

Spencer V. Nyholm, Ph.D.

University of Connecticut
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Education

B.S. Biology / concentration in marine biology (University of California, Los Angeles, June 1994)
Microbial Diversity Course (Marine Biological Laboratory, Woods Hole, MA, 1999)
Ph.D. Zoology (University of Hawaii at Manoa, December 2001)
Postdoctoral Fellow (Stanford University, April 2002 – June 2005)
Postdoctoral Fellow/Research Associate (Harvard University, August 2005 – August 2007)

Positions Held

2013 – present	Associate Professor, Molecular and Cell Biology, University of Connecticut
2007 – 2013	Assistant Professor, Molecular and Cell Biology, University of Connecticut
2005 – 2007	Research Associate, Organismic and Evolutionary Biology, Harvard University Advisor: Dr. Peter Girguis
2002 – 2005	Postdoctoral Fellow, Stanford University School of Medicine and Hopkins Marine Station, Advisor: Dr. Irving Weissman
1996 – 2001	Graduate Research Assistant, Kewalo Marine Laboratory, University of Hawaii Advisor: Dr. Margaret McFall-Ngai
1995 – 1996	Teaching Assistant, Dept. of Biological Sciences, University of Southern California

Extramural Funding

- National Science Foundation IOS-0958006 "Characterizing the Role of Host Blood Cells in a Beneficial Symbiosis" (PI Spencer Nyholm; February, 2010 – January, 2015) \$616,483
- Department of Energy, Joint Genome Institute "Community Sequencing Project: Characterizing the molecular basis of primary productivity in hydrothermal vent tubeworm symbioses" (Co-PI Spencer Nyholm; Sept. 2006 – April, 2010) \$0, sequencing support only

Intramural Funding

- University of Connecticut Research Foundation "Pilot Study: Characterizing the Role of Symbiotic Bacteria in a Host Reproductive Organ" (PI Spencer Nyholm; July 1, 2012 – June 30, 2014) \$20,800
- University of Connecticut Research Foundation "Regulation of Mucus Secretion in a Squid/*Vibrio* Symbiosis" (PI Spencer Nyholm; June 1, 2008-May 31, 2009) \$21,000

Peer-Reviewed Publications (reverse chronological order)

- Schleicher TR, VerBerkmoes NC, Shah, M, **Nyholm SV** (2014) Colonization state influences the hemocyte proteome in a beneficial squid-vibrio symbiosis. *Mol. Cell Proteomics* (in press).
- Beinart, RA, **Nyholm SV**, Dubilier, N, Girguis, PR (2014) Intracellular Oceanospirales inhabit the gills of the hydrothermal vent snail *Alviniconcha* with chemosynthetic γ -proteobacterial symbionts. *Environ. Microbiol. Rep.* DOI: 10.1111/1758-2229.12183
- Albertin CB, Bonnaud L, Brown CT, Crookes-Goodson WJ, da Fonseca RR, Di Cristo C, Dilkes BP, Edsinger-Gonzales E, Freeman RM Jr, Hanlon RT, Koenig KM, Lindgren AR, Martindale MQ, Minx P, Moroz LL, Nödl MT, **Nyholm SV**, Ogura A, Pungor JR, Rosenthal JJ, Schwarz EM, Shigeno S, Strugnell JM, Wollesen T, Zhang G, Ragsdale CW. (2012) Cephalopod genomics: a plan of strategies and organization. *Stand Genomic Sci.* 7: 175-188.
- **Nyholm SV**, Graf J. (2012) Knowing your friends: how invertebrate innate immunity fosters beneficial symbioses. *Nature Reviews Microbiology* 10: 815-27.
- Rader BA, **Nyholm SV** (2012) Host/Microbe Interactions Revealed through “Omics” in the Symbiosis Between the Hawaiian Bobtail Squid, *Euprymna scolopes*, and the Bioluminescent Bacterium, *Vibrio fischeri*. *Biological Bulletin* 223: 103-111.
- **Nyholm SV***, Song P, Dang J, Bunce C, Girguis PR* (2012) Expression and putative function of innate immunity genes, under *in situ* conditions, in the symbiotic hydrothermal vent tubeworm *Ridgeia piscesae*. *PLoS ONE* 7(6): e38267 *co-corresponding authors
- Fidopiastis P, Rader BA, Gerling D, Gutierrez N, Watkins K, Frey M, **Nyholm SV**, Whistler CA (2012) Characterization of a *Vibrio fischeri* aminopeptidase and evidence for its influence on an early state of squid colonization. *Journal of Bacteriology* 194: 3995-4002.
- Collins AJ*, Schleicher TR*, Rader BA, **Nyholm SV** (2012) Understanding the role of host hemocytes in a squid/*Vibrio* symbiosis using transcriptomics and proteomics. *Frontiers in Immunology* 3:91. (*co-first authors)
- Collins AJ, LaBarre BA, Wong Won BS, Shah MV, Heng S, Choudhury MH, Haydar SA, Santiago J, **Nyholm SV** (2012) Diversity and partitioning of bacterial populations within the accessory nidamental gland of the squid *Euprymna scolopes*. *Appl. Environ. Microbiol.* 78: 4200-4208.
- Schleicher TS, **Nyholm SV** (2011) Characterizing the host and symbiont proteomes in the association between the bobtail squid *Euprymna scolopes* and the bacterium *Vibrio fischeri*. *PLoS ONE* 6(10) e25649.
- Collins AJ, **Nyholm SV** (2011) Draft genome of *Phaeobacter gallaeciensis* ANG1, a dominant member of the accessory nidamental gland of *Euprymna scolopes*. *J. Bacteriol.* 193: 3397-3398

