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Current Appointments

- 2017- **Assistant Professor**, Scripps Institution of Oceanography, University of California, San Diego
2017- **Assistant Professor**, Department of Mechanical and Aerospace Engineering, University of California, San Diego

Previous Appointments

- 2014-2017 **Lecturer**, Scripps Institution of Oceanography, University of California, San Diego
2012-2017 **Assistant Research Oceanographer**, Scripps Institution of Oceanography, University of California, San Diego
2011-2012 **Postdoctoral Researcher**, University of California, Santa Cruz
2010-2011 **Postdoctoral Researcher**, University of Cape Town, Cape Town, South Africa

Education

- 2009 Ph.D. Oceanography, Scripps Institution of Oceanography
Committee: Peter Franks (*chair*), Robert Pinkel, James Leichter, John Largier, Clinton Winant
2003 M.Sc. Oceanography, Scripps Institution of Oceanography
1998 B.A. Biology, Pomona College

Awards & Fellowships

- 2017-2018 The Center on Global Transformation Policy (UCSD) Faculty Fellow
2017-2022 Office of Naval Research Young Investigator Program Fellow
2010-2011 National Science Foundation International Postdoctoral Research Fellow
2005 E.W. Fager Award (*Scripps Institution of Oceanography*)
1999-2000 US Fulbright Fellow
1998 Special Distinction, Senior Thesis. (*Pomona College*)

Peer-reviewed Publications

- 2018 Sinnett, G., F. Feddersen, **A.J. Lucas**, G. Pawlak, and E. Terrill, 2018: Observations of Nonlinear Internal Wave Run-Up to the Surfzone. *J. Phys. Oceanogr.* 48: 531–554, <https://doi.org/10.1175/JPO-D-17-0210.1>
- 2018 Ramachandran, S., A. Tandon, J. Mackinnon, **A.J. Lucas**, R. Pinkel, A.F. Waterhouse, J. Nash, E. Shroyer, A. Mahadevan, R.A. Weller, and J.T. Farrar, 2018: Submesoscale Processes at Shallow Salinity Fronts in the Bay of Bengal: Observations during the Winter Monsoon. *J. Phys. Oceanogr.* 48: 479–509 <https://doi.org/10.1175/JPO-D-16-0283.1>
- 2017 **Lucas, A. J.**, R. Pinkel, and M. Alford. Ocean wave energy for long endurance, broad bandwidth ocean monitoring. *Oceanography* 30(2):126-127 <https://doi.org/10.5670/oceanog.2017.232>

