

Veronica P. Lance

CURRENT AFFILIATION: Lamont-Doherty Earth Observatory at Columbia University
POSITION: Postdoctoral Research Scientist

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EDUCATION: Duke University, Durham, NC 9/2000 – 5/2007
Ph.D., Nicholas School of the Environment and Earth Sciences
1st International Summer School on Surface Ocean-Lower Atmosphere Study (SOLAS)
Université de Corse, France 30 June – 11 July 2003
East Carolina University, Greenville, NC 1992-1996
B.S. Biology /Chemistry minor *Magna cum laude*
Centenary College, Hackettstown, NJ 1984-1990
Evening classes toward B.A. in Business

PROFESSIONAL POSITIONS AND APPOINTMENTS:

2007 – present Postdoctoral Research Scientist, Lamont-Doherty Earth Observatory at Columbia University,
Palisades, NY USA
2000-2007 Teaching assistant, Research Assistant, Research Fellow while Ph.D. student; Duke University
Marine Laboratory, Beaufort, NC, USA
1997-2000 Research Technician II; Duke University Marine Laboratory, Beaufort, NC, USA
1996-97 Research Technician; East Carolina University, Greenville, NC, USA

HONORS/AWARDS: Duke University Marine Laboratory Teaching Assistantships (2000-2004; 2006)
Evolution of Photoautotrophs Symposium Participant/Travel Award (2006)
Duke University Marine Laboratory Research Assistantship (2005-06)
Duke University Marine Laboratory Research Fellowship (2004-05)
Duke University Graduate Student Travel Fellowship (2005)
Duke University Graduate Student Travel Fellowship (2004)
1st Int'l Summer School on Surface Ocean-Lower Atmosphere Study (SOLAS - 2003)
Monterey Bay Aquarium Research Institute Summer Internship (2001)
Mary Caughey Helms Senior Award, East Carolina University (1995-96)
Detlev M. Bunker Memorial Scholarship, East Carolina University (1995-96)
East Carolina University Biology Department Travel Award (1996)
East Carolina University Dean's List (1993-1996)

CRUISE EXPERIENCE:

July 2008 Quantum Efficiency Leg 3, R/V Cape Hatteras, Northwestern and midwestern Atlantic
(Vaillancourt – NSF)
Feb-Apr 2008 Southern Ocean Gas Exchange Experiment (SOGasEx), NOAA ship Ronald H. Brown, Southern
Ocean, Atlantic Sector (Ho and Sabine – NOAA, NASA, NSF).
August 2007 Quantum Efficiency at BATS, Leg 2, R/V Atlantic Explorer, Bermuda Atlantic Time Series
(Marra – NSF)
April 2007 Quantum Efficiency at BATS, Leg 1, R/V Atlantic Explorer, Bermuda Atlantic Time Series and
nearby mode water eddy (Marra – NSF)
Jan-Feb 2007 WP2, R/V Kilo Moana, Phylogenetic Diversity of *Prochlorococcus* in the Western Pacific,
(Johnson – NSF)
Aug-Oct 2006 EUCFe, R/V Kilo Moana, Source of Iron in the Equatorial Undercurrent, (Murray – NSF)
August 2004 Eddy Cruise R/V Cape Hatteras, Mid Atlantic Gulf Stream Frontal Eddy, (Hyrenbach, Johnston
and Lance – DUNCOC)

September 2003 AOSNII Leg 3 R/V Point Sur, Monterey Bay/Coastal CA, (McManus - MBARI)
 August 2003 AOSNII Leg 2 R/V Point Sur, Monterey Bay/Coastal CA, (McManus - MBARI)
 July 2003 AOSNII Leg 1 R/V Point Sur, Monterey Bay/Coastal CA, (McManus - MBARI)
 May 2003 GOCNB, R/V Western Flyer, Gulf of California – Northbound Transit, (Collins – MBARI)
 June 2002 SECRET 302 R/V Western Flyer, California Current, (Pennington – MBARI)
 July 2002 MUSE2 R/V Western Flyer, Davenport/Big Sur CA Coast, (Chase - MBARI)
 Jan-Feb 2002 SOFeX (Southern Ocean Iron Experiment) R/V Roger Revelle, (Johnson – NSF)
 August 2001 SECRET 301 R/V Western Flyer, California Current, (Pennington – MBARI)
 August 1999 NAVO R/V Cape Hatteras, Onslow Bay, NC, NAVO

