

Dr. Casey William Dunn

Curriculum Vitae

1 Position and Contact Information

Manning Assistant Professor

Dept. of Ecology and Evolutionary Biology
Brown University
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Providence, RI 02906 USA

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bitbucket.org – caseywdunn
vimeo.com – Casey Dunn

2 Home address

Providence, RI

3 Education

2005 Ph.D. Yale University, Department of Ecology and Evolutionary Biology (With Distinction)
2003 M.S. Yale University, Department of Ecology and Evolutionary Biology
1999 B.S. Stanford University, Biological Sciences (Honors, Phi Beta Kappa)

4 Professional Appointments

2010–present Manning Assistant Professor of Biology, Dept. of Ecology and Evolutionary Biology, Brown University
2008–2010 Assistant Professor of Biology, Dept. of Ecology and Evolutionary Biology, Brown University
2007–2008 Assistant Professor of Biology (Research), Dept. of Ecology and Evolutionary Biology, Brown University
2005–2007 Postdoctoral Fellow, Kewalo Marine Lab, University of Hawaii

5 Completed Publications

a. Books/ monographs

SHD Haddock and CW Dunn. (2010) Practical Computing for Biologists. 538 pages. Sinauer Associates. Sunderland, MA. <http://practicalcomputing.org>.

b. Chapters in books

Giribet, G, CW Dunn, GD Edgecombe, A Hejnol, MQ Martindale, and GW Rouse (2009) Assembling the spiralian tree of life (p 52-64) In: *Animal Evolution*. MJ Telford and DTJ Littlewood (eds). Oxford University Press.

Mills, CE, AC Marques, AE Migotto, DR Calder, C Hand, JT Rees, SHD Haddock, CW Dunn, and PR Pugh. (2007) *Hydrozoa: Polyps, Hydromedusae, and Siphonophora*. In: *The Light & Smith manual: intertidal invertebrates from central California to Oregon*, 4th edition. JT Carlton (ed). University of California Press.

c. Refereed journal articles

Zapata, F, NG Wilson, M Howison, SCS Andrade, KM Jörger, Michael Schrödl, Freya E Goetz, Gonzalo Giribet, Casey W Dunn (2014) Phylogenomic analyses of deep gastropod relationships reject Orthogastropoda. *Proceedings of the Royal Society B: Biological Sciences* 281:1471-2954. <http://dx.doi.org/10.1098/rspb.2014.1739>. BioRxiv preprint: <http://dx.doi.org/10.1101/007039>. Git code repository: <https://bitbucket.org/caseywdunn/gastropoda>.

Dunn, CW (2014) Reconsidering the phylogenetic utility of miRNA in animals. *PNAS*. <http://dx.doi.org/10.1073/pnas.1413545111>.

Howison, M, F Zapata, EJ Edwards, and CW Dunn (2014) Bayesian genome assembly and assessment by Markov Chain Monte Carlo sampling. *PLoS One* 9:e99497. <http://dx.doi.org/10.1371/journal.pone.0099497>. arXiv preprint: <http://arxiv.org/abs/1308.1388>. Git code repository: <https://bitbucket.org/mhowison/gabi>. Example analysis report: <https://web3.ccv.brown.edu/mhowison/gabi-report/>.

Lopez, J, H Bracken-Grissom, A Collins, T Collins, K Crandall, D Distel, C Dunn, et al. (2014) Global Invertebrate Genomics Alliance (GIGA): Developing Community Resources to Study Diverse Invertebrate Genomes. *Journal of Heredity* 105:1-18. <http://dx.doi.org/10.1093/jhered/est084>

Ryan, JF, K Pang, CE Schnitzler, A Nguyen, RT Moreland, DK Simmons, BJ Koch, WR Francis, P Havlak, NISC Comparative Sequencing Program, SA Smith, NH Putnam, SHD Haddock, CW Dunn, TG Wolfsberg, JC Mullikin, MQ Martindale, AD Baxeavanis (2013) The genome of the ctenophore *Mnemiopsis leidyi* and its implications for cell type evolution. *Science* 432:1242592. <http://dx.doi.org/10.1126/science.1242592>.