- 2017 Albery, M. S., S. Billheimer, M. M. Hamann, C. Y. Ou, V. Tamsitt, **A. J. Lucas**, and M. H. Alford (2017), A reflecting, steepening, and breaking internal tide in a submarine canyon, *J. Geophys. Res. Oceans* 122:6872–6882 <http://dx.doi.org/10.1002/2016JC012583>
- 2016 **Lucas, A. J.**, J. D. Nash, R. Pinkel, J. A. MacKinnon, A. Tandon, A Mahadevan, M. Omand, M. Frielich, D. Sengupta, M. Ravichandran, and A. Le Boyer. Adrift upon a salinity-stratified sea: a view of upper ocean processes in the Bay of Bengal during the southwest monsoon. *Oceanography* 29(2):134–145 <http://dx.doi.org/10.5670/oceanog.2016.46>
- 2016 MacKinnon, J. A., J. D. Nash, M. H. Alford, **A. J. Lucas**, J. B. Mickett, E. Shroyer, A. F. Waterhouse, A. Tandon, D. Sengupta, A. Mahadevan, M. Ravichandran, R. Pinkel, D. Rudnick, C. B. Whalen, M. S. Albery, J. Sreeleha, E. C. Fine, D. Chaudhuri, G. L. Wagner. A tale of two spicy seas. *Oceanography* 29(2):50–61 <http://dx.doi.org/10.5670/oceanog.2016.38>
- 2016 Lotliker, A. A. M. Omand, **A. J. Lucas**, S. R. Laney, A. Mahadevan and M. Ravichandran. Penetrative Radiative Flux in the Bay of Bengal. *Oceanography* 29(2):214–221 <http://dx.doi.org/10.5670/oceanog.2016.53>
- 2016 Jinadasa, S. U. P., I. Lozovatsky, J. Planella-Morató, **A. J. Lucas**, J. MacKinnon, J. Nash, H. W. Wijesekera, H. J. S. Fernando. Ocean Turbulence and Mixing around Sri Lanka and in Adjacent Waters of the Northern Bay of Bengal. *Oceanography* 29(2):170–179 <http://dx.doi.org/10.5670/oceanog.2016.49>
- 2016 Wijesekera, H. W., E. Shroyer, A. Tandon, M. Ravichandran, D. Sengupta, P. Jinadasa, H. J. S. Fernando, N. Agarwal, K. Arulanathan, M. Baumgartner, J. Buckley, L. Centurioni, P. Conry, E. D’Asaro, J. Tom Farrar, A. L. Gordon, E. Jarosz, T. Jensen, H. S. Johnston, C. Lee, L. S. Leo, M. Lankhorst, I. Lozovatsky, **A. J. Lucas**, and others... Decrypting a mystery bay - The ASIRI Ocean-Atmosphere Initiative on the Bay of Bengal. *Bulletin of the American Meteorological Society* <http://dx.doi.org/10.1175/BAMS-D-14-00197.1>
- 2015 Pinkel, R. P., M. H. Alford, **A. J. Lucas**, S. Johnston, J. A. MacKinnon, A. Waterhouse, N. Jones, S. Kelly, J. Klymak, J. N. Nash, L. Rainville, Z. Zhao, H. Simmons, and P. Strutton. Breaking internal tides keep the ocean in balance, *Eos*, 96, <http://onlinelibrary.wiley.com/doi/10.1029/2015EO039555/full>
- 2015 **Lucas, A. J.** and R. M. Kudela. The fine-scale vertical variability of a wastewater plume in shallow, stratified coastal waters. *Estuarine, Coastal, and Shelf Science*, <http://dx.doi.org/10.1016/j.ecss.2015.08.010>
- 2015 Kudela, R. M., **A. J. Lucas**, K. Hayashi, K. McLaughlin, and M. Howard. Death from below: Investigation of inhibitory factors in bloom development during a wastewater effluent diversion. *Estuarine, Coastal, and Shelf Science*, <http://dx.doi.org/10.1016/j.ecss.2015.07.021>
- 2014 **Lucas, A. J.**, E. L. Shroyer, H. W. Wijesekera, H. J. S. Fernando, E. D’Asaro, M. Ravichandran, S. U. P. Jinadasa, J. A. MacKinnon, J. D. Nash, R. Sharma, L. Centurioni, J. T. Farrar, R. Weller, R. Pinkel, A. Mahadevan, D. Sengupta and A. Tandon. From Monsoons to Mixing: the Multi-scale Mosaic of Air-Sea Interactions in the Bay of Bengal. *Eos*, 95 (30): 269–270 <http://onlinelibrary.wiley.com/doi/10.1002/2014EO300001/full>
- 2014 **Lucas, A. J.**, G. P. Pitcher, T. A. Probyn, and R. M. Kudela. The influence of diurnal winds on phytoplankton dynamics in a coastal upwelling system. *Deep-Sea Res. II* 101: 50–62 <http://dx.doi.org/10.1016/j.dsr2.2013.01.016>