LABORATORY/FIELD RESEARCH EXPERIENCE:

Spring 2005 Kinetics of quantum yield response of *Thalassiosira weissflogii* to iron enrichment. NOAA Beaufort Lab
 Summer 2001 Iron, and the climatology of transmissivity, chlorophyll, and nitrate in the Monterey Bay National Marine Sanctuary. MBARI Summer Internship
 Fall 2000 Silica concentrations in *Thalassiosira weissflogii* grown in iron-replete and iron-deficient cultures. NOAA Beaufort Lab
 1997-2000 Research Technician II; Duke University Marine Laboratory, Beaufort, NC - Nitric oxide interactions with structure and function of hemoglobins and other respiratory proteins.
 1996/97 Research Technician; East Carolina University, Greenville, NC - Physicochemistry and benthic food availability in created vs. natural, and oligohaline vs. polyhaline, estuarine habitats.
 1995/96 Sediment protein as a measure of benthic food quality in created vs. natural oligohaline habitats.
 1994 “Reference” wetlands field and data technician
 1993 Effects of thin-layer dredge spoils on a *Juncus roemerianus* marsh.

TEACHING EXPERIENCE:

Fall 2006 Biological Oceanography – Instructor. Responsible for entire course with lecture, lab and day cruises. Supervised graduate student teaching assistant.
 Fall 00 & 04 Analysis of Ocean Ecosystems – Presented substitute lectures on the global carbon cycle and microbial loops.
 Fall 00, 01, 03 & Spring 04 Marine Ecology – Teaching Assistant. Developed laboratory curriculum, taught field and classroom labs; led several day-trip teaching/research cruises in the Pamlico Sound of North Carolina aboard the R/V Susan Hudson.
 Spring 02 & 03 Biological Oceanography – Teaching Assistant. Taught field and classroom labs; led day-trip teaching/research cruises in the Newport River and Core Sound aboard R/V Susan Hudson.
 Spring 03 Sensory Physiology and Behavior of Marine Animals – Teaching Assistant. Assisted students with independent lab projects.
 Fall 02 General Physics – Teaching Assistant. Set up laboratories; guide students to empirically discover the laws of classical mechanics and thermodynamics.

GRANTS AWARDED:

2008 Lamont-Doherty Advisory Board Innovation Fund; \$25,000; Carbon productivity responses to increased dissolved inorganic carbon concentrations in surface ocean.
 2008 Lamont-Doherty Climate Center; \$8,000; Miniconference; Carbon productivity responses to increased dissolved inorganic carbon concentrations in surface ocean: Exploring the feasibility of an *in situ* mesoscale carbon addition experiment.
 2008 Lamont-Doherty NSF Advance Fund: ~\$4,000; Supplemental funding for workshop. Carbon productivity responses to increased dissolved inorganic carbon concentrations in surface ocean: Exploring the feasibility of an *in situ* mesoscale carbon addition experiment.

PUBLICATIONS:

- Marchetti, A., D.E. Varela, V.P. Lance, Z.I. Johnson, E.V. Armbrust. 2010. Iron and silicic acid controls on phytoplankton composition and productivity assessed by Si, C and N utilization in the central Equatorial Pacific Ocean. *Limnology and Oceanography*, 55(1); 11-29.
- Hiscock, M.R., V.P. Lance, A. Apprill, R.R. Bidigare, Z.I. Johnson, B.G. Mitchell, W.O. Smith, Jr., and R.T. Barber. 2008. Photosynthetic maximum quantum yield increases are an essential component of the Southern Ocean phytoplankton response to iron. *Proceedings of the National Academy of Science of the USA*, 105(12) 4775-4780, doi#10.1073#pnas.0705006105.
- Lance, V. P., M.R. Hiscock, A.K. Hiltling, D.A. Steube, R.R. Bidigare, W.O. Smith, Jr., R.T. Barber. 2007. Primary productivity increases and differential phytoplankton pigment composition responses in two Southern Ocean in situ iron enrichments. *Deep Sea Research Part I*, doi:10.1016/j.dsr.2007.02.008.
- Buesseler, K. O., J. E. Andrews, S. Pike, M. A. Charette, L. E. Goldson, M. A. Brzezinski, and V. P. Lance. 2005. Particle export during the Southern Ocean Iron Experiment (SOFeX). *Limnology and Oceanography*, 50(1), 311-327.
- Coale, K. H. et al. 2004. Southern ocean iron enrichment experiment: Carbon cycling in high- and low-Si waters. *Science* 304, 408-414.
- Bonaventura, J. and V.P. Lance. 2001. Nitric oxide, invertebrates and hemoglobin. *American Zoologist*, 41:346-359.

PUBLICATIONS IN PROGRESS:

- Johnson, Z.I, Ragini S., Ritchie, A.E., Mioni, C., Lance. V.P., Murray, J., Webb E.A., Zinser, E.R., The effects of iron- and light-limitation on phytoplankton communities of deep chlorophyll maxima of the Western Pacific Ocean. *Submitted (2010)*.
- Lance, V.P. and R.T. Barber. Annual carbon productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. *In preparation (2009)*.
- Lance, V.P., P. Strutton, R. Vaillancourt, B. Hargreaves, J. Marra. Primary productivity, new productivity and phytoplankton photophysiology during the Southern Ocean Gas Exchange (SOGasEx) *In preparation (2009)*.
- Lance, V.P., Z.I. Johnson, A.E. Ritchie and J. Murray, R.T. Barber. Primary Productivity in the Western Pacific. *In preparation (2009)*.

INVITED PRESENTATIONS:

- 16 September 2009, How will phytoplankton respond to ocean acidification? Lamont-Doherty Earth Observatory Advisory Board Meeting, Palisades, NY USA.
- 17 April 2009, Carbon Productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. Dept. of Marine Sciences, University of Connecticut, Avery Point, CT USA.
- 21 October 2008, Carbon productivity in the Southern Ocean. Dept. of Geology, City University of New York, Brooklyn College, Brooklyn, NY USA.
- 7 December 2005, Annual carbon productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. Dept. of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA, USA.
- 6 October 2005, Annual carbon productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. Biology Dept., East Carolina University, Greenville, NC, USA.

MEETING ABSTRACTS:

- Lance, V.P., P. Strutton, R. Vaillancourt, B. Hargreaves, J. Marra. Primary productivity, new productivity and export during the Southern Ocean Gas Exchange (SOGasEx) Lagrangian tracer experiments. Ocean Sciences Meeting, 4-6 May, 2010, Portland, OR USA.
- Sabine, C.L., R.A., Feely, P.G., Strutton, V.P. Lance, M.D. DeGrandpre, L.W. Juranek. A Carbon Mass Balance for the Southern Ocean GasEx Experiment. Ocean Sciences Meeting, 4-6 May, 2010, Portland, OR USA.
- Vaillancourt, R D, Marra, J, Lance, VP, Does density stratification control photosynthetic quantum yield at the deep chlorophyll maximum? Ocean Sciences Meeting, 4-6 May, 2010, Portland, OR USA.

