Member  
 Rosalind Franklin Society, Founding Board Member  
 Society of Photo-Optical and Instrumentation Engineers  
 Wings WorldQuest Fellow

**RESEARCH CRUISES :**

Sep, 2009 National Geographic Expedition to Cocos Island, Costa Rica to dive Las Gemelas seamounts with DeepSee submersible  
 Jul, 2009 Co-Chief Scientist – *R/V Seward Johnson* Benthic Bioluminescence, Bahamas  
 Jan, 2009 Chief Scientist - *ROV Ventana- R/V Pt. Lobos* Installation of the Eye-in-the-Sea on MARS - world’s first deep-sea webcam.  
 Aug, 2007 JSL submersible –*R/V Seward Johnson I* Deep Scope III, Bahamas  
 Sep, 2006 Chief Scientist - *ROV Ventana- R/V Pt. Lobos* Unobtrusive observations of deep-sea fish behavior and acoustical recordings of ROV.  
 May, 2006 Chief Scientist - *ROV Ventana- R/V Pt. Lobos* Unobtrusive observations of deep-sea fish behavior and acoustical recordings of ROV.  
 Nov, 2005 Chief Scientist – *MV Thunderforce* – HIDEX 3 field studies  
 Sep, 2005 Chief Scientist - *ROV Ventana- R/V Pt. Lobos* Using red light for unobtrusive observations of deep-sea fish behavior.  
 Aug, 2005 JSL submersible –*R/V Seward Johnson I* Deep Scope II, Gulf of Mexico

May, 2005 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Using red light for unobtrusive observations of deep-sea fish behavior.

Sep, 2004 Chief Scientist – *R/V Seward Johnson II* HIDEX 3 field test, Gulf of Maine

Aug, 2004 Chief Scientist, JSL submersible – *R/V Seward Johnson II* Deep Scope, Gulf of Mexico

Jun, 2004 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Using red light for unobtrusive observations of deep-sea fish behavior.

Oct, 2003 Chief Scientist, JSL submersible – *R/V Seward Johnson II* Downwelling spectral irradiance.

Sep, 2003 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Nature and function of benthic bioluminescence, Monterey Canyon

Jul, 2003 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Nature and function of benthic bioluminescence, Monterey Canyon

Mar, 2003 *ROV Tiburon – R/V Western Flyer.* Midwater biology in the Sea of Cortez

Oct, 2002 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Nature and function of benthic bioluminescence, Monterey Canyon

Aug, 2002 Co-Chief Scientist, JSL submersible – *R/V Seward Johnson* Exploration of bioluminescence and vision in the deep sea benthos. South Atlantic Bight

Jul, 2002 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Nature and function of benthic bioluminescence, Monterey Canyon

Oct/Nov, 2001 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Impact of white light.

Oct, 2001 Co-Chief Scientist, JSL submersible – *R/V Seward Johnson II* Downwelling irradiance and vertical migration, Bahamas.

Jul, 2001 *R/V Endeavor* HYCODE 2001 HIDEX-BP measurements, LEO 15

Jun, 2001 Co-Chief Scientist, JSL submersible – *R/V Seward Johnson* Downwelling irradiance and vertical migration, Gulf of Maine.

Apr, 2001 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Impact of white light.

Oct, 2000 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Impact of white light.

Sep, 2000 Co-Chief Scientist, JSL submersible – *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Aug, 2000 Chief Scientist, *ROV Ventana- R/V Pt. Lobos* Impact of white light.

Jul, 2000 Chief Scientist, JSL submersible – *R/V Edwin Link* Bioluminescent thin layers and in situ holography, Gulf of Maine.

Jun, 2000 Co-Chief Scientist, JSL submersible – *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Oct-Nov, 1999 *RRS Discovery* - Visual Ecology, Trawling of NW coast of Africa.

Sep, 1999 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Jul, 1999 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Dec, 1997 JSL submersible – *R/V Seward Johnson* Downwelling irradiance and bioluminescence, Cuba.

Sep, 1997 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Aug, 1996 Chief Scientist, JSL submersible - *R/V Edwin Link* Field tests of 3D LITES, Cape Hatteras

Sep, 1995 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Mexico.

Jun, 1995 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Gulf of Maine.

Sep, 1994 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Cape Hatteras, NC.

Apr, 1994 Co-Chief Scientist, JSL submersible - *R/V Edwin Link* Downwelling irradiance and vertical migration, Bahamas.

Oct, 1993 Photoecology *RRS Discovery*, Dakar Africa

Aug, 1992 Chief Scientist, JSL submersible-*R/V Seward Johnson*. Downwelling irradiance, bioluminescence and vertical migration in the Gulf of Maine.

Apr, 1991 Chief Scientist, JSL submersible-*R/V Seward Johnson*. Bioluminescence in the Western Alboran Sea.

Feb, 1991 Chief Scientist, JSL submersible-*R/V Edwin Link*. Field tests of LoLAR and HIDEX.

Dec, 1990 Chief Scientist, JSL submersible-*R/V Seward Johnson*. Field tests of HIDEX-3 and defined excitation and capture device.

Sep, 1990 Photoecology *RRS Discovery*, Canary Islands.

Nov, 1989 Co-Chief Scientist, JSL submersible-*R/V Edwin Link*. Coelenterate bioluminescence.

Sep, 1989 JSL submersible-*R/V Seward Johnson*. Bioluminescence in the Gulf of Maine.

Mar, 1989 Bathyphotometer vertical profiling, trans-Atlantic transect, *USNS Kane*.

Jul-Aug, 1988 WATERCOLORS 88 project. Bathyphotometer vertical profiling, *R/V Melville*.

Jun, 1988 Chief Scientist, Bathyphotometer trials *M/V JR*

Jul, 1987 Microspectrophotometry of visual pigments of deep- sea crustacea and fish aboard *R/V New Horizon*. Midwater trawling cruise off Hawaii.

Apr, 1987 Chief Scientist, Bathyphotometer vertical profiling of bioluminescence potential, *R/V De Steiger*.

Oct, 1986 Bathyphotometer trials, *R/V New Horizon*.