CW Dunn, M Howison, and F Zapata (2013) Agalma: an automated phylogenomics workflow. *BMC Bioinformatics* 14:330. <http://dx.doi.org/10.1186/1471-2105-14-330>. arXiv preprint: <http://arxiv.org/abs/1307.6432>. Git code repository: <https://bitbucket.org/caseywdunn/agalma> (software), <https://bitbucket.org/caseywdunn/dunnhowisonzapata2013> (analyses).

Howison, M, F Zapata, CW Dunn (2013) Toward a statistically explicit understanding of *de novo* sequence assembly. *Bioinformatics* 29:2959-2963. <http://dx.doi.org/10.1093/bioinformatics/btt525>.

Siebert, S, PR Pugh, SHD Haddock, CW Dunn (2013) Re-evaluation of characters in Apolemiidae (Siphonophora), with description of two new species from Monterey Bay, California. *Zootaxa* 3702: 201-232. <http://www.mapress.com/zootaxa/2013/f/zt03702p232.pdf>. Accompanying video of new species available at <https://vimeo.com/59928656>.

Dunn, CW, X Luo, Z Wu (2013) Phylogenetic analysis of gene expression. *Integrative and Comparative Biology* 53:847-856. <http://dx.doi.org/10.1093/icb/ict068>. arXiv preprint: <http://arxiv.org/abs/1302.2978>. Git code repository: <https://bitbucket.org/caseywdunn/sicb2013>.

Helm, RR, S Siebert, S Tulin, J Smith, CW Dunn (2013) Characterization of differential transcript abundance through time during *Nematostella vectensis* development. BMC Genomics 14:266. <http://dx.doi.org/10.1186/1471-2164-14-266>. Git code repository: https://bitbucket.org/caseywdunn/helm_et_al_2013.

Howison, M, N Sinnott-Armstrong, CW Dunn (2012) BioLite, a lightweight bioinformatics framework with automated tracking of diagnostics and provenance. 4th USENIX Workshop on the Theory and Practice of Provenance (TaPP12). <https://www.usenix.org/system/files/conference/tapp12/tapp12-final5.pdf> (peer-reviewed conference proceeding).

Smith, SA, NG Wilson, F Goetz, C Feehery, SCS Andrade, GW Rouse, G Giribet, CW Dunn (2011) Resolving the evolutionary relationships of molluscs with phylogenomic tools. Nature 480:364-367. <http://dx.doi.org/10.1038/nature10526>.

Siebert, S, MD Robinson, SC Tintori, F Goetz, RR Helm, SA Smith, N Shaner, SHD Haddock, CW Dunn (2011) Differential Gene Expression in the Siphonophore *Nanomia bijuga* (Cnidaria) Assessed with Multiple Next-Generation Sequencing Workflows. PLoS One 6(7): e22953. <http://dx.doi.org/10.1371/journal.pone.0022953>.

Edgecombe, GD, G Giribet, CW Dunn, A Hejnol, RM Kristensen, RC Neves, GW Rouse, K Worsaae, and MV Sørensen (2011) Higher-level metazoan relationships: recent progress and remaining questions. Organisms, Diversity, and Evolution 11:151-172. <http://dx.doi.org/10.1007/s13127-011-0044-4>.

Hejnol, A, M Obst, A Stamatakis, M Ott, G Rouse, G Edgecombe, P Martinez, J Baguña, X Bailly, U Jondelius, M Wiens, WEG Müller, Elaine Seaver, WC Wheeler, MQ Martindale, G Giribet, and CW Dunn (2009) Assessing the root of bilaterian animals with scalable phylogenomic methods. Proc. R. Soc. B. 276:4261-4270. <http://dx.doi.org/10.1098/rspb.2009.0896>.

Cartwright, P, NM Evans, CW Dunn, AC Marques, MP Miglietta, P Schuchert, and AG Collins (2008) Phylogenetics of Hydroidolina (Hydrozoa: Cnidaria). Journal of the Marine Biological Association of the United Kingdom 88:1663-1672. <http://dx.doi.org/10.1017/S0025315408002257>.

