

# Jarrett Edward Kaplan Byrnes

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## Appointments:

2019 - Present Associate Professor, University of Massachusetts Boston  
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

## Education:

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

## Publications:

### *Refereed Papers*

\* - Denotes undergraduate author, † - Denotes graduate student trainee

54. Eger, A. M., E. M. Marzinelli, R. Beas-Luna, C. O. Blain, L. K. Blamey, J. E. K. Byrnes, P. E. Carnell, C. G. Choi, M. Hessing-Lewis, K. Y. Kim, N. H. Kumagai, J. Lorda, P. Moore, Y. Nakamura, A. Pérez-Matus, O. Pontier, D. Smale, P. D. Steinberg, and A. Vergés. 2023. The value of ecosystem services in global marine kelp forests. *Nature Communications*. 14:1894. <https://www.nature.com/articles/s41467-023-37385-0>

53. Dee, L.E., Ferraro, P.J., Severen, C., Kimmel, K., Borer, E.T., **Byrnes, J.E.K.**, Clark, A., Hautier, Y., Hector, A., Raynaud, X., Reich, P.B., Wright, A., Arnillas, C.A., Davies, K.F., MacDougall, A.S., Mori, A., Smith, M.D., Adler, P.B., Bakker, J.D., Braumann, K., Cowles, J.M., Komatsu, K.J., Knops, J., McCulley, R., Moore, J.L., Morgan, J.W., Ohlert, T., Power, S.A., Sullivan, L., Stevens, C. and Loreau, M. 2023. Clarifying the effect of biodiversity on productivity in natural ecosystems with longitudinal data and new methods for causal inference. *Nature Communications*. 14:2607. <https://www.nature.com/articles/s41467-023-37194-5>

52. Byrnes, J. E. K., F. Roger, and R. Bagchi. 2022. Understandable multifunctionality measures using Hill numbers. *Oikos*: e09402. <https://doi.org/10.1111/oik.09402>

51. Filbee-Dexter, K., Feehan, C. J., Smale, D. A., Krumhansl, K. A., Augustine, S., Bettignies, F. de, Burrows, M. T., **Byrnes, J. E. K.**, Campbell, J., Davoult, D., Dunton, K. H., Franco, J. N., Garrido, I., Grace, S. P., Hancke, K., Johnson, L. E., Konar, B., Moore, P. J., Norderhaug, K. M., O'Dell, A., Pedersen, M. F., Salomon, A. K., Sousa-Pinto, I., Tiegs, S., Yiu, D. and Wernberg, T. 2022. Kelp carbon sink potential decreases with warming due to accelerating decomposition. *PLOS Biology* 20: e3001702. <https://doi.org/10.1371/journal.pbio.3001702>

50. Ganley, L. C., **Byrnes, J.E.K.**, Pendleton, D. E., Mayo, C. A., Friedland, K. D., Redfern, J. V., Turner, J. T. and Brault, S. 2022. Effects of changing temperature phenology on the abundance of a critically endangered baleen whale. *Global Ecology and Conservation* 38: e02193. <https://doi.org/10.1016/j.gecco.2022.e02193>

49. Houskeeper H.F., Rosenthal I.S., Cavanaugh K.C., Pawlak C., Trouille L., **Byrnes J.E.K.**, Bell, T.W., and Cavanaugh, K.C.. 2022. Automated satellite remote sensing of giant kelp at the Falkland

Islands (Islas Malvinas). PLoS ONE 17(1): e0257933. <https://doi.org/10.1371/journal.pone.0257933>

48. Hensel, M.J., Silliman, B.R., Hensel, E. and **Byrnes, J.E.K.** 2021. Feral hogs control brackish marsh plant communities over time. Ecology. Accepted Author Manuscript e03572. <https://doi.org/10.1002/ecy.3572>

47. Hensel, M. J. S., B. R. Silliman, J. van de Koppel, E. Hensel, S. J. Sharp, S. M. Crotty, and J. E. K. **Byrnes.** 2021. A large invasive consumer reduces coastal ecosystem resilience by disabling positive species interactions. Nature Communications 12:6290. <https://doi.org/10.1038/s41467-021-26504-4>

46. O'Connor, M. I., Mori, A S., Gonzalez, A., Dee, L. E., Loreau, M, Avolio, M., **Byrnes J. E. K.**, Cheung, W., Cowles, J., Clark, A. T., Hautier, Y., Hector, A., Komatsu, K., Newbold, T., Outhwaite, C. L., Reich, P. B., Seabloom, E., Williams, L., Wright, A. and Isbell, F. 2021. Grand challenges in biodiversity–ecosystem functioning research in the era of science–policy platforms require explicit consideration of feedbacks. *Proc. R. Soc. B.* 2882021078320210783 <http://doi.org/10.1098/rspb.2021.0783>