Jul, 1986 Microspectrophotometry of visual pigments of deep- sea crustacea aboard *R/V New Horizon* off Hawaii.

Aug-Sep, 1985 DEEP ROVER submersible program. Piloted single person submersible for *in situ* investigations of mesopelagic bioluminescence. Deployed from *R/V Wecoma* in Monterey Canyon to depths of 575 m.

Oct, 1984 Microspectrophotometry of visual pigments and spectrophotometry of bioluminescence. Epibenthic trawling off California, *R/V New Horizon*.

Jul-Aug, 1984 WASP submersible program. Piloted single person submersible studying bioluminescence in the Santa Barbara Basin, *R/V Thomas G. Thompson*.

Aug-Sep, 1983 Spectrophotometry of bioluminescence. Midwater and epibenthic trawling, NW coast of Africa to England, *RRS Discovery*.

Jul, 1983 Spectrophotometry, Midwater trawling. Hawaii. *R/V New Horizon*.

- Mar, 1983 Spectrophotometry, Midwater and epibenthic trawling, off California, *R/V Velero IV*.
- Oct, 1982 Spectrophotometry, Epibenthic trawling, off California. *R/V New Horizon*.
- Sep, 1982 WASP submersible program in Santa Barbara Basin. Spectrophotometry and photon counting of bioluminescence. *R/V New Horizon*.
- Feb, 1982 Spectrophotometry, Midwater trawling. Off California. *R/V Velero IV*.

## **PUBLICATIONS:**

- Widder, E.A. and J.F. Case. (1980) Bioluminescence excitation in a dinoflagellate. IN **Bioluminescence: Current Perspectives** (K.H. Neilson, ed.) Burgess Publishing Company, Minneapolis, pp. 125-132.
- Widder, E.A. and J.F. Case. (1981) Two flash forms in the bioluminescent dinoflagellate, *Pyrocystis fusiformis*. **J. Comp. Physiol.** 143:43-52.
- Widder, E.A. (1982) Effector control in the bioluminescent dinoflagellate, *Pyrocystis fusiformis* (Murray) **Ph.D. Dissertation**, University of California, Santa Barbara.
- Widder, E.A. and J.F. Case. (1982) Luminescent microsource activity in bioluminescence of the dinoflagellate, *Pyrocystis fusiformis*. **J. Comp. Physiol.** 145:517-527.
- Widder, E.A. and J.F. Case. (1982) Distribution of subcellular bioluminescent sources in a dinoflagellate, *Pyrocystis fusiformis*. **Biol. Bull.** 162:423-448.
- Widder, E.A., M.I. Latz and J.F. Case. (1983) Marine bioluminescence spectra measured with an optical multichannel detection system. **Biol. Bull.** 165:791-810.
- Frank, T.M., E.A. Widder, M.I. Latz and J.F. Case. (1984) Dietary maintenance of bioluminescence in a deep-sea mysid. **J. Exp. Biol.** 109:385-389.
- Widder, E.A., M.I. Latz, P.J. Herring, and J.F. Case. (1984) Far red bioluminescence from two deep-sea fishes. **Science** 225:512-514.
- Denton, E.J., P.J. Herring, E.A. Widder, M.I. Latz and J.F. Case. (1985) The roles of filters in the photophores of oceanic animals and their relation to vision in the oceanic environment. **Proc. R. Soc. Lond. B** 225:63-97.
- Widder, E.A., M.I. Latz, and P.J. Herring. (1986) Temporal shifts in bioluminescence emission spectra from the deep-sea fish, *Searsia koefoedi*. **Photochem. Photobiol.** 44:97-101.
- Widder, E.A., P. Hiller-Adams and J.F. Case. (1987) A multichannel microspectrophotometer for visual pigment investigations. **Vision Research** 27(7):1047-1055.
- Latz, M.I., T.M. Frank, M.R. Bowlby, E.A. Widder and J.F. Case. (1987) Variability in flash characteristics of a bioluminescent copepod. **Biol. Bull.** 173:489-503.

- Hiller-Adams, P., E.A. Widder, and J.F. Case. (1988) The visual pigments of four deep-sea crustacean species. **J. Comp. Physiol. A.** 163:63-72.
- Widder, E.A., S.A. Bernstein, D.F. Bracher, J.F. Case, K.R. Reisenbichler, J.J. Torres and B.H. Robison. (1989) Bioluminescence in Monterey Submarine Canyon: image analysis of video recordings from a midwater submersible. **Mar. Biol.** 100:541-551.
- Huber, M.E., A.C. Arneson and E.A. Widder. (1989) Extremely blue bioluminescence in the polychaete *Polycirrus* (Terebellidae). **Bull. of Mar. Science** 44:1236-1239.
- Bowlby, M.R., E.A. Widder, and J.F. Case. (1990) Patterns of stimulated bioluminescence in two Pyrosomes (Tunicata: Pyrosomatidae). **Biol. Bull.** 179: 340-350.
- Bowlby, M.R., E.A. Widder, and J.F. Case. (1991) Disparate forms of bioluminescence from the amphipods *Cyphocaris faurei*, *Scina crassicornis* and *S. borealis*. **Mar. Biol.** 108:247-253.
- Widder, E.A., (1991) Midwater bioluminescence assessment in the West Alboran Gyre (Mediterranean Sea). **HBOI MP #126.**
- Hollman, R., D.M. Lavoie, and E.A. Widder. (1991) Executive Summary Western Alboran Sea Assessments: April 1991. **Naval Oceanographic and Atmospheric Research Laboratory. Technical Note 270.**
- Herring, P.J., E.A. Widder and S. Haddock. (1992) Correlation of bioluminescence emissions with ventral photophores in the mesopelagic squid *Abralia veranyi*. **Mar. Biol.** 112:293-298.
- Widder, E.A. (1992) Mixed light imaging system for recording bioluminescence behaviors. **J. Mar. Biol. Assoc. U.K.** 72:131-138.
- Greene, C.H., E.A. Widder, M.J. Youngbluth, A. Tamso, and G.E. Johnson. (1992) The migration behavior, fine structure, and bioluminescent activity of krill sound-scattering layers. **Limnol. Oceanogr.** 37:650-658.
- Widder, E.A., C.H. Greene and M.J. Youngbluth. (1992) Bioluminescence of sound-scattering layers in the Gulf of Maine. **J. Plank. Res.** 14(11): 1607-1624.
- Spinrad, R.W. and E.A. Widder. (1992) Ship shadow measurements obtained from a manned submersible. **SPIE Proceedings** Vol. 1750: 372-383.
- Widder, E. A., Caimi, F. M., Taylor, L. D. and Tusting, R. F. (1992) Design and development of an autocalibrating radiometer for deep sea biooptical studies. **Oceanic Engineering Society of the IEEE, OCEANS '92**, Mastering the Oceans through technology. 1:525-530. New York.
- Widder, E.A., J.F. Case, S.A. Bernstein, S. MacIntyre, M.R. Lowenstine, M.R. Bowlby, and D.P. Cook. (1993) A new large volume bioluminescence bathyphotometer with defined turbulence excitation. **Deep-Sea Res.** 40(3): 607-627.