- Collins AJ, **Nyholm SV** (2010) Obtaining hemocytes from the Hawaiian bobtail squid *Euprymna scolopes* and observing their adherence to symbiotic and non-symbiotic bacteria. *JoVE*. 36. doi: 10.3791/1714
- Wier AM, **Nyholm SV**, Mandel MJ, Massengo-Tiassé RP, Schaefer AL, Koroleva I, Splinter-Bondurant S, Brown B, Manzella L, Snir E, Almabrazi H, Scheetz TE, Bonaldo Mde F, Casavant TL, Soares MB, Cronan JE, Reed JL, Ruby EG, McFall-Ngai MJ. (2010) Transcriptional patterns in both host and bacterium underlie a daily rhythm of anatomical and metabolic change in a beneficial symbiosis. *Proc. Nat. Acad. Sci., USA*, 107, 2259-64
- McFall-Ngai MJ, **Nyholm SV**, Castillo MG (2010) The role of the immune system in the initiation and persistence of the *Euprymna scolopes-Vibrio fischeri* symbiosis. *Semin. Immunol.* 22: 48-53.
- **Nyholm SV**, Stewart JJ, Ruby EG, McFall-Ngai, MJ (2009) Recognition between symbiotic *Vibrio fischeri* and the haemocytes of *Euprymna scolopes*. *Environ. Microbiol.*, 11: 483-93.
- **Nyholm SV**, Robidart J, Girguis PR (2008) Coupling metabolite flux to transcriptomics: insights into the molecular mechanisms underlying primary productivity by the hydrothermal vent tubeworm *Ridgeia piscesae*. *Biol. Bull.* 214: 255-265.
- **Nyholm SV**, Nishiguchi, MK (2008) The evolutionary ecology of a sepiolid squid-*Vibrio* association: from cell to environment. *Vie et Milieu* 58: 175-184.
- **Nyholm SV**, Passegue E, Ludington WB, Voskoboynik A, Mitchel K, Weissman IL, DeTomaso AW (2006) *Fester*, a candidate allorecognition receptor from a primitive chordate. *Immunity*. 25: 163-73.
- DeTomaso AW, **Nyholm SV**, Palmeri KJ, Ishizuka KJ, Ludington WB, Mitchel K, Weissman IL (2005) Isolation and characterization of a protochordate histocompatibility locus. *Nature*. 438:454-9.
- **Nyholm SV**, McFall-Ngai MJ (2004) The Winnowing: Establishing the Squid-*Vibrio* Symbiosis. *Nature Rev. Microbiol.* 2: 632-642.
- **Nyholm SV**, McFall-Ngai MJ (2003) Dominance of *Vibrio fischeri* in secreted mucus outside the light organ of *Euprymna scolopes*: the first site of symbiont specificity. *Appl. Environ. Microbiol.* 69: 3932-7.
- **Nyholm SV**, Deplancke B, Gaskins HR, Apicella MA, McFall-Ngai MJ (2002) Roles of nonsymbiotic and symbiotic bacteria in the dynamics of mucus secretion during symbiont colonization of the *Euprymna scolopes* light organ. *Appl. Environ. Microbiol.* 68:5113-5122.
- **Nyholm SV**, Stabb EV, Ruby EG, McFall-Ngai MJ (2000) Establishment of an animal-bacterial association: recruiting symbiotic vibrios from the environment. *Proc. Nat. Acad. Sci., USA* 97:10231-10235.