Dunn, CW, A Hejnol, DQ Matus, K Pang, WE Browne, SA Smith, E Seaver, GW Rouse, M Obst, GD Edgecombe, MV Sørensen, SHD Haddock, A Schmidt-Rhaesa, A Okusu, RM Kristensen, WC Wheeler, MQ Martindale, and G Giribet (2008) Broad phylogenomic sampling improves resolution of the Animal Tree of Life. Nature 452:745-749. <http://dx.doi.org/10.1038/nature06614>. (Cover Article).

Smith, SA and CW Dunn (2008) Phyutility: a phyloinformatics tool for trees, alignments, and molecular data. Bioinformatics. 24:715-716. <http://dx.doi.org/10.1093/bioinformatics/btm619>. Code repository: <https://code.google.com/p/phyutility>.

Giribet, G, CW Dunn, GD Edgecombe, and GW Rouse (2007) A modern look at the Animal Tree of Life. Zootaxa 1668:61-79.

Oota, H, CW Dunn, WC Speed, AJ Pakstis, MA Palmatier, JR Kidd and KK Kidd (2007) Conservative evolution in duplicated genes of the primate Class I ADH cluster. Gene 392:64-76. <http://dx.doi.org/10.1016/j.gene.2006.11.008>.

Dunn, CW and GP Wagner (2006) The evolution of colony-level development in the Siphonophora (Cnidaria:Hydrozoa). Development, Genes, and Evolution. 216:743-754. <http://dx.doi.org/10.1007/s00427-006-0101-8> (Cover Article).

Matus, DQ, K Pang, H Marlow, CW Dunn, GH Thomsen, and MQ Martindale (2006) Deep evolutionary roots for bilaterality in the metazoa. Proceedings of the National Academy of Sciences USA. 103:11195-11200. <http://dx.doi.org/10.1073/pnas.0601257103>.

Matus, DQ, RR Copley, CW Dunn, A Hejnol, H Eccleston, KM Halanych, MQ Martindale, and MJ Telford (2006) Broad Taxon and Gene Sampling Indicate that Chaetognaths Are Protostomes. *Current Biology*. 16:R575-R576. <http://dx.doi.org/10.1016/j.cub.2006.07.017>.

Dunn, CW, PR Pugh, and SHD Haddock (2005) Molecular phylogenetics of the Siphonophora (Cnidaria), with implications for the evolution of functional specialization. *Systematic Biology* 54:916-935. <http://dx.doi.org/10.1080/10635150500354837> (Cover Article).

Dunn, CW (2005) The complex colony-level organization of the deep-sea siphonophore *Bargmannia elongata* (Cnidaria, Hydrozoa) is directionally asymmetric and arises by the subdivision of pro-buds. *Developmental Dynamics* 234:835-845. <http://dx.doi.org/10.1002/dvdy.20483> (Cover Article).

Haddock, SHD, CW Dunn, PR Pugh and CE Schnitzler (2005) Bioluminescent and red-fluorescent lures in a deep-sea siphonophore. *Science* 309:263. <http://dx.doi.org/10.1126/science.1110441>.

Dunn, CW, PR Pugh, and SHD Haddock (2005) *Marrus claudanielis*, a new species of deep-sea physonect siphonophore (Siphonophora, Physonectae). *Bulletin of Marine Science* 76:699-714.

Haddock, SHD, CW Dunn, and PR Pugh (2005) A reexamination of siphonophore terminology and morphology, applied to the description of two new prayine species with remarkable bio-optical properties. *Journal of the Marine Biological Association of the U.K.* 85:695-707. <http://dx.doi.org/10.1017/S0025315405011616>.

