Major Emily L. Lilly

Contact Information

Assistant Professor
Biology Department
Virginia Military Institute
Lexington, VA 24550

Phone: 540-464-7423
Fax: 540-464-7661
Email: lillyel10@vmi.edu

Education

Harvard University — **Cambridge, MA**
NASA Exobiology Postdoctoral Fellow, 2003 - 2005
Advisor: Colleen Cavanaugh

Massachusetts Institute of Technology and Woods Hole Oceanographic Institution Joint Program — **Cambridge and Woods Hole, MA**
Ph.D. in Biological Oceanography, 2003
Advisor: Donald M. Anderson
Dissertation: Phylogeny & Biogeography of the Toxic Dinoflagellate *Alexandrium*

Smith College — **Northampton, MA**
B.A. *summa cum laude*, with highest honors in Biology, 1998
Thesis Advisor: Paulette M. Peckol
Honors Thesis: Physiological Responses of the Coral *Porites asteroides* and its Algal Symbionts to Moderate Phosphate Enrichment

Simon's Rock College of Bard — **Great Barrington, MA**
A.A. with distinction, 1996

Appointments

2010-present	**Assistant Professor** Biology Department, Virginia Military Institute
2009-2010	**Lecturer** Department of Biological and Environmental Sciences, Longwood University
2008-2009	**Visiting Lecturer** Biology Department, University of Virginia
2005-2009	**Assistant Professor** Biology Department, University of Massachusetts Dartmouth
2003-2005	**Postdoctoral Fellow** Department of Organismic and Evolutionary Biology, Harvard University
2002-2003	**Visiting Professor** Department of Natural Sciences, Babson College
2000	**Guest Student** Centre for Marine Studies, University of Queensland
1998-2003	**Graduate Research Fellow** Biology Department, Woods Hole Oceanographic Institution
1997-1998	**Undergraduate Research Intern** Divisions of Marine Biology and Fisheries Rosenstiel School of Marine and Atmospheric Science
1997	**Howard Hughes Undergraduate Research Fellow** Biology Department, Smith College

Courses Taught

Assistant Professor, Virginia Military Institute, 2010-present

Genetics: a required course for all Biology Majors, including both theoretical and practical applications of Mendelian and modern molecular genetics.

Molecular Biology: an upper-level elective providing students with practical experience in molecular techniques.

Introductory Biology, II: the second semester of an introductory biology course, using human biology as a focus to teach biological principles.

Lecturer, Longwood University, 2009-2010

Environmental Science: a non-major science course with laboratory, covering ecology, human impacts on the environment, and potential solutions to current environmental problems.

Assistant Professor, **University of Massachusetts, Dartmouth**, 2005-2009

Bioinformatics: a hands-on experience in the fundamentals of bioinformatics and genomic analysis, from protein modeling to comparative genomics.

General Microbiology: microbial physiology, medical microbiology, molecular biology, genetic engineering, diversity, ecology, and virology.

Marine Microbiology: a seminar with lab for seniors and graduate students covering diversity, virology, harmful algae, and marine pathogens.

Microbial Symbiosis: a seminar style course for seniors and graduate students investigating beneficial symbiosis involving microbial symbionts.

Biology of Organisms, I: The first course for biology majors, covering cell biology, metabolism, genetics, and evolution.

Biology of Organisms, II: The second course for biology majors, covering organismal biology, human anatomy, and immunology.

The Ocean Environment: a non-major course covering the origins, physics, chemistry, geology, and biology of the oceans, including climate change.

Teaching Fellow, **Harvard University**, Spring 2004-Spring 2005

Genetics: a first-year course. I taught two sections of 14 students each, leading discussion, recitation, and laboratory sections.

- Awarded the Certificate of Distinction in Teaching for Excellence in Undergraduate Education, 2005.

Biology of Symbiosis: a seminar style course for seniors and graduate students. As teaching fellow, I designed and led laboratory sessions, some lectures, and class discussion.

Visiting Professor, **Babson College**, Spring 2002-Spring 2003

Course Director, Spring 2003

Marine Science: a non-major fundamental science course. I taught two sections of 36 students.

Oceanography: a new non-major fundamental science course. I assisted Professor Jim Phillips with designing and teaching laboratories.