45. Wong R.J.\*, Roy M.S.†, **Byrnes J.E.K.** 2021 Sediment selection: range-expanding fiddler crabs are better burrowers than their historic-range counterparts. Marine Ecology Progress Series. 674:163-171. <https://doi.org/10.3354/meps13811>

44. Hautier, Y., Zhang, P., Loreau, M. Wilcox, K..R., Seabloom, E.W., Borer, E.T., **Byrnes, J.E.K., et al.** 2020. General destabilizing effects of eutrophication on grassland productivity at multiple spatial scales. *Nature Communications.* 11: 5375 . <https://doi.org/10.1038/s41467-020-19252-4>

43. Lyman, T. P., Elsmore, K., Gaylord, B., **Byrnes, J. E. K.**, & Miller, L. P. 2020. Open Wave Height Logger: An open source pressure sensor data logger for wave measurement. *Limnology and Oceanography: Methods.* [doi] [[website for logger](#)]

42. Kirshen, P., Borrelli, M., **Byrnes, J.**, Chen, R., Lockwood, L., Watson, C., Starbuck, K., Wiggins, J., Novelty, A., Uiterwyk, K., Thurson, K., McMann, B., Foster, C., Sprague, H., Roberts, H. J., Bosma, K., Jin, D., & Herst, R. 2020. Integrated assessment of storm surge barrier systems under present and future climates and comparison to alternatives: A case study of Boston, USA. *Climatic Change.* [[link](#)]

41. Chai, F., Xu, W., Musoke, T., Tarabelsi, G., Assaad, S., Freedman, J., Peterson, R., Piotrowska, K., **Byrnes, J.**, Rogers, S., Veraksa, A. 2019. Structure-function analysis of beta-arrestin Kurtz reveals a critical role of receptor interactions in downregulation of GPCR signaling in vivo. *Developmental Biology.* 455(2):209-419. *Developmental Biology,* 455(2), 409-419. [[link](#)]

40. Blowes, S. A., S. R. Supp, L. H. Antão, A. Bates, H. Bruelheide, J. M. Chase, F. Moyes, A. Magurran, B. McGill, I. H. Myers-Smith, M. Winter, A. D. Bjorkman, D. E. Bowler, **J. E. K. Byrnes,** A. Gonzalez, J. Hines, F. Isbell, H. P. Jones, L. M. Navarro, P. L. Thompson, M. Vellend, C. Waldock, and M. Dornelas. 2019. The geography of biodiversity change in marine and terrestrial assemblages. *Science* 366:339. [[link](#)]

39. Duffy, J.E., Benedetti-Cecchi, L., Trinanes, J.A., Muller-Karger, F.E., Ambo-Rappe, R., Boström, C., Buschmann, A.H., **Byrnes, J.**, Coles, R.G., Creed, J., Cullen-Unsworth, L., Diaz-Pulido, G., Duarte, C.M., Edgar, G.J., Fortes, M.D., Goni, G.J., Hu, C., Huang, X., Hurd, C.L., Konar, B., Krause-Jensen, D., Krumhansl, K., Macreadie, P.I., Marsh, H., McKenzie, L.J., Mieszkowska, N., Miloslavich, P., Montes, E., Nakaoka, M., Norderhaug, K.M., Nordlund, L.M.,

Orth, R.J., Prathep, A., Putman, N.F., Samper-Villarreal, J., Serrao, E.A., Short, F., Sousa Pinto, I., Steinberg, P.D., Stuart-Smith, R., Unsworth, R.K.F., van Keulen, M., Van Tussenbroek, B.I., Wang, M., Waycott, M., Weatherdon, L.V., Wernberg, T., Yaakub, S.M., 2019. Toward a coordinated global observing system for seagrasses and marine macroalgae. *Front. Mar. Sci.* 6. [\[link\]](#)

38. Chase, J.M., McGill, B.J., Thompson, P.L., Antão, L.H., Bates, A.E., Blowes, S.A., Dornelas, M., Gonzales, A., Magurran, A.E., Supp, S.R., Winter, M., Bjorkman, A.D., Bruelhiede, H.L., **Byrnes, J.E.K.**, Cabral, J.S., Elahi, R., Gomez, C., Guzman, H.M., Isbell, F., Myers-Smith, I.H., Jones, H.P., Hines, J., Vellend, M., Waldock, C., O'Connor, M. 2019. Species richness change across spatial scales. *Oikos*. 128: 1079-1091. [\[link\]](#)

37. Grace, J.B., Johnson, D.J., Lefcheck, J.S., **Byrnes, J.E.K.**, 2018. Quantifying relative importance: computing standardized effects in models with binary outcomes. *Ecosphere* 9, e02283. [\[link\]](#)

36. Bowen, J.L., Kearns, P.J., **Byrnes, J.E.K.**, Wigginton, S., Allen, W.J., Greenwood, M., Tran, K., Yu, J., Cronin, J.T., Meyerson, L.A., 2017. Lineage overwhelms environmental conditions in determining rhizosphere bacterial community structure in a cosmopolitan invasive plant. *Nature Communications* 8, 501. [\[link\]](#)

35. Mora, F., Jaramillo, V.J., Bhaskar, R., Gavito, M., Siddique, I., **Byrnes, J.E.K.**, Balvanera, P., 2017. Carbon Accumulation in Neotropical Dry Secondary Forests: The Roles of Forest Age and Tree Dominance and Diversity. *Ecosystems* 20, 1-15.

