

Jarrett Edward Kaplan Byrnes

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<http://jarrettbyrnes.info>

Education:

2002-2008 UC Davis, Population Biology, M.S. 2003, Ph.D. 2008, Advisor: John J. Stachowicz
1997-2001 Brown University, Bachelor of Science in Biology

Appointments:

2012 - Present Assistant Professor, University of Massachusetts Boston
2010 - 2012 Postdoctoral Fellow, National Center for Ecological Analysis and Synthesis
2008 - 2010 Postdoctoral Fellow, Santa Barbara Long Term Ecological Research Project

Research Summary:

My research focuses on the causes and consequences of food web complexity. I am interested in how human driven global environmental change will affect the function of ecosystems by altering the diversity and structure of food webs. I study these issues in the marine systems due to the enormous number, diversity, and economic importance of life in the sea. I use small-scale experimental techniques coupled with the statistical modeling of large-scale long-term datasets to bridge the gap between microecological mechanisms and macroecological patterns.

Publications:

Refereed Papers

15. **Byrnes, J.E.K.**, Cardinale, B.J., and Reed, D.R. In Press. Sea urchin grazing increases with prey diversity on temperate rocky reefs. *Ecology*.
14. Wheat, R. E., Wang, Y., **Byrnes, J. E.**, Ranganathan., J. 2012. Raising money for scientific research through crowdfunding. *Trends in Ecology & Evolution*. 28:71-72. [[doi](#)]
13. Hooper, D.U., Adair, E.C., Cardinale, B.J., **Byrnes, J.E.K.**, Hungate, B.A., Matulich, K.L., Gonzalez, A., Duffy, J.E., Gamfeldt, L., O'Connor, M.I. Accepted. Biodiversity loss ranks as a major driver of ecosystem change. *Nature*.
12. Ponette-González, A.G. and **Byrnes, J.E.** 2011. Sustainable science? Reducing the carbon impacts of mega-meetings. *Ethnobiology Letters*. 2:65-71. [[doi](#)]
11. **Byrnes, J.E.**, Reed, D.C., Cardinale, B.J., Cavanaugh, K.C., Holbrook, S.J., and Schmitt, R.J. 2011. Climate driven increases in storm frequency simplify kelp forest food webs. *Global Change Biology*. 17: 2513-2524. [[doi](#)]
10. Cardinale, B.J., Matulich, K., Hooper, D.U., **Byrnes, J.E.**, Duffy, E., Gamfeldt, L., Balvanera, P., O'Connor, M.I., Gonzalez, A. 2011. The functional role of producer diversity in ecosystems. *American Journal of Botany*. 98: 572-592. [[doi](#)]
9. Yang, L.J., Edwards, K.E., **Byrnes, J.E.**, Bastow, J.L., Wright, A.N., and Spence, K.O. 2010. A meta-analysis of resource pulse-consumer interactions. *Ecological Monographs*. 80: 125-151. [[doi](#)]

8. **Byrnes, J.E.** and Stachowicz, J.J. 2009. The consequences of consumer diversity loss: different answers from different designs. *Ecology*. 90: 2879-2888. [doi]
7. **Byrnes, J.E.** and Stachowicz, J.J. 2009. Short and Long Term consequences of increases in exotic species richness on water filtration by marine invertebrates. *Ecology Letters*. 8: 830-841. [doi]
6. Hughes A.R., **Byrnes J.E.**, Kimbro D.L. & Stachowicz J.J. 2007. Reciprocal relationships and potential feedbacks between biodiversity and disturbance. *Ecology Letters*. 10: 849-864. [doi]
5. **Byrnes, J.E.**, Reynolds, P.L., Stachowicz, J.J. 2007. Invasions and extinctions reshape coastal marine food webs. *PLoS One*. 2: e295. [doi]
4. Bullard S. G., Lambert G, Carman M.R., **Byrnes J.**, Whitlatch R.B., Ruiz G., Miller R.J., Harris L., Valentine P.C., Collie J.S., Pederson J., McNaught D.C., Cohen A.N., Asch R.G., Dijkstra J., Heinonen K. 2007. The invasive colonial ascidian *Didemnum* sp.: current distribution, basic biology, and potential threat to marine communities of the northeast and west coasts of North America. *Journal of Experimental Marine Biology and Ecology*. 342: 99-108. [doi]
3. Stachowicz, J.J. and **Byrnes, J.E.** 2006. Species diversity, invasion success and ecosystem functioning: combining experimental and observational approaches to assess the roles of resource competition, facilitation and extrinsic factors. *Marine Ecology Progress Series*. 311: 251-262. [doi]
2. **Byrnes, J.E.**, Stachowicz, J.J., Hultgren, K.M., Hughes, A.R., Olyarnik, S.V., Thornber, C. 2006. Predator Diversity Enhances Trophic Cascades in Kelp Forests by Modifying Herbivore Behavior. *Ecology Letters*. 9: 61-71. [doi]
1. **Byrnes, J.E.** and Witman, J.D. 2003. Impact assessment of an invasive flatworm, *Convoluta convoluta*, in the southern Gulf of Maine. *Journal of Experimental Marine Biology and Ecology*. 293: 173-191. [doi]