Lynch, VJ, JJ Roth, K Takahashi, CW Dunn, DF Nonaka, G Stopper and GP Wagner (2004) Adaptive evolution of HoxA-11 and HoxA-13 at the origin of the uterus in mammals. *Proceedings of the Royal Society B: Biological Sciences* 271:2201-2207. <http://dx.doi.org/10.1098/rspb.2004.2848>.

d. Non-refereed journal articles

Dunn, CW (2014) Fiery Bodies Under the Waves. *New York Times*, August 14, 2014. <http://www.nytimes.com/2014/08/14/science/a-colonizing-fire-of-giant-plankton.html>

Dunn, CW (2014) A Marine Magician's Vanishing Act. *New York Times*, May 28, 2014. <http://www.nytimes.com/2014/05/28/science/a-marine-magicians-vanishing-act.html>

Dunn, CW (2014) A Cloak of Near Invisibility in an Underwater World. *New York Times*, April 24, 2014. <http://www.nytimes.com/2014/04/24/science/a-cloak-of-near-invisibility-in-an-underwater-world.html>

Dunn, CW (2014) Two Urchins, Similar but Not. *New York Times*, February 26, 2014. <http://www.nytimes.com/2014/02/26/science/two-urchins-similar-but-not.html>

Dunn, CW (2014) Poisonous Prey Turned Into Hunter's Defense. *New York Times*, February 12, 2014. <http://www.nytimes.com/2014/02/13/science/poisonous-prey-turned-into-hunters-defense.html>

Dunn, CW (2014) Moving, Without Feet to Do So. *New York Times*, January 23, 2014. <http://www.nytimes.com/2014/01/23/science/earth/moving-without-feet-to-do-so.html>

Dunn, CW (2013) The Color of Royalty, Bestowed by Science and Snails. *New York Times*, October 9, 2013. <http://www.nytimes.com/2013/10/09/science/the-color-of-royalty-bestowed-by-science-and-snails.html>

Dunn, CW (2013) As 'Normal' as Rabbits' Weights and Dragons' Wings. *New York Times*, September 23, 2013. <http://www.nytimes.com/2013/09/24/science/as-normal-as-rabbits-weights-and-dragons-wings.html>

Dunn, CW (2013) Sex in Spoonworms. New York Times, September 16, 2013. <http://www.nytimes.com/2013/09/17/science/creatures-strange-and-complex-in-colorful-detail.html> (the text I wrote accompanies the video).

Dunn, CW (2013) Evolution: Out of the ocean. *Current Biology* 23:R242-R243. <http://dx.doi.org/10.1016/j.cub.2013.01.067>.

Dunn, CW (2009) Siphonophores. *Current Biology* 19:R233-R234. <http://dx.doi.org/10.1016/j.cub.2009.02.009>.

Haddock, SHD and CW Dunn (2005) The complex world of siphonophores. *JMBA Global Marine Environment* 2005(2):24-25.

f. Abstracts

Dunn, CW (2013) The comparative biology of gene expression. Invited speaker for the symposium "Understanding First Order Phenotypes: Transcriptomics for Emerging Models" at the 2013 meeting for the Society of Integrative and Comparative Biology. Abstract S4-2.1. <http://www.sicb.org/meetings/2013/SICB%202013%20abstracts.pdf>.

Helm, RR and CW Dunn (2013) The evolution of direct development in Scyphozoa. A poster presented at the 2013 meeting for the Society of Integrative and Comparative Biology. Abstract P1.58. <http://www.sicb.org/meetings/2013/SICB%202013%20abstracts.pdf>.