- **Nyholm SV**, McFall-Ngai MJ (1998) Sampling the light-organ microenvironment of *Euprymna scolopes*: description of a population of host cells in association with the bacterial symbiont *Vibrio fischeri*. *Biol. Bull.* 195: 89-97.

Book Chapters

- **Spencer V. Nyholm** and Margaret J. McFall-Ngai. Animal Development in a Microbial World. In "Towards a Theory of Development." Pp. 260-273. Oxford University Press, 2014.

Published Commentaries

- **Nyholm SV** (2009) Peptidoglycan monomer release and *Vibrio fischeri*. *J. Bacteriol.*, 191:1997-1999.

Teaching Experience (University of Connecticut)

Undergraduate Courses

- Microbial Symbioses with Animals and Plants: The Science of Living Together, MCB 3841W (Spring 2009 - present; 3 credits)
- Introduction to Undergraduate Research, MCB 3989 (Fall/Spring 2008 - 2012; 1-3 credits)
- Introduction to Honors Research, MCB 4989 (Fall 2008-2009, Spring 2009 - 2010; 1-3 credits)
- Fundamentals of Microbiology, MCB 2610 (co-instructor, Fall 2009, 3 credits; enrollment 339 students)

Graduate Courses

- Microbial Physiology, MCB 5679 (co-instructor, Spring 2008, 3 credits)
- Marine/Aquatic Microbial Ecology, MCB 5896 (co-instructor, Fall 2010, 2012, 2014 3 credits)
- Seminar in Microbiology, MCB 5699 (Fall, 2008 and 2011, 2013 1 credit)
- Graduate Student Independent Study, MCB 6897 (Fall/Spring 2008 - 2012, 1-3 credits)

Guest Lectures (in other courses)

- Introduction to Faculty Research, MCB 5899 (Fall 2007-2012)
- Fundamentals of Microbiology, MCB 2610 (Fall 2011, 2012)
- Introduction to Honors Research, BIO 2289 (Fall 2011-2012)

Student/Postdoctoral Advisees

Postdoc

- Bethany Rader, Ph.D. (September 2010 – December 2012)

Doctoral Students

- Andrew Collins (August 2007 – August 2014), Ph.D. thesis "Bacterial Symbioses and the Innate Immune Response of the Host, *Euprymna scolopes*" (anticipated completion 2013)
- Tyler Schleicher (August 2008 – August 2014), Ph.D. thesis "Proteomic characterization of host-microbe interactions in the *Euprymna scolopes* / *Vibrio fischeri* light organ symbiosis" (anticipated completion 2014)
- Allison Kerwin (August 2011 – present)
- Sarah McNulty (August 2013 – present)
- Andrea Suria (August 2013 – present)

Masters Students

- Corey Bunce (August 2010 – May, 2013)
- Barrett Nuttall (August 2011 – May 2012)

Invited Talks (* national or international conference)