In Review

2. O'Connor, M.I. and **Byrnes, J. E.K.** Biodiversity and Ecosystem Function in Marine Ecosystems. in *Marine Community Ecology and Conservation*, M. Bertness, J. Stachowicz, and B. Silliman, eds.
1. **Byrnes, J.E.K.**, Ranganathan, J., Walker, B., and Faulkes, Z. To crowdfund their research, scientists must build an audience for their work. *PLoS One*.

Book Chapters

2. Fox, J., **Byrnes, J.**, Boker, S., and Neale, M. In Press. Structural equation modeling in R with the *sem* and *OpenMX* packages. In *Handbook of Structural Equation Modeling*. Rick H. Hoyle, David Kaplan, George Marcoulides, and Steve West, eds.
1. Olyarnik, S.V., Bracken, M.E., **Byrnes, J.E.**, Hughes, A.R., Hultgren, K.M., Stachowicz, J.J. 2009. Ecological factors affecting community invasibility. In *Biological Invasions in Marine Ecosystems: Ecological, Management, and Geographic Perspectives*. Gil Rilov and Jeff Crooks, eds. Springer-Verlag. pp. 215-138.

Films

Fear and Fishing in Lake Davis. Documentary film produced in collaboration with 5 other UC Davis students over two years detailing the invasion of Northern Pike in California and the politics of

invasive species eradication efforts. Lead Editor. Flag in the Ground Productions. <http://cpb.ucdavis.edu/bioinv/projects/pike/>. 2005.

Other Writing

2002-Present. I'm a chordata! Urochordata! <http://www.imachordata.com/>. A science blog discussing ecology, marine biology, and the culture of science in the modern age.

2007. Embracing Blogs and Other Tools of the Information Age. <http://www.esa.org/esablog/?p=21>. An article for Ecotone, the Ecological Society of America blog.

Software:

Lavaan - Analysis of latent variable structural equation models in R. Contributing Developer. <http://lavaan.org>

The sem.additions library – Methods for the simple model manipulation, multimodel inference, and correcting for non-normality in the analysis of structural equation in R. <http://r-forge.r-project.org/projects/sem-additions/>

Students Mentored:

UCSB: Jocelyn Christie, Eric Dilley, Matt Foster

UC Davis: Jonathan Schram (current graduate student at Duke), Cameron Coates (current graduate student at UCSD), Tanya Rogers (field technician at Florida State University)

Teaching:

2013. BIOL697: An Introduction to Computational Data Analysis for Biologists. UMass Boston. <http://jarrettbyrnes.info/biol697>

2011-2012. Structural Equation Modeling for Ecologists and Evolutionary Biologists. 3-5 day Workshop. University of Zurich, National Center for Ecological Analysis and Synthesis, and Universidad Nacional Autónoma de México, Morelia. University of British Columbia. <http://jarrettbyrnes.info/sem>

2012. An Introduction to Structural Equation Modeling - a Tool for Studying Complex Systems. Co-Taught with James Grace. Stockholm University, Sweden.

2010. Introduction to R for the Social Sciences. University of California Santa Barbara. 1 day workshop.

2010. Structural Equation Modeling for Field Biologists (in R!). 1 week intensive. Lovén Center for Marine Sciences.

2007. Course Organizer: Applied Bayesian Analysis of Hierarchical Models. Spring.

2007. Course Organizer: Kelp Forest Ecology and Structural Equation Modeling.

2007. Programming in R for Populations Genetics. One week session of Population Biology Graduate Group Core Course.

2006. An Introduction to Statistics in R. 2 Day workshop. Bodega Marine Laboratory and UC Davis.

2005. Teaching Assistant: Introduction to Ecology (EVE101). UC Davis.

2001. Teaching Assistant: Underwater Research. Shoals Marine Laboratory.

2000. Teaching Assistant: Principles of Ecology (BI042). Brown University.

Synergistic Activities:

2013. Global Impacts of Climate Change on Kelp Forests. Leader, National Center for Ecological Analysis and Synthesis working group.