g. Invited lectures

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| 2014 | Universidad Austral de Chile (Valdivia, Chile), Bowdoin College (Brunswick, Maine), University of Missouri, Evolution of First Nervous Systems II meeting (Whitney Laboratory for Marine Bioscience, Florida) |
| 2013 | American Museum of Natural History, Global Invertebrate Genomics Alliance (GIGA) workshop at Nova University (Fort Lauderdale, FL), meeting of the Centre National de Ressources Biologiques Marines, EMBRC (Villefranche, France), Brown Department of Ecology and Evolutionary Biology Seminar, Brown Computer Science Department Industrial Partners Program Symposium, Tree of Life Symposium at the 2013 meeting of the Society of Systematic Biologists (title: "Building trees with transcriptomes and analyzing transcriptomes with trees"), Brown EPSCoR Bioinformatics Workshop |
| 2012 | World Economic Forum Annual Meeting (Davos, Switzerland), Smithsonian Tropical Research Institute (Panama), Sars International Centre for Marine Molecular Biology (Bergen, Norway), Clark University, University of Miami, Stony Brook University, Applied Math at Brown University, University of Florida |
| 2011 | National Science Board, (Washington, DC), National Science Foundation (Washington, DC), Marine Biological Laboratory (Woods Hole, MA), Boston University (Boston, MA), Marine Observatory at Villefranche-sur-Mer (France), Smithsonian National Museum of Natural History Department of Invertebrate Zoology (Washington, DC), Smithsonian National Museum of Natural History - Symposium "Next generation Sequencing: Transformative Technology for Biodiversity Science", keynote speaker at the Brown University Communicating Your Science Workshop, Rhode Island College |
| 2010 | Harvard University, University of Gothenburg (Sweden), Iowa State University, Brown University Wayland Collegium, Helicos BioSciences, National Academy of Science "Kavli Frontiers of Science" meeting, PopTech, University of Texas at Austin |

- 2009 Yale University, University at Buffalo, LM University Munich, meeting of the German Research Foundation Priority Program “Deep Metazoan Phylogeny” at Humboldt University Berlin, University of Connecticut, Harvard University course OEB275r: “Phylogenetics in the Era of Genomics”, University of Rhode Island, Barcelona University, Brown MCB, invited speaker at the Society for Systematic Biologists symposium “Advances in Tree Reconstruction from Complex Data Matrices” in Moscow, Idaho
- 2008 University of Rochester, Friday Harbor Marine Laboratory, Woods Hole Oceanographic Institute, New England Biolabs
- 2007 Harvard University, Roger Williams University
- 2005 University of Hawaii

i. Work in review

This section includes publicly available preprints.

Church, SH, JF Ryan, CW Dunn (preprint) Automation and Evaluation of the SOWH Test of Phylogenetic Topologies with SOWHAT. BioRxiv. <http://dx.doi.org/10.1101/005264>. Git code repository: <https://github.com/josephryan/sowhat>.

Siebert, S, FE Goetz, SH Church, P Bhattacharyya, F Zapata, SHD Haddock, and CW Dunn. (preprint) Stem Cells in a Colonial Animal with Localized Growth Zones. BioRxiv. <http://dx.doi.org/10.1101/001685>. Git code repository: https://bitbucket.org/caseywdunn/siebert_etal.

6 Academic Honors

- 2012 Teaching with Technology Award (Brown University)
- 2011 Alan T. Waterman Award (National Science Foundation)
- 2010 Named the Manning Assistant Professor of Ecology and Evolutionary Biology
- 2010 PopTech Science and Public Leadership Fellow
- 2010 Kavli Frontiers of Science Fellow (Sponsored by U.S. National Academy of Sciences)
- 2006 John Spangler Nicholas Prize (Yale University)
- 2000–2003 NSF Graduate Research Fellowship (National Science Foundation)
- 2000–2002 Sterling Fellowship (Yale University)

7 Teaching

Courses

- 2014 Summer Workshop on Molecular Evolution at the Marine Biological Laboratory (Woods Hole, MA)
- 2013 Fall Invertebrate Zoology (Biol 0410, 40 students)
- 2013 Summer Workshop on Molecular Evolution at the Marine Biological Laboratory (Woods Hole, MA)
- 2013 Spring Phylogenetic Biology (Biol 1425, 11 students)
- 2012 Fall Invertebrate Zoology (Biol 0410, 37 students)
- 2012 Summer Workshop on Molecular Evolution at the Marine Biological Laboratory (Woods Hole, MA); Guest lecture in: Bioinformatics: Biodiscovery By Computer at Summer@Brown (a high school summer course)