- 2014 Dupont, CL, Larsson J, Yooseph S, Ininbergs K, Goll J, Asplund-Samuelsson J, McCrow JP, Celepli N, Allen LZ, Ekman M, **Lucas A. J.**, Hagstrom A, Thiagarajan M, Brindefalk B, Richter AR, Andersson AF, Tenney A, Lundin D, Tovchigrechko A, Nylander JAA, Brami D, Badger JH, Allen AE, Rusch DB, Hoffman J, Norrby E, Friedman R, Pinhassi J, Venter JC, Bergman B. Functional tradeoffs underpin salinity-driven divergence in microbial community composition. *Plos One*. 9 <http://dx.doi.org/10.1371/journal.pone.0089549>
- 2014 E. Berdalet, M.A. McManus, O.N. Ross, H. Burchard, F.P. Chavez, J.S. Jaffe, I.R. Jenkinson, R. Kudela, I. Lips, U. Lips, **A.J. Lucas**, D. Rivas, M.C. Ruiz-de la Torre, J. Ryan, J.M. Sullivan, H. Yamazaki. Understanding harmful algae in stratified systems: Review of progress and future directions *Deep-Sea Res. II* 101: 4–20 <http://dx.doi.org/10.1016/j.dsr2.2013.09.042>
- 2014 G. C. Pitcher, T. A. Probyn, A. du Randt, **A.J. Lucas**, S. Bernard, H. Evers-King, T. Lamont, and L. Hutchings. Dynamics of oxygen depletion in the nearshore of a coastal embayment of the southern Benguela upwelling system. *J. Geophys. Res. Oceans* <http://dx.doi.org/10.1002/2013JC009443>
- 2012 Graham, R., F. Py, J. Das, **A. J. Lucas**, T. Maughan, and K. Rajan. Exploring space-time tradeoffs in autonomous sampling for marine robotics. *In: International Symposium on Experimental Robotics*. Springer Tracts in Advanced Robotics (STAR). Springer.
- 2011 **Lucas, A. J.**, C. L. Dupont, V. Tai, J. L. Largier, B. Palenik, and P. J. S. Franks. The green ribbon: Multiscale physical control of phytoplankton productivity and community structure over a narrow continental shelf. *Limnol. Oceanogr.* 56: 611–626, <http://dx.doi.org/10.1007/s12237-013-9606-3>
- 2011 **Lucas, A. J.**, P. J. S. Franks, and C. L. Dupont. Horizontal internal-tide fluxes support elevated phytoplankton productivity over the inner continental shelf. *Limnol. Oceanogr. Fluid. Env.* 1: 56–74 <http://lofe.dukejournals.org/content/1/56.full.pdf>
- 2011 Omand, M. M., J. J. Leichter, P. J. S. Franks, R. T. Guza, **A. J. Lucas**, and F. Feddersen. Physical and biological processes underlying the sudden surface appearance of a red tide in the nearshore. *Limnol. Oceanogr.* 56: 787–801, <http://dx.doi.org/10.4319/lo.2011.56.3.0787>
- 2010 Fodrie, F. J., L. A. Levin, and **Lucas, A. J.** Use of population fitness to evaluate the nursery function of juvenile habitats. *Mar. Ecol. Prog. Ser.* 385: 39–49 <http://dx.doi.org/10.3354/meps08069>
- 2007 Fodrie F. J., S. Z. Herzka, and **A. J. Lucas**. Intraspecific density regulates positioning and feeding mode selection of the sand dollar *Dendraster excentricus*. *J. Exp. Mar. Bio. Ecol.* 340(2): 169–183. <http://dx.doi.org/10.1016/j.jembe.2006.09.009>
- 2005 Hsieh C. H., S. M. Glaser, **A. J. Lucas**, and G. Sugihara. 2005. Distinguishing random environmental fluctuations from ecological catastrophes for the North Pacific Ocean. *Nature* 435(7040): 336–340. <http://dx.doi.org/10.1038/nature03553>
- 2005 **Lucas, A. J.**, R. A. Guerrero, H. W. Mianzan, M. A. Acha, and C. A. Lasta. Coastal oceanographic regimes of the Northern Argentine Continental Shelf. *Est. Coast. Shelf Sci.* 65(3): 405–420. <http://dx.doi.org/10.1016/j.ecss.2005.06.015>

In-preparation Publications & Technical Reports

- in prep **A. J. Lucas** and R. Pinkel. In situ evidence of global instability in shoaling internal solitary waves. *Geophysical Research Letters*