2012-2013. The future of publishing in ecology, evolution, and environmental sciences. Leader, National Center for Ecological Analysis and Synthesis working group.

2011-2012. The #SciFund Challenge. A large-scale effort to attempt to get scientists to crowdfund their research. <http://scifund.rockethub.com> for projects and <http://scifund.wordpress.com> for the project blog. Project raised \$250,000 in 3 rounds.

2011-2012. Determinants of extinction in ancient and modern seas. National Evolutionary Synthesis Center working group.

2011. The #SciFund Challenge. A large-scale effort to attempt to get scientists to crowdfund their research. <http://scifund.rockethub.com> for projects and <http://scifund.wordpress.com> for the project blog. Project raised \$75,000.

2010-2011. Biodiversity and the functioning of ecosystems: translating results from model experiments to functional reality. National Center for Ecological Analysis and Synthesis working group.

2010. Dissertation Initiative for the advancement of Climate Change ReSearch (DISCCRS) participant. Interdisciplinary workshop in climate change communication.

Outreach

2011. Statistics and the Natural World. Alameda High School.

2011. Kelp Forest Research. Palo Alto Jewish Community Center.

2011. Kids do Ecology. Helping 4th graders conduct their own ecological experiments and present results to their peers. Topic: Does light reduce kelp consumption by beach hoppers?

2010-2011. Speaker, Santa Barbara Coastal LTER High-School Teacher Ocean Science Workshop.

2009-2011. Editor at Researchblogging.org.

2004-2005. Intern, Gulf of the Farallones National Marine Sanctuary and Cordell Bank National Marine Sanctuary. Created species list of all non-native species either present in sanctuary waters, or likely to invade in the near future.

Professional Service

2011 - Present. Contributor, Faculty of 1000. <http://goo.gl/ekVCz>

2010 - Present. Editor, Ecology on the Web. *Bulletin of the Ecological Society of America*.

Reviewer. *Ecology*, *Ecological Monographs*, *Ecology Letters*, *Journal of Animal Ecology*, *Oecologia*, *Oikos*, *PLoS One*, *Marine Ecology Progress Series*, *Botanica Marina*, *Hydrobiologia*.

Western Society of Naturalists Student Committee. 2005-2007. Organized 2005 symposium on Cross Ecosystem interactions. Organized symposium “The Natural History of the Channel Islands” in 2007. Created and maintained online meeting registration and submission system.

Grants and Awards:

2011. Hey! Where’s that fish?! A #SciFund Crowdfunded project. \$4,600.

2010. Nation Center for Ecological Analysis and Synthesis, Postdoctoral Fellowship. Full Stipend.

2007. Bodega Marine Lab Graduate Student Fellowship. \$800.

2007. Western Society of Naturalists Student Travel Award. \$500.

2006. Achievement Rewards for College Scientists (ARCS) Fellow. Full Stipend.

2002-2004, 2007. NSF Integrative Graduate Education and Research Traineeship Long Term Fellowship in Biological Invasions. Full Stipend.

2003-2004. UC Davis Center for Population Biology Research Fellowship. \$2500.

2001. Susan Colver Rosenberger Prize in Biology.

2000. NSF Research Experience for Undergraduates. \$2000.

2000. Brown Undergraduate Teaching and Research Assistantship. \$2000.

Work History:

2001-2002. Research Assistant. Northeastern University Marine Science Center. Worked with Robert Miller.

2001. Research Assistant. Bodega Marine Laboratory. Worked with Ronnie Estelle.

1999-2001. Research Assistant. Brown University. Worked with Dr. Jon Witman.

Invited Presentations:

2012. Taking the Ecological Conversation Online. Ecological Society of America.

2012. Engagement leads to science funding: the #SciFund Challenge. NCEAS, Coral Reef Alliance.

2011. Consequences of climate driven shifts in kelp forest food web complexity. Romberg Tiburon Center for Environmental Studies. Hopkins Marine Lab

2011. Beyond species richness: food web structure and ecosystem function. World Conference on Marine Biodiversity.

2011. Causes and consequences of ecological complexity. Stony Brook University. Northeastern University. Universidad Nacional Autónoma de México, Morelia.

2010. Giving a great talk: How to use your body and your voice. With Lila Rose Kaplan and Anne Torsiglieri. Kavli Institute for Theoretical Physics.