Instructor, Spring 2002-Fall 2002

Marine Science Laboratory: developed lectures and ran two weekly lab sections, covering physics, chemistry, geology, and biology of the oceans.

Teaching Assistant, **Sea Education Association**, Spring 2002
Oceanography: presented two lectures, designed and ran laboratories, advised on research projects, and graded assignments and exams.

Instructor, **Woods Hole Children's School of Science**, July 2001
Life Under the Microscope: an intensive laboratory course for 12-13 year-olds covering microbial life in the air, land, and sea.

Teaching Assistant, **Massachusetts Institute of Technology**, Spring 2001
Biological Oceanography: a graduate course. I wrote and presented a lecture on planktonic symbioses, conducted weekly review sessions, developed class problems sets, tutored, and graded assignments and exams.

Publications

Stern, R.F., Andersen, R.A., Jameson, I. Küpper, F.C., Coffroth, M.-A., Vaulot, D., Le Gall, F., Véron, B., Brand, J.J., Skelton, H., Kasai, F., **Lilly, E.L.,** and Keeling, P.J. Evaluating The Ribosomal Internal Transcribed Spacer (ITS) as a Candidate Dinoflagellate Barcode Marker. *Submitted.*

Lilly, E.L. 2011. Assigned positions for in-class debates influence student opinions. International Journal of Teaching and Learning in Higher Education, 24(1):*in press.*

Lilly, E.L., Halanych, K., and Anderson, D. M. 2007. Species boundaries and global biogeography of the dinoflagellate "*A. tamarense*" complex of the dinoflagellate genus *Alexandrium* (Dinophyceae). Journal of Phycology, 43: 1329-1338.

Orlova, T.Y., Selina, M.S., **Lilly, E.L.** Kulis, D.M. and Anderson, D.M. 2007. Morphogenetic and toxin composition variability of *Alexandrium tam*arense (Dinophyceae) from the east coast of Russia. Phycologia, 46(5): 534-548.

Persich, G.R., Kulis, D., **Lilly, E.L.,** Anderson, D.M. and Garcia, M.T. 2006. Probable origin and toxin profile of *Alexandrium tamarense* (Lebour) Balech from southern Brazil. Harmful Algae, 5(1): 36-44.

Lilly, E.L., Halanych, K.M., and Anderson, D.M. 2005. Phylogeny, biogeography, and species boundaries within the *Alexandrium minutum* group. Harmful Algae, 4(6): 1004-1020.

Nascimento, S.M., Purdie, D.A., **Lilly, E.L.,** Larsen, J., Morris, S. 2005. Toxin profile, pigment composition and large subunit rDNA phylogenetic analysis of an *Alexandrium minutum* (Dinophyceae) strain isolated from the Fleet Lagoon, United Kingdom. Journal of Phycology, 41: 343-353.

Band-Schmidt, C.J., **Lilly, E.L.**, and Anderson, D.M. 2003. Identification of *Alexandrium affine* and *A. margalefi* (Dinophyceae) using DNA sequencing and LSU rDNA-based RFLP-PCR assays. Phycologia, 42(3):261-268.

Lilly, E.L., Kulis, D.M., Gentien, P. and Anderson, D.M. 2002. Paralytic shellfish poisoning toxins in France linked to a human-introduced strain of *Alexandrium catenella* from the Western Pacific: Evidence from DNA and toxin analysis. Journal of Plankton Research, 24(5): 443-452.

Research Students

Virginia Military Institute

Undergraduate students:

Caroline Wortham
Arthur Gross
Matthew Marcenelle

University of Massachusetts Dartmouth

Graduate students:

Marco Pedulli, Ph.D. student
Amanda Glazier, M.S. student

Undergraduate students:

Jonathan Breton
Anubhab Pudisaini
Abigail Toltin
Sarah Toltin
Emilee Towle
Meaghan O'Halloran
Kara Maloney
Laura Atkins
Claudia Martin
Rich Elkins

Harvard University

Undergraduate students:

Caitlin Frame
Kathryn Giblin

Woods Hole Oceanographic Institution

Undergraduate students:

Stethanie Jacobs
Nina Kanin

Work-Study Research Assistants

University of Massachusetts Dartmouth

Tracy Pearson
Caitlin Sorbello
Nathan Waldron
Kara Maloney
Kerri Ann Kelly
Fardin Ghanimat

Research Grants

Distribution and Molecular Genetics of Toxic Cyanobacteria in Rockbridge County Surface Water Systems, Graint-In-Aid, $4250

Bioremediation Science at Two Local EPA Superfund sites.
Stahl, E.A., Lilly, E.L., (Co-PI). Chancellor's Research Fund/Joseph P. Healey Endowment Grants. $8,283

Complete Genome Sequencing of *Cyanobium* sp. PCC 7001.
George and Betty Moore Foundation, approx. value $150,000

Tomlinson Fund Grant, Smith College, 1997-1998, $500

E. J. Murphy Grant, Smith College, 1997 and 1998, $500

Travel Awards

Early Career Travel Grant, American Society of Microbiology, 2006, $750
Teaching Development Travel Grant, Center for Teaching Excellence Travel Grant, University of Massachsuetts Dartmouth, 2006, $750
NASA Exobiology Travel Grant, 2005, $750
Gordon Research Conference Student Grants, 1999 and 2001, $500 & $500
MIT Joint Program Fund Grant, 2000 and 2002, $500 and $500

Fellowships

Paul M. Fye Teaching Fellowship, WHOI, 2001-2002, $22,000
National Science Foundation Fellowship for Graduate Study, 1998-2001, $100,000
Howard Hughes Scholarship for Summer Research, Smith College, 1997, $4000

Professional Meetings: Research

American Society for Microbiology Virginia Branch 2011 Annual Meeting
Blacksburg, VA 2011
Judge: graduate student presentations

International Society of Protistologists 2nd Meeting of the North American Section
Lexington, VA, 2010
Invited Speaker: Evaluating the species concept in the dinoflagellate genus *Alexandrium.*

108th General Meeting of the American Society of Microbiology
Boston, MA, 2008
Poster Title: A unique RubisCO found in the cold-adapted methanogen *Methanococcoides burtonii.*

Second Annual Research Colloquium of the School of Marine Science, Boston, MA, 2008
Invited Speaker: Global range expansion in the toxic dinoflagellate genus *Alexandrium*: Who's who and what's where?

106th General Meeting of the American Society of Microbiology
Orlando, FL, 2006

NSF Frontiers in Integrative Biology Research Workshop on Species in Microbial Communities
Montana State University, Bozeman, MT, 2005.

Eigth NASA Exobiology Principal Investigator's Symposium
Mountain View, CA, 2005
Poster Title: Cyanobacterial acquisition of Form IA RubisCO by horizontal gene transfer. Silver Certificate of Acheivement for Outstanding Presentation

Boston Bacterial Meeting
Boston, MA, 2005
Poster title: RubisCO diversity in nitrifying bacteria.

Gordon Research Conference on the Molecular Basis of Microbial Single Carbon Metabolism, South Hadley, MA, 2004
Poster title: RubisCO diversity in nitrifying bacteria.

Fourth International Symbiosis Society Congress
Halifax, NS, 2003

Tenth International Conference on Harmful Algae
St. Petersburg Beach, FL, 2002
Invited Speaker: The global biogeography of the genus *Alexandrium.*

Gordon Research Conference on Mycotoxins and Phycotoxins
Williamstown, MA, 2001
Invited Student Speaker: Paralytic shellfish poisoning outbreak in France caused by a human-introduced strain of *Alexandrium catenella* from the western Pacific: Evidence from DNA and toxin analysis

First United States National Conference on Harmful Algal Blooms
Woods Hole, MA, 2000
Poster title: The global biogeography of the genus *Alexandrium*.

Ninth International Conference on Harmful Algal Blooms.
Hobart, Tasmania, Australia, 2000
Poster title: The global biogeography of the genus *Alexandrium*.

Gordon Research Conference on Mycotoxins and Phycotoxins
Plymouth, NH, 1999
Poster title: The global biogeography of the genus *Alexandrium*.