- Lance, V.P., P. Strutton, R. Vaillancourt, J. Marra. Primary productivity, new productivity and phytoplankton photophysiology during the Southern Ocean Gas Exchange (SOGasEx) Lagrangian tracer experiments. NASA Ocean Color Research Team Meeting, 4-6 May, 2009, New York, NY USA.
- Lance, V.P., P. Strutton, R. Vaillancourt, J. Marra. Primary productivity and carbon export during the Southern Ocean Gas Exchange (SOGasEx) Lagrangian tracer experiments. "Unknown knowns and known unknowns: Chemical oceanography in a changing world" Symposium. Skidaway Institute of Oceanography, 22-24 February 2009, Savannah, GA USA.
- Marra, J., E. Capuzzo, V.P. Lance, V. Montecino, R. Vaillancourt. Phytoplankton respiration determined by carbon assimilation dilution. ASLO Aquatic Sciences Meeting, 25-30 January 2009, Nice, France.
- Lance, V.P., P. Strutton, R. Vaillancourt, J. Marra. Primary productivity and carbon export during the Southern Ocean Gas Exchange (SOGasEx) Lagrangian tracer experiments. AGU, 15-19 December 2008, San Francisco.
- Vaillancourt R.D., V.P. Lance, J. Marra. ON DEQUE: Optical and Nutrient-DEpendence of QUantum Efficiency. Preliminary results from the Western North Atlantic Ocean. AGU, 15-19 December 2008, San Francisco, USA
- Hargreaves, B.R., Lance, V.P., Vaillancourt, R., Marra J., An improved T-R System for Filterpad Measurement of Phytoplankton Spectral Absorption, Ocean Optics XIX, Castelveccchio Pascoli, ITALY, 6-10 October, 2008.
- Vaillancourt, R., J. Marra, V.P. Lance and B.R. Hargreaves. Carbon dioxide drawdown during Southern Ocean GasEx: A preliminary assessment of the role of phytoplankton. NASA Carbon Cycle and Ecosystem Science Joint Science Workshop, 28 Apr – 2 May 2008, Adelphi, MD, USA.
- Lance, V.P., Z.I. Johnson, A.E. Ritchie and R.T. Barber. Primary Productivity and the contribution by a "Prochlorococcus size-fraction" in the Western Pacific. *Prochlorococcus*fest 2008 Colloquium, 30-31 May 2008, Cambridge, Massachusetts, USA.
- Lance, V.P., Z.I. Johnson, A.J. LeFevre, A. Ritchie, and R.T. Barber. Primary productivity regulation in the western and central Pacific near the initiation and termination of the 2006-2007 moderate ENSO event. 2008 Ocean Sciences Meeting, 2-7 March 2008, Orlando, Florida, USA.
- Marchetti, A., E.V. Armbrust, S. Bonnet, Z.I. Johnson, V.P. Lance, and D. Varela. A comparison of biogeochemical controls on phytoplankton composition and productivity in the eastern (140°W) versus western (165°E) equatorial Pacific. 2008 Ocean Sciences Meeting, 2-7 March 2008, Orlando, Florida, USA.
- Lance, V.P., R.T. Barber. Annual carbon export productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. Ocean Carbon and Biochemistry Summer Workshop, 23-26 July 2007, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA.
- Lance, V.P., K.O. Buesseler, R.T. Barber. Annual carbon export productivity in the Southern Ocean: Revisiting the Martin Iron Hypothesis. AGU/ASLO/TOS Ocean Sciences Meeting, 20-24 Feb. 2006, Honolulu, HI USA
- Lance, V.P. Carbon productivity and flux in an iron-replete southern ocean. ASLO Summer 2005 meeting, 19-24 June 2005, Santiago de Compostela, Spain.
- Lance, V.P. and R.T. Barber, Photosynthetic performance in Southern Ocean *in-situ* iron-enrichment experiments, Polar Marine Science Gordon Research Conference - Climate Feedbacks and Trophic Shifts in Polar Seas 13-18 March 2005, Ventura, CA, USA.
- Bonaventura J., Lance V.P., Moens L., DeWilde S., Fusaro T.T., Gow A.J. Globin structure determines heme reactivity with NO: lessons from invertebrates. 3rd International Conference on the Biology, Chemistry and Therapeutic Applications of Nitric Oxide. 24-28 May 2004, Nara, Japan.
- Lance, V.P. Primary productivity and photosynthetic performance in Southern Ocean *in situ* iron-enrichment experiments. JGOFS Synthesis and Modelling Project Final Meeting, 12-15 July 2004, Woods Hole, MA.
- Lance, V.P., M.R. Hiscock, R.R. Bidigare, K.O. Buesseler, W.O. Smith, R.T. Barber. Primary productivity and chlorophyll response signatures for an *in situ* mesoscale Pacific sector Southern Ocean Fe enrichment experiment (SOFEX) at 55°S and 66°S. ASLO/TOS Ocean Research 2004 Conference, 15-20 Feb. 2004, Honolulu, Hawaii, USA.
- Hiscock, M.R., V.P. Lance, A. Apprill, R.R. Bidigare, B.G. Mitchell, R.T. Barber. Iron elevates photosynthetic efficiency of most, but not all, phytoplankton: Implications for Southern Ocean iron enrichment and primary production algorithms. ASLO/TOS Ocean Research 2004 Conference, 15-20 Feb. 2004, Honolulu, Hawaii, USA.
- Pennington, J.T., R.P. Michisaki, C.A. Collins, V. Kuwahara, V.P. Lance, B. Marinovic, F.P. Chavez. Alongshore variability of the California Current System from central to Baja California in winter and spring 2003:

- Physical, chemical and biological properties. ASLO/TOS Ocean Research 2004 Conference, 15-20 Feb. 2004, Honolulu, Hawaii, USA.
- Lance, V.P., M. Armstrong, J.T. Pennington, Z. Chase, K.S. Johnson, F.P. Chavez. Quantum yield of photosynthesis in relation to iron in the California coastal upwelling system. Final JGOFS Open Science Conference, 4-9 May 2003, Washington DC.
- Lance, V.P., M.R. Hiscock, A.K. Hilting, L. Delizo, D.A. Stuebe, S.J. Tanner, A. Apprill, W.O. Smith, Jr. and R.T. Barber. Primary Productivity and Size-Fraction Shifts During an *in situ* Southern Ocean Iron Fertilization Experiment (SOFEX). AGU Fall Meeting, 6-10 Dec. 2002, San Francisco, CA.
- Lance, V.P. and A. Hilting. Arabian Sea Primary Productivity: Observations from the 1995 US JGOFS Expedition. AGU/ASLO 2000 Ocean Sciences, 24-28 Jan. 2000, San Antonio, TX.
- Bonaventura, J. and V.P. Lance. Nitric oxide, invertebrates and hemoglobin. Nitric oxide in the invertebrates: Comparative physiology and diverse functions invited symposium. 2000 SICB Annual Meeting, 4-8 Jan. 2000, Atlanta, GA.
- West, T.L., L.M. Clough and V.P. Lance. Infaunal community structure, physicochemistry, and food availability in created vs. natural, and oligohaline vs. polyhaline, estuarine habitats. International Conference on Concepts and Controversies in Tidal Marsh Ecology, April 5-9, 1998, Vineland NJ.
- Clough, L.M.; T.L. West, and V.P. Lance. Infauna and estimates of food availability: Seasonal patterns in different locations. Benthic Ecology Meetings. March 12-15, 1998, Melbourne FL.
- Lance, V.P., Clough L.M., West, T.L. Temporal variation in infaunal community structure and food availability in high stress estuarine habitats. ASLO Aquatic Sciences Meeting, Feb. 1997, Santa Fe NM.
- Lance, V.P., Clough L.M., West, T.L., Syster, D.A. Food availability in oligohaline sediments: A worm's perspective. Marine Benthic Ecology Meeting, March 1996, Columbia SC.

NON-PEER REVIEWED REPORTS, PUBLICATIONS, OUTREACH:

- Lance, V.P. "Assessing Effects of Rising Carbon Dioxide Levels on Ocean Ecosystems: Exploring an in Situ Open Ocean Mesoscale CO₂/pH Perturbation Experiment; Palisades, New York, 23–24 March 2009" *EOS Transactions*, American Geophysical Union Volume 90, Number 29, 21 July 2009.
- Lance, V.P.; "Exploring the feasibility of an in situ mesoscale carbon addition experiment". *Ocean Carbon & Biogeochemistry News*, Volume 2, Number 2, Spring 2009.
- Lance, V.P., P.G. Strutton, R.D. Vaillancourt, B. Hargreaves, J.F. Marra, SOGasEx primary productivity, new productivity (export proxy), phytoplankton photophysiology & assemblage, SOGasEx Data Workshop, 14 Dec. 2008, San Francisco, CA, USA.
- Lance, V.P. Primary productivity in the Western Pacific warm pool, WP2 Data Workshop, 2008, 9 Sep. 2008, Honolulu, HI, USA.
- Lance, V.P. Primary Productivity – Blog entry on SOGasEx website, 30 March, 2008
- Lance, V.P. Primary production and its regulation in the central and western Pacific: A serendipitous opportunity to study complementary regions in space and time during the moderate 2006-2007 El Niño event. *SOLAS Newsletter*, Issue 6, Winter 2007.
- Lance, V.P. and R.T. Barber, EUC Fe Primary Productivity, EUC Fe Data Workshop, 18-19 Sept. 2007, Seattle, Washington, USA.

PROFESSIONAL SERVICE:

- Participant: Ocean Observatories Initiative Science Community Workshop, NSF, Nov. 11-12 2009
- Participant, Rapporteur: New Frontiers in Southern Ocean Biogeochemistry and Ecosystem Research; OCB Scoping Workshop: June 8-11, 2009
- Participant: Observing Biogeochemical Cycles at Global Scales with Profiling Floats and Gliders; OCB Scoping Workshop April 28-30, 2009
- Participant: Evolution of Photoautotrophs Symposium, Rutgers University; May 2006
- Manuscript reviewer: Deep Sea Research I; Deep Sea Research II; Marine Ecology Progress Series; Marine Environmental Research
- Proposal reviewer: National Science Foundation (Biological Oceanography; Chemical Oceanography; Polar Programs Antarctic Division; Div. of Ocean Sciences for NSF-wide MRI proposal)
- AGU Committee: AGU Perlman Award Committee - 2009 to present

OTHER PROFESSIONAL ACTIVITIES AND OUTREACH:

- 2008 to present BPE Division Rep. to LDEO Website Committee

2007 to 2009	Seminar Coordinator for Biology and Paleoenvironment Div., LDEO
October 2007, 2008	Lamont-Doherty Earth Observatory Open House – 2007 & 2008
October 2007	Hudson River Snapshot Day 2007
February 2007	North Carolina Ocean Sciences Bowl Volunteer – Team Challenge Judge
March 2006	North Carolina Ocean Sciences Bowl Volunteer – Science Judge
January 2006	Evolution of Photoautotrophs Symposium Participant
2002 – Present	Radiation Safety Laboratory Manager for Barber Lab, Duke University
2005 - 2006	Duke University Marine Laboratory Seminar Series Co-coordinator
February 2005	North Carolina Ocean Sciences Bowl Volunteer – Science Judge
Fall 2004	Duke Marine Laboratory Graduate Student MiniSymposium Coordinator
August 2004	NSF Antarctic Sciences New Investigator Workshop Participant
March 2003	ASLO Student Representative Candidate
March 2003 - May 2004	Duke Marine Laboratory PhD Student Representative
Fall 2002	Duke Marine Laboratory Graduate Student MiniSymposium Coordinator
Fall 2001	Duke Marine Laboratory Superspeaker Coordinator
January 2001	NC Ocean Sciences Bowl Volunteer – Timekeeper
1994-1996	Member (Officer, 1995) Aquatic Science Club, East Carolina Univ.

STUDENTS ADVISED:

Sarah Fackler, U. Penn.; Summer 2009 - LDEO Summer Intern Program

Katherine Lee, Elon College; Summer 2008 - LDEO Summer Intern Program – co-advised with R. Vaillancourt
 1996-2000 As laboratory technician, I frequently trained graduate and undergraduate students in a variety of laboratory skills and procedures and assisted in advising undergraduate independent research projects.

PROFESSIONAL AFFILIATIONS:

American Geophysical Union
 American Society for Oceanography and Limnology
 The Oceanography Society