- Herring, P.J., M.I. Latz, N.J. Bannister and E.A. Widder. (1993) Bioluminescence of the poecilostomatoid copepod *Oncaea conifera*. **MEPS** 94:297-309.
- Case, J.F., E.A. Widder, S.A. Bernstein, K. Ferer, D. Young, M. Latz, M. Geiger, and D. Lapota. (1993) Assessment of Marine Bioluminescence. **Naval Research Reviews** XLV:31-41.
- Widder, E.A. (1993) 3-D bioluminescence mapping. **U.S. GLOBEC News** No. 4 August 1993:6.
- Frank, T.M. and E.A. Widder. (1994) Evidence for behavioral sensitivity to near-UV light in the deep-sea crustacean, *Stellaspis debilis*. **Mar. Biol.** 118: 279-284.
- Frank, T.M. and E.A. Widder. (1994) Comparative study of behavioral sensitivity thresholds to near-UV and blue-green light in deep-sea crustaceans. **Mar. Biol.** 121: 229-235.
- Frank, T.M. and E.A. Widder. (1996) UV light in the deep-sea: In situ measurements of downwelling irradiance in relation to the visual threshold sensitivity of UV-sensitive crustaceans. **Mar. Fresh. Behav. Physiol.** 27 (2-3): 189-197.
- Kocak, D.M., N.da V. Lobo, E.A. Widder (1996) Tracking and mapping underwater bioluminescent displays using snakes. **Marine Technology Society of the IEEE, OCEANS '96** 3:1220-1226.
- Widder, E.A. (1997) Bioluminescence - Shedding some light on plankton distribution patterns. **Sea Technology** March 1997:33-39.
- Widder, E.A. (1997) *In situ* video recordings of bioluminescence in the ostracod, *Conchoecia elegans*, and co-occurring bioluminescent zooplankton in the Gulf of Maine. In: **Bioluminescence and chemiluminescence: molecular reporting with photons**. (eds J.W.Hastings, L.J.Kricka, & P.E.Stanley), pp. 159-164. John Wiley: Chichester
- Makemson, J.C., N.R. Fulayfil, W.L. Landry, L.M. Van Ert, C.F. Wimpee, E.A. Widder and J.F. Case (1997) *Shewanella woodyi* sp. nov., an exclusively respiratory luminous bacterium isolated from the Alboran Sea. **International Journal of Systematic Bacteriology** 47 (4): 1034-1039.
- Frank, T.M. and E.A. Widder (1997) The correlation of downwelling irradiance and staggered vertical migration patterns of zooplankton in Wilkinson Basin, Gulf of Maine. **J. Plankton Research** 19 (12): 1975-1991.
- Haddock, S.H.D. Neilson, D.J. Widder, E.A. and Case, J.F. (1998) Feasibility of using in situ measurements of bioluminescence spectra to determine the vertical distribution of plankton. In: **Pelagic Biogeography IcoPB II Proceedings of the 2<sup>nd</sup> International Conference Workshop Report** 142:137-142.
- Widder, E.A. (1998) A predatory use of counterillumination by the squaloid shark, *Isistius brasiliensis*. **Env. Biol. Fishes** 53:267-273.
- Johnsen, S. and E.A. Widder. (1998) Measurements of the transparency of mesopelagic gelatinous zooplankton from the North Western Atlantic. **Biol. Bull.** 195:337-348.

- Widder, E.A. and S. Johnsen. (1998) Optical imaging, identification and 3D analysis of spatial distribution patterns of bioluminescent plankton. **SPIE Ocean Optics XIV.**
- Johnsen, S. and E.A. Widder. (1998) The transparency and visibility of gelatinous zooplankton. **SPIE Ocean Optics XIV.**
- Widder, E.A. (1999) Bioluminescence. In: “**Adaptive Mechanisms in the Ecology of Vision.**” Edited by: S.N. Archer, M.B.A. Djamgoz, E. Loew, J.C. Partridge & S. Vallergera. Kluwer Academic Publishers, Dordrecht, the Netherlands. Pp 555-581.
- Kocak, D.M., N.D.V. Lobo, and E.A. Widder. (1999) Computer vision techniques for quantifying, tracking and identifying Bioluminescent plankton. **IEEE J. Oceanic Engineering** 24(1):81-95.
- Johnsen, S., E.J. Balsler and E.A. Widder. (1999) Modified suckers as light organs in a deep-sea octopod. **Nature** 398:113-114.
- Johnsen, S., E.J. Balsler, E.C. Fisher, and E.A. Widder (1999) Bioluminescence in the deep-sea cirrate octopod *Stauroteuthis syrtensis* Verrill (Mollusca: Cephalopoda) **Biol. Bull.** 197: 26-39
- Widder, E.A., S. Johnsen, S. A. Bernstein, J. F. Case, D. J. Neilson. (1999) Thin layers of bioluminescent copepods found at density discontinuities in the water column. **Mar. Biol.** 134: 429-437.
- Johnsen, S. and E.A. Widder. (1999) The physical basis of transparency in biological tissue: Ultrastructure and the minimization of light scattering. **J. Theor. Biol.** 199: 181-198
- Frank, T.M. and E.A. Widder. (1999) A comparative study of the spectral sensitivities of mesopelagic crustaceans. **J. Comp. Physiol.** 185(3): 255-265.
- Widder, E.A and S. Johnsen (2000) 3D spatial point patterns of bioluminescent plankton: A map of the “minefield” **J. Plank. Res.** 22(3): 409-420.
- Widder, E.A. (2000) Bioluminescence in octopods. **Yearbook of Science and Technology.** McGraw-Hill 2001: 52-55.
- Herring, P.J. and E.A. Widder (2001) Bioluminescence in plankton and nekton. In; Steele, J.H., Thorpe, S.A. and Turekian, K.K. editors, **Encyclopedia of Ocean Science**, Vol. 1, 308-317. Academic Press, San Diego.
- Widder, E.A. and T.M. Frank (2001) The Speed of an Isolume: A Shrimp’s Eye View. **Mar. Biol.** 138:669-677.
- Johnsen, S. and E.A. Widder (2001) Ultraviolet absorption in transparent zooplankton and its implications for depth distribution and visual predation. **Mar. Biol.** 138:717-730.
- Widder, E.A. (2001) Bioluminescence. **Bioscience Explained** <http://www.bioscience-explained.org/EN1.1/features.html> Invited review.