- in prep **A. J. Lucas**, M.A. Goldin, M.H. Alford, R. Pinkel. C-GEN: Towards a free-flooding motor/generator for oceanographic applications. *Journal of Atmospheric and Oceanic Technology*
- 2016 **A. J. Lucas** The City of Los Angeles LA Sanitation Environmental Monitoring Division Wirewalker Profiling Mooring. Report prepared for The City of Los Angeles Environmental Monitoring Division 2015 Hyperion Water Reclamation Plant Header replacement wastewater diversion project. 11 pp.
- 2009 **A. J. Lucas** The physical oceanographic control of phytoplankton dynamics over the Southern California Bight continental shelf. Ph.D. Dissertation. Scripps Institution of Oceanography. University of California, San Diego. 157 pp.
- 2003 Largier, J., M. Carter, M. Roughan, D. Sutton, J. Helly, B. Lesh, T. Kacena, P. Atjai, L. Clarke, **A.J. Lucas**, P. Walsh, L. Carrillo. 2003. Mission Bay Contaminant Dispersion Study. Prepared for City of San Diego, 77pp.

Invited Seminars and Selected Presentations to Professional Organizations

- 2016 International Symposium of Stratified Flows. San Diego. "Quasi-continuous observations of internal wave run-up over the inner continental shelf."
- 2016 Ocean Sciences Meeting. New Orleans. "Subduction, restratification, and the formation of barrier layers along an eddy edge."
- 2015 Dynamics of the Indian Ocean: Perspective and Retrospective, IIOE-2. "Upper ocean dynamics in the Bay of Bengal: early results from rapid profiling platforms employed during the ASIRI-OMM collaborative fieldwork."
- 2015 University of Southern California, Marine and Environmental Biology Seminar series. "Where, when, why the wild things are... the intricate relationship between physical dynamics and life in the sea."
- 2014 Ocean Sciences Meeting. Honolulu, Hawaii. "Direct observations of the shallow water evolution of the internal tide."
- 2013 Eastern Pacific Ocean Conference. "The influence of high frequency physical dynamics on Harmful Algal Blooms in stratified systems."
- 2013 Scripps Institution of Oceanography, Marine Ecology Seminar series. "The Impact of Diurnal/Inertial Resonance on Phytoplankton Dynamics in a Coastal Upwelling Area."
- 2012 GEOHAB Open Science Meeting, University of Victoria, Victoria, Canada. *Invited plenary talk*: "The physical dynamics that control Harmful Algal Bloom patterns and persistence in coastal environments."
- 2012 Department of Oceanography, University of Cape Town, Cape Town, South Africa. "The influence of diurnal winds and forced inertial coastal flows on phytoplankton productivity in the southern Benguela Current region."
- 2011 Bodega Marine Laboratory, University of California, Davis. "Contrasting physical modes of primary productivity control in internal wave dominated and wind dominated systems."
- 2010 Department of Oceanography, University of Cape Town, South Africa. 2010. "Quantifying internal tide fluxes to the inner continental shelf."
- 2009 Institute of Marine Science, University of California, Santa Cruz. "Multiscale physical control of phytoplankton productivity over a narrow continental shelf."
- 2007 Bodega Marine Laboratory, University of California, Davis. "The green ribbon: enhanced phytoplankton productivity and community composition gradients over the inner continental shelf."
- 2006 Humboldt Current System Conference. Lima, Peru. "Nonlinear state-space modeling reveals differences between the Humboldt and California Current systems."
- 2006 Instituto del Mar de Perú, Lima, Peru. May, 2006. "Distinguishing random fluctuations from nonlinear catastrophes for the North Pacific Ocean."

Supervised students

- 2017- Bofu Zheng (Ph.D. student), Scripps Institution of Oceanography. *Supervisor*
2014- Gregory Sinnett (Ph.D. student), Scripps Institution of Oceanography. *Committee Member*
2016- Jessica Carriere-Garwood (Ph.D. student), Scripps Institution of Oceanography. *Committee Member*
2016- Madeleine Hamann (Ph.D. student), Scripps Institution of Oceanography. *Committee Member*
2015- Tamara Schlosser (Ph.D. student), University of Western Australia. *Co-Supervisor*
2016- Rebecca McPherson (Ph.D. student), University of New Zealand. *Committee Member*