- Department of Biology, University of Hawaii, Manoa, April 11, 2014
- Department of Biology, Hawaii Pacific University, March 13, 2014
- Department of Molecular Cellular and Developmental Biology, University of California Santa Barbara, February 20, 2014
- Department of Biology, Holy Cross University, October 28, 2013
- Marine Science Center, Northeastern University, October 8, 2013
- * 113th General Meeting, American Society for Microbiology, Denver, CO, May 18-21, 2013.
- Department of Biological Sciences, University of Rhode Island, April 12, 2013.
- * 4th ASM Conference on Beneficial Microbes, San Antonio, Texas, Oct. 22-26, 2012.
- * 2nd International Conference on Model Hosts, Rhodes, Greece, Sept. 1-6, 2012.
- * 7th International Symbiosis Society Congress (Session Chair, Cellular Interactions), Krakow, Poland, July 22-28, 2012.
- * Paths to Cephalopod Genomics, National Evolutionary Synthesis Center, Duke University, Durham, NC, May 24-27, 2012.
- United States Coast Guard Academy, New London, CT, April 11, 2012.
- * 4th ASM Conference on Cell-Cell Communication in Bacteria, Miami, FL, November 6-9, 2011.
- Dept. of Biology, Georgia State University, Atlanta, GA Oct. 21, 2011.
- * 44th Annual Meeting of the Japanese Society of Developmental Biologists. (Co-Chair, Development of Extended Phenotypes) May 18-21, 2011 Okinawa, Japan
- Department of Microbiology and Cell Science, University of Florida, Feb. 7, 2011.
- Marine Biology Research Division, Scripps Institution of Oceanography, La Jolla, CA. April 28, 2010
- Dept. of Zoology, Oregon State University, Corvallis, OR, March 8, 2010.
- Dept. of Organismic and Evolutionary Biology (Symbiosis Course, Guest Lecturer), Harvard University, Cambridge, MA, February 23, 2010.
- Dept. of Biology, Trinity College, November 19, 2009.
- 44th Annual Region I Meeting, American Society for Microbiology (Session Chair, Microbial Ecology), Cromwell, CT, October 22, 2009.
- Corning School of Ocean Studies, Maine Maritime Academy. Castine, ME, October 5, 2009.
- * 6th International Symbiosis Society Congress. University of Wisconsin, Madison, August 9-15, 2009.
- * 11th International Congress of the International Society for Developmental and Comparative Immunology, Prague, Czech Republic, June 28-July 4, 2009
- New Mexico State University (21st Annual Squid/Vibrio Meeting) March 13-15, 2009
- * International Symposium on Microbial Ecology. International Society for Microbial Ecology, Cairns, Australia, August 17-22, 2008
- National Institutes of Health, NIAID Rocky Mountain Laboratories, Hamilton MT. Weissman Immunology Retreat. July 21-23, 2008.

- Hawaii Institute of Marine Biology, 20th Annual Squid/*Vibrio* Meeting, University of Hawaii, March 13-17, 2008
- Department of Pathobiology, University of Connecticut, Feb. 28, 2008
- Department of Microbiology, University of New Hampshire, November 9, 2007

Poster Presentations (* national or international conference)

- 24th annual *Euprymna scolopes-Vibrio fischeri* symbiosis symposium. California State University, San Luis Obispo, CA June 21-22, 2012
- * 112th General Meeting of the American Society for Microbiology, San Francisco, CA, June 16-19, 2012
- Molecular Investigation of Host-Microbe Interactions XXIII. University of Wisconsin, Madison, June 8-10, 2011
- * 3rd American Society for Microbiology Conference on Beneficial Microbes, Miami, FL., Oct. 25-29, 2010
- 22nd annual *Euprymna scolopes-Vibrio fischeri* symbiosis symposium. Loyola University Medical Center, Maywood, IL June 10-11, 2010
- * 6th International Symbiosis Society Congress. University of Wisconsin, Madison, August 9-15, 2009
- * Beneficial Microbes, American Society for Microbiology, San Diego, CA, Oct. 12-16, 2008.