- Widder, E.A. (2002) Bioluminescence and the pelagic visual environment. **Mar. Fresh. Behav. Physiol.** 35 (1-2): 1-26. Invited review.
- Frank, T.M. and E.A. Widder (2002) Effects of a decrease in downwelling irradiance on the daytime vertical distribution patterns of zooplankton and micronekton. **Mar. Biol.** 140 (6):1181-1194
- Widder, E.A. (2002) SPLAT CAM: Mapping plankton distributions with bioluminescent road-kill. **Marine Technology Society of the IEEE, Oceans** 3:1711-1715
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#### **ABSTRACTS:**

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- Widder, E.A. and P.J. Herring (2000) Revealed in a flash: Signal complexity among coelenterate bioluminescence displays. **Luminescence**. 15, 2000, p.229
- Widder E.A. (2000) Secret lights in the sea: How marine organisms use bioluminescence to survive. **Luminescence**. 15, 2000,
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- Haddock, S. H., E. A. Widder, M. A. Moline, J. G. Bellingham and J. F. Case. (2002) High-Resolution Measurements of Coastal Bioluminescence using Autonomous and Remotely-Operated Vehicles. **Eos Trans. Amer. Geophys. Union.** 83(4): OS21E-86
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- Herring, P.J., E.A. Widder & C. Cope. (2004) Fishes with red lights: different structures, different mechanisms. **10<sup>th</sup> Deep Sea Biology Symposium.** 33:9.
- Widder, E.A. and B.H. Robison. (2004) Eye-In-The-Sea: A deep sea observatory for unobtrusive observations of animal behavior. **ASLO/TOS Ocean Research Conference** 2004:173
- NJ Marshall, TW Cronin, N Shashar, S Johnsen and E Widder (2004) Polarisation vision in terrestrial and aquatic environments. **Insect Sensors and Robotics.** Brisbane.
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- Widder, E.A. (2005) Ocean literacy: A scientist's perspective **Eos Trans. Amer. Geophys. Union.**
- Widder, E.A. (2006) Reading the Ocean by the Light of its Inhabitants. (Plenary) **Eos Trans. Amer. Geophys. Union.** OS21A-01
- Raymond, E.L. and E.A. Widder (2006) Unobtrusive Observations of Deep-Sea Megafauna in the Gulf of Mexico. **Eos Trans. Amer. Geophys. Union.** OS24I-05
- Widder, E.A., E.H. Raymond and T.T. Sutton (2008) The importance of stealth: Recent findings with the eye-in-the-sea deep-sea observatory. **Eos Trans. Amer. Geophys. Union.**

**PATENTS HELD:** Co-holder of U.S. Patent # 5264906, awarded in 1993 for the HIDEX-BP (High Intake Defined Excitation Bathypotometer) which is the standard in the U.S. Navy for the measurement of bioluminescence in the oceans.

**ACADEMIC SERVICE:**

*Peer Review Activities:* Proposals: NSF, NOAA, Natural Environment Research Council (United Kingdom), National Geographic Society.  
Journals: Biological Bulletin, Botanica Marina, Continental Shelf Research, Deep Sea Research, Journal of Bioluminescence and Chemiluminescence, Journal of Comparative Physiology A, Journal of Crustacean Biology, Journal of Environmental Biology of Fishes, Journal of Experimental Marine Biology and Ecology, Journal of the Marine Biological Association of the U.K., Limnology and Oceanography, Marine Biology, Marine Ecology Progress Series, Marine and Freshwater Behaviour and Physiology, Sarsia  
Books: Chemiluminescence: Principles and Applications in Biology and Medicine by A.K. Campbell reviewed for American Zoologist.

*Recent Advisory Activities:*

Board of Directors, UDT-Seal Museum, Fort Pierce, FL Aug 2009-present  
Board of Science Advisors, Schmidt Research Vessel Institute, June 2009 – present.  
Cape Eleuthera Institute Advisory Committee, Sept 2008-present  
Smithsonian Ocean Hall, May 2008  
Google Ocean, Council of Advisors June, 2007  
Rosalind Franklin Society, Founding Board Member, 2007  
Battery Park Conservancy, 2007  
Invited presentation to Deep Submergence Science Committee: “Future Deep Submergence Needs for Midwater Biology.” Jun 25, 2003  
AAUS 2002 Scholarship Committee.  
Consultant for Discovery Channel/BBC filming for *Blue Planet: The Deep*; 1999-2002  
Member of Scientist Advisory Board for ScienCentral's TV news service, Science and Technology News Network (stn2), a NSF-funded Public Understanding of Research (PUR) project, Sep, 2002 – present.  
Invited speaker for briefing on Capitol Hill on “The Oceans and Global Security”, Dec 10, 2001.  
Councilor of the International Society for Bioluminescence and Chemiluminescence, Sept. 2000-present.  
Meeting organizer and co-chair for ONR sponsored Bioluminescence Workshop, San Diego 28 Feb-1 Mar, 2000.  
Member of Technical Advisory Committee for the Sustainable Seas Expedition '98-'99.