Supervised Undergraduate Interns

- 2016- Aoife Henry, University of Dublin, Ireland (UCSD exchange). *Undergraduate Student Researcher*
2016 Eli Simmons, University of Alaska, Fairbanks. *Marine Physical Laboratory Internship Program, SIO*
2016 Max Sun, University of California, San Diego. *Marine Physical Laboratory Internship Program, SIO*
2016 Jordan Field, University of California, San Diego. *Marine Physical Laboratory Internship Program, SIO*
2016 Eva Loeser, Brown University. *Marine Physical Laboratory Internship Program, SIO*
2015 Hannah Sadler, University of San Diego. *Marine Physical Laboratory Internship Program, SIO*
2015 Peter Braun, University of California, San Diego. *Marine Physical Laboratory Internship Program, SIO*
2015 Irene Globus-Harris, Reed College. *Marine Physical Laboratory Internship Program, SIO*
2015 Benjamin Ryan, University of California, Davis. *Marine Physical Laboratory Internship Program, SIO*
2006 Robert Combs, University of California, San Diego. *Undergraduate Student Researcher*

Teaching

- 2018 Department of Mechanical and Aerospace Engineering (MAE 207): Ocean Instrumentation Design and Development: from open-source to under-sea *Instructor*
2017 Department of Mechanical and Aerospace Engineering (MAE 3): Introduction to Engineering Graphics and Design. *Instructor*
2017 Scripps Institution of Oceanography (SIO 60): Experiences in Oceanic and Atmospheric Science. *Instructor*
2016-2017 Coastal Ocean Environmental Summer School in Ghana. University of Ghana, Legon. *Instructor*
2015 Scripps Institution of Oceanography (SIO 278): Proposal writing and experimental design. *Co-Instructor*. Matthew Alford, instructor.
2014 Scripps Institution of Oceanography (SIO 219): Proposal writing and experimental design. *Guest Instructor and Student Proposal Mentor*. Matthew Alford, Instructor
2011 Bodega Marine Laboratory (ESP 152): Coastal Oceanography. *Instructor*
2008 Scripps Institution of Oceanography (SIO 280): Biological Oceanography. *Teaching Assistant*. Peter Franks, Instructor
1998 Pomona College: Aquatic Biology. *Teaching Assistant*. Larry Oglesby, Instructor

University and Professional Service

- 2012-2016 *Ad hoc* Academic Review Committee.
2015-2016 *Faculty advisor* U.C. Ship Funds cruises.
2007-2009 Marine Sciences Physical Planning Committee, Scripps Institution of Oceanography.
2006 Co-chair, SIO Teaching Award Committee, Scripps Institution of Oceanography.

Reviewer *NSF Division of Ocean Sciences: Physical Oceanography Program, Biological Oceanography Program, Chemical Oceanography Program, Journal of Physical Oceanography, Journal of Geophysical Research, Geophysical Research Letters, Limnology and Oceanography, PLOS-One, Oceanography, Continental Shelf Research,*

Technology Development

2006– **The Wirewalker wave-powered profiling vehicle.** The Wirewalker was developed at Scripps Institution of Oceanography under ONR and NSF funding. I began working with the Wirewalker during my Ph.D., have continued working on Wirewalker development as a Researcher at SIO. I am currently funded by an Office of Naval Research Defense University Research Instrumentation Program (DURIP) grant to continue the development of a real-time data telemetry system for the Wirewalker platform, within the context of an ONR DRI to develop a ship-of-opportunity (non-specialist) deployable, long-endurance WW platform, and have pending proposals for the development of a motorized Wirewalker for under-ice and stable platform (e.g. R/P FLIP, oil platforms) deployments. **The Wirewalker technology was licensed to a private company, Del Mar Oceanographic, in 2015 (Lucas, co-founder).** www.delmarocean.com

2014– **C-Gen: Undersea power generation using ambient ocean currents.** A major challenge to long-term observations of the deep ocean is the available power for sensors. Many of these sensors have very low power requirements ($\ll 1W$). Therefore, modest local power generation can greatly enhance the endurance of these instruments. I am currently funded by an Anonymous donor to SIO in the form of a Technology Development Grant to leverage our ONR-funded wave-power generator to low-Wattage production from ambient currents at depth.