2009, 2010. Causes and consequences of biodiversity in southern Californian kelp forests. National Center for Ecological Analysis and Synthesis. San Diego State University Ecology and Evolutionary Biology Seminar Series. University of California Santa Barbara EEMB Seminar Series.

2008. Consequences of declining predator diversity in the ocean: a tale of two systems. Brown University Conservation Biology Seminar Series.

2008. Using structural equation modeling for marine ecological data. Subtidal Ecology Class. Dr. Michael Graham. Moss Landing Marine Laboratory.

2007. The consequences of changing biodiversity in marine ecosystems. California State University, Stanislaus.

2007. Combining long-term surveys with structural equation modeling to examine kelp forest food webs. North American Benthological Society Meetings. Invited for the symposium "Cascades, Chains, and Webs: Alternative Approaches to Understanding Complex Systems"

2007. Identifying the ascidians of San Diego. Scripps Institute of Oceanography.

2005. Predator diversity enhances trophic cascade strength through changes in herbivore behavior. Ecological Society of America Annual Meeting. Invited for the symposium *Incorporating trophic diversity into the biodiversity-ecosystem functioning debate: Lessons from aquatic ecosystems*.

Contributed Presentations:

2013. Jogalekar, A. and **Byrnes, J.E.K.** Science online and rethinking peer review. Science Online.

2010. **Byrnes, J.E.**, Cardinale, B.J., Cavanaugh, K.C., Holbrook, S.J., and Schmitt, R.J. Climate change, storm frequency, and the future of kelp forest food webs. Western Society of Naturalists.

2009. **Byrnes, J.E.**, Cardinale, B.J., and Reed, D.C. The consequences of sessile species richness for resistance to urchin grazing. Western Society of Naturalists.

2008. **Byrnes, J.E.** and Edwards, K.E. Predator diversity influences short and long-term filtration in a marine fouling community. Western Society of Naturalists.

2008. **Byrnes, J.E.** and Stachowicz, J.J. The consequences of increased non-native filter feeder diversity in fouling communities. Benthic Ecology Meetings.

2007. **Byrnes, J.E.** and Stachowicz, J.J. The consequences of accelerating trophic skew in marine fouling communities. Western Society of Naturalists.

2007. **Byrnes, J.E.**, Bowles, C.M., Bracken, M.E.S., Ferner, M., Gruner, D.S., Hays, C., Nickols, K.J., Ram, K., Sorter, C.J.B., Williams, S.L., Kushner, D., Grace, J.B. Combining long-term surveys with structural equation modeling to examine kelp forest food webs. Benthic Ecology Meetings.. Ecological Society of America Meeting.

2005. **Byrnes, J.E.** Biodiversity, invasions, and extinctions: an examination of consumer-prey relationships in fouling communities. Western Society of Naturalists.

2005. **Byrnes, J.E.** and Stachowicz, J.J. Diversity in fouling communities and resistance to invasive ascidians: the role of settlement complementarity and species interactions. International Invasive Sea Squirt Conference.

2004, 2005. **Byrnes, J.E.**, Stachowicz, J.J., Hultgren, K.M., Hughes, A.R., Olyarnik, S.V., Thornber, C. Predator diversity enhances trophic cascade strength through changes in herbivore behavior. Western Society of Naturalists. Benthic Ecology Meetings.

2001. **Byrnes, J.E.**, and Witman, J.D. The potential impact of an invasive Acoel, *Convoluta convoluta*, in the Gulf of Maine. Benthic Ecology Meetings. Poster, Second International Marine Bioinvasions Conference.

Programming Languages

R, SAS, PERL, MATLAB/Octave, Java, LISP, ML, Basic

Professional Organizations:

Western Society of Naturalists, Ecological Society of America, Sigma Xi, American Association for the Advancement of Science, American Academy of Underwater Scientists, National Postdoctoral Association

References

John J. Stachowicz, Ph.D. Advisor
Phone: 530.752.1113 Email: jjstachowicz@ucdavis.edu

Bradley J. Cardinale, Postdoctoral Mentor
Phone: 805.893.4157 Email: bjcardinale@lifesci.ucsb.edu

Daniel C. Reed, Postdoctoral Mentor
Phone: 805.893.8062 Email: reed@lifesci.ucsb.edu

Jon D. Witman, Undergraduate Advisor
Phone: 401.863.3936 Email: jon_witman@brown.edu

Lars Gamfeldt, Collaborator
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