Invited participant in two workshops for the Sloan Census of the Fishes feasibility study '97&'98.  
Invited participant in Symposium on Oceanography for Naval Special Warfare '97.  
Member of NOAA's U.S.-Japan Cooperative Program in Marine Research '99-present.

***Recent Invited Lectures:***

Teacher training, Env. Learning Ctr. Jensen Beach, FL Jan 21, 03  
HBOI: Ocean Science Lecture. "Bioluminescent Oddities" Jan 22, 03  
John's Island FL Mar 4, 03  
American Eagle Cruise Lines, Feb 5 and Mar 5, 03  
Monday Night at Mote, Apr 14, 03  
San Diego Natural History Museum May 21, 03  
"Future Deep Submergence Needs for Midwater Biology, Deep Submergence Committee, San Francisco, CA June 25, 03  
"Ecology and Evolutionary Biology of Marine Bioluminescence" IRREC/USDA Seminar Series, U.S. Horticultural Research Lab, Fort Pierce, FL Oct 7, 03  
Explorer's Club, Fort Lauderdale, FL Oct 18, 2003  
Keynote speaker, Alliance of Coastal Technologies, Fort Pierce, FL Nov 25, 2003  
Rotary Club, Fort Pierce, FL Jan 15, 2004  
Indian River Estates, Vero Beach, FL Mar 2, 2004  
Keynote speaker, Florida Marine Aquarium Society, Dania Beach FL May 22, 2004  
Seattle Science Center for opening of GLOW exhibit June 2, 2004  
Virginia Aquarium for opening of GLOW exhibit, Oct 1, 2004  
Explorer's Club, Naples FL Nov 4, 2004  
Seminar Daytona Beach Community College, Nov 19, 2004  
Blowing Rocks Preserve, Hobe Sound, FL Jan 12, 2005  
Keynote speaker, NOSB Spoonbill bowl, St. Petersburg, FL February 12, 2005.  
HBOI: Ocean Science Lecture: "Deep Scope 2004: A Window into the Deep Sea" March 2, 2005  
Juno Beach Marine Life Center, Mar 16, 2005  
Monterey Bay Aquarium Research Institute, May 5, 2005  
Indian River Estates West, Vero Beach, FL June 29, 2005  
Indian River Estates East, Vero Beach, FL Aug 3, 2005  
NOAA Ocean Exploration Professional Development Workshop, Fort Pierce, FL Sep 10, 2005  
Women in Science, Monterey Bay Aquarium Res. Inst. Sep 21, 2005  
Daytona Beach Community College, Seminar Series Sep 30, 2005  
Smithsonian Field Station, Fort Pierce, FL Nov 18, 2005  
Bent Pines Golf Club, Vero Beach, FL Jan 11, 2006

FAU, Frontiers in Science seminar series, Boca Raton, FL Jan 19, 2006

FL Natural History Museum, Gainesville, FL, Opening of GLOW Jan 26, 27 & 28 2006

Florida Oceanographic Society, Jupiter, FL Feb 8, 2006

Plenary Lecture, “Reading the Oceans by the Light of its Inhabitants” Ocean Sciences, Honolulu, HI, Feb 21, 2006

American Geophysical Union's Geophysical Information for Teachers (GIFT) Workshop, Honolulu, HI Feb 22, 2006

American Museum of Natural History, New York Mar 4, 2006

EARTH teacher training workshop, Tuckerton, NJ Jul 11-13, 2006

Mensa World Gathering, Orlando, FL Aug 13, 2006

The Kennedy Center Imagination Celebration “The Art of Exploration” Fort Worth Texas, Oct 23-25, 2006 6 lectures and 3 labs to over 1500 students.

Scientific Symposium “The Evolution and Development of Marine Invertebrates” Kight Center for Emerging Technologies, Ft Pierce, FL Oct 27, 2006

Explorer’s Club, New York City Nov 13, 2006

*Best job in the world, St. Ed’s High School, Vero Beach, FL Mar 12, 2007*

*Shedding light on bioluminescence. Santa Barbara Museum of Natural History, Santa Barbara, CA Mar 22, 2007*

*New light on bioluminescence signaling: Evolutions and applications. Yale University, New Haven, CT Apr 4, 2007*

*Applications of bioluminescence in ocean conservation. National Resource Defense Council, NYC, NY Apr 5, 2007*

*Applications of bioluminescence in ocean monitoring and ecosystem conservation. Duke University, Durham, NC Apr 9, 2007*

*Eye-in-the-Sea: An ocean observatory for unobtrusive monitoring of animal behavior. Beaufort Marine Lab, Beaufort, NC Apr 10, 2007*

*Evolution of bioluminescence in dinoflagellates. Harvard University, Cambridge, MA Apr 26, 2007*

*Shedding new light on bioluminescence: Evolutions and Applications. Plenary lecture American Chemical Society, Florida Chapter, Orlando, FL May 10, 2007*

*Secret lights in the sea: Explorations and applications of marine bioluminescence. Western Washington U., Inaugural Sundquist Lecturer, May 23, 2007*

*New technologies to explore the deep sea. Keynote – Spring 2007 Research Symposium. The Island School, Eleuthera, Bahamas, June 9, 2007*

*New technologies to explore the deep sea. The Arkansas Governor’s School, Conway, AR June 12, 2007*

*Secret Lights in the Sea NOAA OE Professional Development Workshop St. Petersburg, FL Sep 22, 2007*

*Applications of bioluminescence in ocean monitoring and ecosystem conservation. Fish and Wildlife Research Institute, St. Petersburg, FL Sept 24, 2007*

*Deep Sea Explorations: New technologies and new discoveries. Westminster School, Simsbury, CT Oct 15, 2007*

*Bioluminescence effector systems in dinoflagellates: evolutions and applications. National Institute of Basic Biology. Okazaki, Japan Dec 7, 2007*