2012– **Fiber Optic Distributed Temperature Sensor (FO-DTS) Coastal Deployment Systems.** Developed for the petroleum industry, the FO-DTS system is a transformative technology capable of measuring temperature along a 10km-long fiber optic cable with 5 m spatial resolution every 30 seconds. Past funding to our group from ONR and NSF allowed us to adapt the technology to the field of oceanography. The resulting techniques are now being used by others in the community. In 2015, I received an ONR DURIP to purchase a Fiber Optic DTS system and build a specialized deployment winch.

Major field observation efforts

2017 **Principal Investigator** *Lake Superior*. National Science Foundation-funded Near-inertial motions in the presence of a coastline. August – September 2016. Led the deployment of a moored array of seven Wirewalkers in Lake Superior.

2017 **Principal Investigator** *Seychelles*. Office of Naval Research (ONR) Northern Arabian Sea Circulation-Autonomous Research DRI. March, 2016. Designed and implemented a one-way, expendable, fully telemetered Wirewalker systems, deployed in the equatorial Indian Ocean

2016 **Principal Investigator** *R/V Roger Revelle*. Office of Naval Research (ONR) SKII Process Study cruise. South China Sea, February 2 – February 25, 2016. Implement multi-autonomous-asset investigation of the influence of submesoscale dynamics on water mass exchange in the Bay of Bengal.

2016 **Principal Investigator** *Doubtful Sound, New Zealand*. National Institute of Water and Atmospheric Research, New Zealand (NIWA)-funded Stratified flows in coastal environments. Manapouri Hydroelectric Plant Tail-Race, August 21 – September 21, 2015. Led the implementation of small-vessel rapid sampling of buoyant plume/fjord interaction.

2015

- Principal Investigator** *R/V Roger Revelle*. Office of Naval Research (ONR) Air-Sea Interactions Research Initiative (ASIRI) Process Cruise III. Bay of Bengal, August 21 – September 21, 2015. Participated in the implementation of multi-ship, multi-autonomous-asset investigation of the influence of submesoscale dynamics on air-sea interactions in the Bay of Bengal.
- 2015 **Co-Principal Investigator** *R/V Roger Revelle*. Australian Research Council (ARC). T-SHELF: Internal tide dynamics over the Tasman Sea continental shelf. Feb. 6 – Feb. 27, 2015. Mooring and autonomous profiling vehicle investigation of internal wave dynamics driving sediment resuspension over the Tasman continental shelf. Collaboration with NSF-funded Tasman Sea Tidal Experiment (TTIDE).
- 2014 **Chief Scientist and Principal Investigator** *R/V Roger Revelle*. ONR-ASIRI Process Cruise II. Bay of Bengal, June 14 – July 1, 2014. Oversaw the implementation of multi-national investigation of submesoscale dynamics in the Bay of Bengal, including autonomous and shipboard activities, during the southwest monsoon.
- 2014 **Principal Investigator** *R/V Roger Revelle*. ONR Submesoscale Dynamics in the South China Sea Process Cruise. South China Sea, January 24 – Feb. 22, 2014. Multi-autonomous asset and shipboard investigation of the submesoscale dynamics in the South China Sea driven by the Kuroshio Loop Current during the northeast monsoon.
- 2013 **Chief Scientist and Principal Investigator**, *R/V Roger Revelle*. ONR-ASIRI Process Cruise I. Bay of Bengal, November 08 – November 21, 2013. Oversaw the implementation of multi-national investigation of submesoscale dynamics in the Bay of Bengal, including autonomous and shipboard activities, during the inter-monsoon period.
- 2013 **Investigator** National Science Foundation (NSF) Grant: Optical monitoring of ocean temperature over scales 10m to 10 km. Installed the first long-term fiber-optic based Distributed Temperature Sensing system in the coastal ocean (off SIO pier).
- 2012 **Co-Principal Investigator**. NSF RAPID: Assessing the Ecophysiological and Biogeochemical Response to Deliberate Nutrient Loading in the Southern California Bight. Oversaw the development of a set of wave-powered profiling vehicles (the Wirewalker) to monitor the biophysical response to a planned wastewater diversion event.
- 2010–2011 **Principal Investigator**. NSF International Postdoctoral Fellowship: Designed and implemented two long-term Wirewalker mooring experiments within St. Helena Bay, South Africa and Monterey Bay, California, to investigate the physical control of HAB bloom dynamics.