- 2012 Spring EEB IGERT Course in Reverse Ecology (3 students); Guest lectures in: Analysis of Development (Biol 1310), Topics in Science Communications: Science Journalism Practicum (Biol 0950B)
- 2011 Fall Invertebrate Zoology (Biol 0410, 34 students)
- 2011 Summer Workshop on Molecular Evolution at the Marine Biological Laboratory (Woods Hole, MA)
- 2011 Spring Practical Computing for Biologists NESCENT Academy at North Carolina State University (co-taught with Steve Haddock)
- 2010 Fall Invertebrate Zoology (Biol 0410, 33 students)
- 2010 Spring Origins of Multicellularity and the Evolution of Germ Line (Biol 1940Y-S01, 14 students), Directed Research/Independent Study (Biol 195, 1 students)
- 2009 Fall Invertebrate Zoology (Biol 0410, 18 students), Directed Research/Independent Study (Biol 195, 2 students)
- 2009 Spring Topics in Ecology and Evolutionary Biology (Biol 0244, 16 students, included field trip to Belize), Directed Research/Independent Study (Biol 195, 1 student)
- 2008 Fall Topics in Ecology and Evolutionary Biology (Biol 0243, 16 students), Directed Research/Independent Study (Biol 195, 2 student)
- 2008 Spring Directed Research/Independent Study (Biol 0195, 2 students)
- 2007 Fall Directed Research/Independent Study (Biol 0195, 1 students)

Advising–Postdoctoral researchers

- 2012–present Felipe Zapata
- 2010–2011 Stephen Smith
- 2009–present Stefan Siebert

Advising–Graduate students (primary advisor)

- 2013–present August Guang (Applied Math, co-advised with Chip Lawrence)
- 2013–present Catriona Munro
- 2008–present Rebecca Helm

Advising–Graduate student thesis committee member

- 2013–2014 Warren Francis (University of California at Santa Cruz)
- 2012–present Tara Fresques (Brown University, MCB)
- 2011–2012 Dereck Stefanik (Boston University)
- 2011–2012 Anna Ritz (Brown University, CS)
- 2011–present Ariel Camp (Brown University, EEB)
- 2010–2012 Arturo Ruiz Villanueva (Institute of Ecology, Xalapa, Mexico)
- 2010–present Cat Luria (Brown University, EEB)
- 2009–2014 Adrian Reich (Brown University, MCB)
- 2009–2014 Ben Ewen-Campen (Harvard University, OEB)
- 2009–2011 John Cumbers (Brown University, MCB)

2009–present Steven Swartz (Brown University, MCB)
 2009–2013 Henry Astley (Brown University, EEB)
 2008–2012 Matt Ogburn (Brown University, EEB)
 2007–2009 James Palardy (Brown University, EEB)

Advising–First-year graduate advisory committees (Brown)

2013–2014 Priya Nakka, Robert Lamb
 2012–2013 Lillian Hancock
 2011 Molecular and Cellular Biology (general)
 2011–2012 Terry Dial, Chris Graves
 2010–2011 Ariel Camp

Advising–Rotating graduate students

2010 Matthew Booker
 2009 Steven Swartz

Advising–Undergraduate students

2013–2013 Rachel Kaplan (UTRA)
 2013–2013 Hannah Kerman (EPSCoR Surf)
 2012–Present Sam Church (EPSCoR)
 2012–2014 Pathikrit Bhattacharyya (EPSCoR, Royce Fellow)
 2012–2014 Jessica Eason (EPSCoR)
 2012–2013 Served as a freshman advisor for joint Brown/ RISD students
 2012 Robert Sandler (Royce Fellow)
 2012 James Weis (Thesis reader)
 2011–2012 Natividad Chen (Science Center Fellow, UTRA)
 2011–2012 Norian Caporale-Berkowitz (Beckman Fellow)
 2011 Cecelia Bahamon (Thesis reader)
 2010 Stephanie Spielman (Thesis reader)
 2007–2010 Orla O'Brien (Thesis advisor)
 2007–2010 Caitlin Feehery (participant on several projects)
 2007–2010 Sophia Tintori (Thesis advisor)