*The future of our blue planet: Musings of an edgy optimist. Orchid Island, Vero Beach Florida Jan 28, 2008*

*Using new technologies to discover our world. Carleton College, Northfield, MN Feb 22, 2008*

*Bioluminescence, Semester by the Sea, Harbor Branch Oceanographic Inst. Fort Pierce, FL Mar 18, 2008*

*Applications of bioluminescence in ocean monitoring and ecosystem conservation.* **Indian River Lagoon Boat Tour**, Fort Pierce, FL Apr 3, 2008

*Secret Lights in the Sea*, **Harvard Club of Maryland**, Baltimore, MD Apr 10, 2008

*Applications of bioluminescence in ocean monitoring and ecosystem conservation.* **The Calhoun MEBA Engineering School**, Easton, MD Apr 11, 2008

*Secret Lights in the Sea*, **S Utah Univ**, Convocation, Cedar City, UT Apr 15, 2008

*Secret Lights in the Sea*, **Colorado College**, Colorado Springs, CO Apr 23, 2008

*Applications of bioluminescence in ocean monitoring and ecosystem conservation.* **Univ. of S Calif**, Los Angeles, CA Apr 25, 2008

*Secret Lights in the Sea, The underwater world of a deep-sea explorer*, **USC, COSEE** teacher training workshop, Apr 26, 2008.

*The Ocean Planet*, Teacher training workshop, **Indian River Community College**, Fort Pierce, FL May 10, 2008

*The Future of Our Blue Planet*, **Alexander von Humboldt Fdn, Rice Univ.**, Houston, TX May 31, 2008

*Using New Technologies to Discover our World*, **The Arkansas Governor's School**, Conway, AR June 17, 2008

*Coastal Marine Ecosystems at Risk*, **St. Lucie County Economic Development Council**, Port St. Lucie, FL Jun 20, 2008

*Shedding New Light on Coastal Water Pollution*, **Disney's Animal Programs**, Disney World, Lake Buena Vista, FL Jun 25, 2008

*Hands on Ocean Science*, **Florida Association of Teacher Educators, 2008 Annual Conference** Plenary lecture. Sep 26, 2008

*Deep Sea Bioluminescence* **American Institute of Physics, 2008 Annual Conference**, Boston, MA Oct 21, 2008

*Hands on Ocean Science*, **Treasure Coast Teacher Training Workshop, Indian River State College**, Fort Pierce, FL Nov 15, 2008

*Plants that glow*, **Native Plant Society**, Port St. Lucie, FL Nov 18, 2008

*Secret Lights in the Sea*, **Vieques Conservation & Historic Trust, Vieques Puerto Rico**, Nov 28, 2008

*New Ways to Explore the Deep Sea*, **Explorer's Club, New York City**, NY Dec 1, 2008

*Glow in the dark critters*, **Juno Beach Marine Life Center**, Juno Beach, FL, Jan 8, 2009

*Protecting water with innovative technology*, keynote speaker for **Art of Living Green Festival**, Fort Pierce, FL Jan 16, 2009

*Eye-in-the-Sea: What does deep sea exploration tell us about marine conservation*, **Lawrence University**, Appleton, WI, Feb 3, 2009

*Applications of Bioluminescence*, **Cape Eleuthera Institute**, Eleuthera, Bahamas Feb 14, 2009

*Applications of Bioluminescence in Ocean Monitoring*, **Old Dominion Univ.**, Norfolk, VA, Feb 18, 2009

*Secret Lights in the Sea*, **Butler Univ.** Indianapolis, IN, Mar 4, 2009

*Exploring and Protecting Planet Ocean*, **Geological Society of Washington**, Cosmos Club, Washington, DC Mar 11, 2009

*Hands on Ocean Science*, **NOAA OE Teacher Professional Workshop**, Tampa FL, Mar 21, 2009

*Hands on Ocean Science*, **NSF GK-12 keynote**, Washington, DC Mar 28, 2009

*Best Job in the World*, **Pineschool**, Stuart, FL Mar 31, 2009

*Protecting Water with Innovative Technology*, **Rotary Club of St. Lucie County**, Fort Pierce, FL Apr 16, 2009

*Protecting Water with Innovative Technology*, **Community Foundation of Palm Beach and Martin County**, Palm Beach, FL Apr 27, 2009

*Protecting Water with Innovative Technology*, **Community Foundation of Palm Beach and Martin County**, Palm Beach, FL Apr 28, 2009

*Protecting Water with Innovative Technology*, **MIT**, Cambridge, MA May 28, 2009

*Bioluminescence Oddities and Wonders of the Invertebrate World*, Paul Illg Distinguished Lectureship, San Juan, WA Jul 2, 2009

*Evolution and Adaptive Value of Bioluminescence in Dinoflagellates*. Invited seminar Friday Harbor Labs, University of Washington, Jun 3, 2009

*Using New Technologies to Discover our World*, **The Arkansas Governor's School**, Conway, AR July 7, 2009

*Applications of Bioluminescence in Coastal and Deep-sea monitoring*. Puerto Mosquito Bioluminescent Bay Symposium, Vieques, Puerto Rico Oct 8, 2009

*Protecting Water with Innovative Technology*, NSF Biotrain, IRSC, Fort Pierce, FL Oct 29, 2009

*Why Do We Explore?* NOAA Ocean Exploration Online Profession Development Wrokshop Oct 5-16, 2009

*Secret Lights in the Sea*, COSEE-WEST Online Workshop for Teachers: Using Ocean Observing Systems to Study the Ocean, Q&A online Nov 2-11, 2009  
*New Tools for Ecosystem-Based Management: Marine Monitoring with the ORCA Kilroy Network and Fast Assessment of Sediment Toxins (FAST) Program*. Indian River Lagoon Research Forum. University of Florida Dec 2, 2009

***Students and Postdocs Advised and Co-Advised:***

Graduate Students:

Maura Jess, M.S. University of California Santa Barbara  
Mark Bowlby, Ph.D. University of California Santa Barbara  
Kathy Daumer, M.S. Florida Institute of Technology  
Trevor Myslinski, M.S. Florida Institute of Technology  
Jessie W. Davis, M.S. Florida Institute of Technology  
Nicole McMullen, M.S. Florida Atlantic University  
Karen Breitlow, M.S. Florida Atlantic University  
Erika Raymond, Ph.D. Johns Hopkins University  
Miranda Hoover, Ph.D. Candidate Florida Atlantic University  
Beth Whitehill, M.S. Florida Atlantic University  
Megan Geidner, M.S. Florida Atlantic University  
Kyle Bartow, Ph.D. Florida Atlantic University

Post-docs:

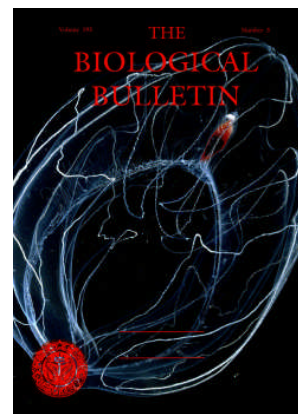
Tamara Frank, HBOI Post Doc  
Sönke Johnsen, HBOI Post Doc

**NATIONAL AND INTERNATIONAL PUBLIC OUTREACH:**

- 1982 Graduate research in bioluminescence described in **BBC** production “Light Creatures of the Night”.
- 1984 **CBS and NBC national news** coverage of first *in situ* video recordings of bioluminescence made from DEEP ROVER in Monterey Canyon.
- 1985 Bioluminescence *in situ* research with DEEP ROVER featured in **BBC** production “Dive to Midnight Waters”.
- 1987 Bioluminescence *in situ* research with DEEP ROVER described in “**The Deep Sea**” by **Joseph Wallace**, published by Gallery Books.
- 1990 Our bioluminescence footage used in **David Attenborough’s “The Trials of Life”**.
- 1993 Bioluminescence *in situ* research with JOHNSON-SEA-LINKS featured in **National Geographic Explorer’s**, Emmy winning, “Ocean Drifters”.
- 1994 Our bioluminescence footage used in the **BBC** David Attenborough program Wildlife on One: “Nature’s Neons”
- 1994 Write-up of bioluminescence research at HBOI in May-June issue of **International Wildlife**.
- 1997 Bioluminescence and vertical migration *in situ* research with JOHNSON-SEA-LINKS featured in “Ocean Currents” on **Discovery Channel**
- 1997 Bioluminescence and vertical migration *in situ* research with JOHNSON-SEA-LINKS featured in **Miami Herald’s** Tropic Magazine March 23.

- 1998 On-camera interview about bioluminescence research featured in “Forces of the Wild” aired on **PBS** May 3, 1998.
- 1998 Interviewed and quoted in articles about fish that use red bioluminescence for **Science News** June 6, 1998 and **Chemical and Engineering News** June 8, 1998.
- 1998 Article in **Science News** Aug 1, 1998 on publication re. Cookie-Cutter Shark bioluminescence.
- 1998 Photos and interview published in French natural history magazine, **Terre Sauvage** July/Aug ‘98.
- 1998 Bioluminescence Department footage used and credited in **Discovery Channel** program, “Ultimate guide to Octopus” aired Sept 20, 1998.
- 1998 Article in Brazilian magazine **Super Interessante** on publication re. Cookie-Cutter Shark bioluminescence. October, 1998.
- 1998 Photos and quotes in **Ocean Realm** magazine Winter 1997-98.
- 1998 Cover story December **Biological Bulletin** on first measurements of transparency in gelatinous zooplankton
- 1998 6 page story by Angela Swafford describing bioluminescence dive in **Potpourri: A Magazine of the Literary Arts** Vol. 10(3):60-65.
- 1999 Photos and biography published in **Ranger Rick - National Wildlife Federation Magazine** January 1999.
- 1999 Article in **National Wildlife Magazine** on publication re. Cookie-Cutter Shark bioluminescence. January 1999.
- 1999 Article in **Wildlife BBC Magazine** on publication re. Cookie-Cutter Shark bioluminescence. January 1999.
- 1999 Cover story **Nature** Mar 11, 1999 on discovery of deep-sea octopus with bioluminescent suckers
- 1999 Cover story **Science News** Mar 13, 1999 on discovery of deep-sea octopus with bioluminescent suckers
- 1999 Article and photos **New Scientist** Mar 13, 1999 on discovery of deep-sea octopus with bioluminescent suckers
- 1999 Cover photo plus quotes and photos in **New Scientist** Mar 27, 1999 on red light emitters in the deep sea
- 1999 Two page spread in **Biophotonics International** May/June 1999 on deep-sea octopus.
- 1999 National and international news coverage on discovery of deep-sea octopus with bioluminescent suckers in U.S. (eg. **ABCnews.com** , **National Geographic News**, **New York Times**, **Atlanta Constitution**, **Buffalo News**, **Dallas Morning News**, **Chicago Defender**), Canada (**Discovery Canada**), U.K. (**Opto & Laser Europe**), France (**Science et vie**, **Science et vie junior** , **Le nouvel Observateur**, **Sciences et Avenir** and **Pour La Science** {French edition of Scientific American}), Germany (**Süddeutsche Zeitung** and **Frankfurter Allgemeine Zeitung**), Sweden (**Daeger Nyheter**), Brazil (**Superinteressante**), Switzerland (**Die Weltwoche**).
- 1999 Text books to include discovery of deep-sea octopus with bioluminescent suckers:  
**Essentials of Oceanography** published by Prentice Hall  
**Introductory Oceanography** published by Prentice Hall  
**Exploring the Oceans** (CD-ROM) produced by Tasa Graphic Arts
- 1999 **Discovery Channel On Line** – Served as one of two guest speakers for live webcast program on Deep Sea Biology March 17.
- 1999 Provided on-camera interviews for **Project Oceanography**, a distance education television course.
- 1999 Bioluminescence research with JOHNSON-SEA-LINKS featured in two part series “Forbidden Depths” on **Discovery Channel**, June 6.
- 1999 Interview for **NPR** on octopus with bioluminescent suckers, September 8.