Professional Societies

- American Association for the Advancement of Science (AAAS)
- Sigma Xi
- American Society for Microbiology
- Society for Integrative and Comparative Biology
- International Society for Developmental and Comparative Immunology
- International Symbiosis Society

Selected Outreach Efforts

- "Life by the Hydrothermal Vents" – Connecticut State Museum of Natural History. Public Lecture (March 9, 2013)
- Mentor: Northeast Alliance (NEA) for Graduate Education and the Professoriate (2008-present) summer research program for undergraduate minority students. Hosted students during the summers of 2008, 2010, and 2011.
- "Bioluminescent Squid: Symbiosis Under the Sea" – Connecticut State Museum of Natural History. Public Lecture (April 14, 2012).
- "Germ Safari: Discover the Wild Microscopic World In Your Backyard" Connecticut State Museum of Natural History. Led public laboratory and field workshop on microbiology (Sept. 17, 2011)
- Tri County 4H Food Show – Conducted workshops on microbiology and food safety for 60 K-12 students, University of Connecticut, Hartford Campus, Jan. 29, 2011
- Manchester Community College: Public Lecture/Keynote Speaker: "Shedding Light on a Squid/Bioluminescent Bacterial Symbiosis", Sponsored by the American Society for Microbiology, the Connecticut Association of Biology Teachers and Manchester Community College, April 7, 2010.

Department/University Service

- Department of Molecular and Cell Biology (MCB) Graduate Admissions Committee (member, 08/09-05/12)
- MCB Recruitment Committee (Chair, 12/08-5/09 and 12/12-5/13; member 8/07 – 12/08, 8/09 – present) organize annual departmental graduate student recruitment
- Biology Honors Advisory Committee (member, 8/11 – present) advise undergraduate honors students
- MCB Planning Committee (member 08/11 – present) plan future educational and research priorities for the MCB department
- MCB Annual Retreat Committee (Chair 9/08- 9/09; member 09/07 – 09/08) organize annual departmental retreat

Other Professional Service

- American Society for Microbiology, International Mentoring Program – advise international students and postdoctoral scholars about education and research opportunities (2010 – present)
- Associate Editor, *Frontier in Microbial Symbioses* (2013 – present)
- Review Editor, *Frontiers in Aquatic Microbiology* (2010 – present)
- National Science Foundation, Proposal Review Panel Member (Integrative and Organismal Systems) Sept. 9-Oct. 29, 2010
- Examiner: Swarthmore College Honor's Program, Swarthmore, PA May 20-22, 2010
- Ad Hoc Reviewer (Since 2007)
Journals: *Nature Reviews Microbiology*, *Proc. Nat. Acad. Sci., USA*, *J. Bacteriology*, *J. Biological Chemistry*, *The Biological Bulletin*, *Biological Reviews*, *Cladistics*, *Environmental Microbiology*, *Evolution*, *FEBS Journal*, *FEMS Microbiology Letters*, *FEMS Microbiology Ecology*, *Frontiers Aquatic Microbiol.*, *J. Invertebrate Biology*, *Microbial Ecology*, *Trends Ecol. Evol.*, *Marine Biology*, *Vie et Milieu*, *Zoology*
Granting agencies: National Science Foundation, Austrian Science Fund, Florida Space Grant

Press Coverage (while at University of Connecticut)

- “Lecture explores squid immune system” *The Daily Campus*, April 16, 2012
- “Squid, glowing bacteria work well together” *Discovery News*, published on-line March 3, 2010 (<http://news.discovery.com/animals/squid-glowing-bacteria.html>)
- “Glowing squid illuminate immune system function” *UConn Today*, University of Connecticut, March 3, 2010.
- “Squid uses bacterial light to avoid place on menu” *MCB Notes*, University of Connecticut, February, 2010.
- Jermy, A. (2008) “Squid sort the wheat from the chaff.” *Nature Reviews Microbiology* 6: 875. Research Highlights (review of Nyholm et al., 2009 (epub ahead of print at time of publication), *Environmental Microbiology* 11: 483-493).