Professional Meetings: Teaching

AACU: Engaged STEM Learning: From Promising to Pervasive Practices
Miami, FL, 24-26 March 2011

Conference on Higher Education Pedagogy
Blacksburg, VA, 3-4 February 2011
Invited Speaker**:** Assigned positions for in-class debates influence student opinions.

American Society of Microbiology Conference for Undergraduate Educators
Beverly, MA, May-June 2008
Poster title: Petri dish art: an exercise to improve student involvement in the microbiology laboratory.

First Year Success Conference
Dartmouth, MA, 6 June 2007
Active learning in the lecture hall: student-driven active learning exercises vs. clicker-based lecture.

First Year Success Conference
Dartmouth, MA, 6 June 2006

American Society of Microbiology Conference for Undergraduate Educators
Orlando, FL, 19-21 May 2006
Poster title: Use of the temperature-sensitive mutant *Serratia marcescens* D1 in a series of laboratory exercises: Bacterial genetics, quorum sensing, and antibiotic production.

Harvard University Derek Bok Center Teaching Conference
Cambridge, MA, 1-2 February 2005

Invited Seminars

Virginia Military Institute, November, 2009

Longwood University, May, 2009

Randolph-Macon College, January, 2009

Washington and Lee University, January, 2009

Hampden-Sydney College, November, 2008

University of Massachusetts Boston, October, 2008

Sweet Briar College, April 2008

University of South Alabama, February 2008

Hood College, Janyary 2008

Southern Connecticut State University, November 2007

UMass School of Marine Science and Technology, September 2007

Massachusetts Institute of Technology, March 2007

University of Massachusetts Dartmouth, March, 2006

Haverford College, December 2004

Woods Hole Oceanographic Institution, January, 2003

Woods Hole Oceanographic Institution, July, 2001

Outreach

Big South Undergraduate Research Symposium April, 2011. Proposal reviewer and session moderator.

Central Virginia Regional Science Fair, March 2009. Judge.

UMass Dartmouth Children's Center for Learning, March, 2008. Water quality testing: what's different about pond, ditch, and tap water?

University of Massachsuetts Dartmouth, Jauary, 2008.
Marine microbes and global warming: can Earth's smallest organisms solve the environment's biggest problem?

University of Massachsuetts Dartmouth, April, 2006.
Marine microbes and global warming: can Earth's smallest organisms solve the environment's biggest problem?

Falmouth High School Career Day, 2002, 2001, and 2000.
Careers in oceanography and marine biology.

Woods Hole Science and Teachers Education Partnership, 2002, 2001, 2000.
Adviser for students on literature review, experimental design, and data analysis for school science fair.

Greenfield Middle School, 1997.
Guest lecturer on life cycles and physiology of phytoplankton and macroalgae.

Fairview Memorial Middle School, 1997.
Guest lecturer, with a group experiment on prey size selection in *Carcinus major*, the green shore crab, for five sections of seventh grade *Biology*.

Reviewer

Journal articles: Applied and Environmental Microbiology, Archives of Microbiology, Coral Reefs, European Journal of Phycology, Focus on Microbiology Education, Harmful Algae, Journal of Microbiology and Biology Education, Journal of Phycology, Phycologia, and Protist.

Textbook, Curriculum: McGraw-Hill, Cengage, Microbe Library Curriculum

Grant Proposals: Chilean Research Fund Council, Connecticut Sea Grant, New York Sea Grant Long Island Sound Study

Professional Societies

International Society of Protistology, Virginia Academy of Acience, American Society of Microbiology, International Society for the Study of Harmful Algae

References

Donald M. Anderson, Senior Scientist
Biology Department
MS # 32
Woods Hole Oceanographic Institution
Woods Hole, MA 02543
508-289-2351
danderson@whoi.edu

Colleen M. Cavanaugh, Professor
Organismic & Evolutionary Biology
Harvard University
16 Divinity Ave., Biolabs 4083
Cambridge, MA 02138
617-495-2177
cavanaug@fas.harvard.edu

Colonel Jim Turner, Chair
Biology Department
Virginia Military Institute
Lexington, VA 24550
540-464-7436
turnerje@vmi.edu

Joseph Garcia, Chair
Biological and Environmental Sciences
Longwood University
201 High Street
Farmville, VA 23909
434-395-2588
garciaje@longwood.edu