- 1999 Research in bioluminescence described in Chapter 6 of “**The Restless Sea – Exploring the World Beneath the Waves**” by Robert Kunzig. W.W. Norton & Co. 1999.
- 2000 Quotes and photos in **Ocean Realm**, Winter 2000 on red light emitters in the deep sea.
- 2000 Photo and description of bioluminescent octopus discovery in **National Geographic**, April 2000.
- 2000 Photos and research on transparency of gelatinous zooplankton described in **Scientific American**, February 2000 in article written by former postdoc Sonke Johnsen.
- 2000 Photos and research on deep-sea octopus and on cookie-cutter shark in **Australia Nature**, Autumn 2000.
- 2000 Photos and research in bioluminescence described in Chapter 10 of “**Mapping the Deep – The extraordinary story of ocean science**” by Robert Kunzig. Sort of Books 2000.
- 2000 Photos of bioluminescent jellies and quotes in **National Geographic**, July 2000.
- 2000 Cover story “Diving into the light” **Vero Beach Magazine**, Sept/Oct 2000
- 2001 Photos of bioluminescent fish and quotes in **National Geographic**, June 2001
- 2002 **BBC Radio 4** interview for “The Serendipity of Science”, Sept 2001
- 2003 Interview for **Korean TV**, March 2003
- 2003 Photos of bioluminescent jellyfish and quotes in **National Geographic**, April 2003
- 2004 Bioluminescence research featured in "Mid-Water Mysteries" on **Discovery's Science Channel** June 9.
- 2004 Interview and photos in **Discover Magazine**, May 2004
- 2004 **NPR** interview Panama City, FL Aug 6
- 2005 National (**AP wire**) news story on Eye-in-the-Sea Mar 2005
- 2005 Photos and story on Eye-in-the-Sea in **Biophotonics International** Aug 2005
- 2005 National (**AP wire**) news story on Deep Sea expedition in Gulf of Mexico Sep 2005
- 2005 **ABC News Online** news story on Deep Sea expedition in Gulf of Mexico Sep 2005
- 2005 **Science Daily** news story on Deep Sea expedition in Gulf of Mexico Sep 2005
- 2005 Photos and biography in **Muy Interesante** Oct 2005
- 2005 Photos and biosketch in high school text book **Life on an Ocean Planet**
- 2006 Photos and biography in **In the Deep Sea** by Sneed B. Collard, published by Marshall Cavendish
- 2006 **Popular Mechanics** story: A More Candid Underwater Camera, May 2006
- 2006 **CNN Headline News** Interview about Wings Worldquest award 27 Sep 2006
- 2006 **NPR - All Things Considered** Interview about MacArthur award 19 Sep 2006
- 2006 **NYTimes, Forbes, USA Today, MSNBC, Chronicle of Philanthropy, Physics Today, National (AP wire)** news stories about MacArthur award Sep 2006
- 2006 **NYTimes Science Illustrated** re: Eye-in-the-Sea, Dec 19, 2006
- 2007 **Tufts Magazine** Photo essay: Oceans of Light. Fall 2007
- 2008 **Photonics Spectra** Photos and story on Eye-in-the-Sea, Jan 2008
- 2008 **Vero Beach Magazine**. Saving the Oceans, ORCA style. Jan 2008
- 2008 **PBS Nature** Interview for The Beauty of Ugly 11 Jun 2008
- 2008 **Marine Technology Society Journal**. A focus on recent developments and trends in underwater imaging. Spring 2008
- 2008 **NPR – All Things Considered** Interview about bioluminescent bays 9 Jun 2008
- 2008 **NOVA Science NOW** profile on E. Widder 23 Jul 2008
- 2008 Interview for **Ocean Explorer Video for Smithsonian's Ocean Hall Exhibit** at the Museum of Natural History, Washington DC
- 2009 **Wired Science**: Robotic Sub Installs Deep-Sea Webcam 22 Jan 2009
- 2009 National (**AP wire**) news story on installation of world's first deep-sea webcam 4 Feb 2009
- 2009 Article on Kilroy in **The Scientist** 23(5):23-24
- 2009 **CBS News Magazine, Brink** interview on Eye-in-the-Sea. 20 Jul, 2009



## EDUCATION PRODUCTIONS:

- 1997 Educational web site on bioluminescence [www.biolum.org](http://www.biolum.org) produced in 1997. Winner of the National Science Teachers Association sciLINKS award in 2001.
- 1998 The Bioluminescence Coloring Book. Harbor Branch Oceanographic Institution, Fort Pierce, Florida. Over 5000 sold.
- 2000 Marine bioluminescence: Secret Lights in the Sea. 26 min educational video. Harbor Branch Oceanographic Institution, Fort Pierce, Florida. Winner of the 2001 Silver Reel Award in Media Excellence and the 2002 Silver CINDY (Cinema In Industry) Award from the International Association of Audio-Visual Communicators.
- 2003 National Geographic Virtual Teacher Workshop May 5 - 9, 2003: "Living Light in the Ocean" <http://www.coexploration.org/ceo/> Over 3000 registrants (K-12 teachers).
- 2003-2008 Curator of 5000 sq ft traveling museum exhibit on bioluminescence. Glow: Living Lights is scheduled for a 5 year North American tour and will be seen by over 5 million viewers. <http://www.glowexhibit.com/>
- 2004 Operation Deep Scope posted on NOAA's Ocean Explorer Explorations web page <http://oceanexplorer.noaa.gov/explorations/04deepscope/welcome.html>
- 2005 OceanAGE profile posted on NOAA website for web chat with video interview <http://oceanexplorer.noaa.gov/edu/oceanage/welcome.html>

- 2005 Operation Deep Scope II posted on NOAA's Ocean Explorer Explorations web page  
<http://oceanexplorer.noaa.gov/explorations/05deepscope/welcome.html>
- 2007 Operation Deep Scope III posted on @sea web page  
<http://at-sea.org/missions/deepscope3/>
- 2007 Contributing author and photographer to *The Deep: The Extraordinary Creatures of the Abyss* <http://www.thedeepbook.org/>
- 2008 Science advisor and contributing photographer to exhibition *The Deep* at the Hong Kong Science Museum.