34. O'Connor, M. I., Gonzalez, A., **Byrnes, J. E. K.**, Cardinale, B. J., Duffy, J. E., Gamfeldt, L., Griffin, J. N., Hooper, D., Hungate, B. A., Paquette, A., Thompson, P. L., Dee, L. E. and Dolan, K. L. 2017., A general biodiversity–function relationship is mediated by trophic level. *Oikos*, 126: 18–31. [\[doi\]](#)

33. Krumhansl, K.A., Okamoto, D.K., Rassweiler, A., Novak, M., Bolton, J.J., Cavanaugh, K.C., Connell, S.D., Johnson, C.R., Konar, B., Ling, S.D., Micheli, F., Norderhaug, K.M., Pérez-Matus, A., Sousa-Pinto, I., Reed, D.C., Salomon, A.K., Shears, N.T., Wernberg, T., Anderson, R.J., Barrett, N.S., Buschmann, A.H., Carr, M.H., Caselle, J.E., Derrien-Courtet, S., Edgar, G.J., Edwards, M., Estes, J.A., Goodwin, C., Kenner, M.C., Kushner, D.J., Moy, F.E., Nunn, J., Steneck, R.S., Vásquez, J., Watson, J., Witman, J.D., **Byrnes, J.E.K.**, 2016. Global patterns of kelp forest change over the past half-century. *Proc. Natl. Acad. Sci. U.S.A.* 113, 13785–13790. [\[doi\]](#)

32. Gonzalez, A., Cardinale, B.J., Allington, G.R.H., **Byrnes, J.**, Arthur Endsley, K., Brown, D.G., Hooper, D.U., Isbell, F., O'Connor, M.I., Loreau, M., 2016. Estimating local biodiversity change: a critique of papers claiming no net loss of local diversity. *Ecology* 97, 1949–1960. [\[doi\]](#)

31. Rogers, T.L.\*, **Byrnes, J.E.K.**, Stachowicz, J.J., 2016. Native predators limit invasion of benthic invertebrate communities in Bodega Harbor, California, USA. *Marine Ecology Progress Series*. 545: 161-173. [\[doi\]](#)

30. Witman, J. D., R. W. Lamb, and **J. E. K. Byrnes**. 2015. Towards an integration of scale and complexity in marine ecology. *Ecological Monographs* 85:475–504. [\[doi\]](#)

29. Orzechowski, E.A., Lockwood, R., **Byrnes, J.E.K.**, Anderson, S.C., Finnegan, S., Finkel, Z.V., Harnik, P.G., Lindberg, D.R., Liow, L.H., Lotze, H.K., McClain, C.R., McGuire, J.L., O'Dea, A., Pandolfi, J.M., Simpson, C., Tittensor, D.P., 2015. Marine extinction risk shaped by trait-environment interactions over 500 million years. *Global Change Biology*. 21: 3595–3607. [\[doi\]](#)

28. Elahi, R., O'Connor, M.I., **Byrnes, J.E.K.**, Dunic, J.<sup>†</sup>, Eriksson, B.K., Hensel, M.J.S.<sup>†</sup>, Kearns, P.J. 2015. Recent Trends in Local-Scale Marine Biodiversity Reflect Community Structure and Human Impacts. *Current Biology*. 25: 1938–1943. [doi]
27. Lefcheck, J.S., **Byrnes, J.E.K.**, Isbell, F., Gamfeldt, L., Griffin, J.N., Eisenhauer, N., Hensel, M.J.S.<sup>†</sup>, Hector, A., Cardinale, B.J., Duffy, J.E., 2015. Biodiversity enhances ecosystem multifunctionality across trophic levels and habitats. *Nature Communications* 6, 6936. [doi]
26. Finnegan, S., Anderson, S.C., Harnik, P.G., Simpson, C., Tittensor, D.P., **Byrnes, J.E.K.**, Finkel, Z.V., Lindberg, D.R., Liow, L.H., Lockwood, R., Lotze, H.K., McClain, C.R., McGuire, J.L., O'Dea, A., Pandolfi, J.M., 2015. Paleontological baselines for evaluating extinction risk in the modern oceans. *Science* 348, 567–570. [doi]
25. Foster, M.E.\* , **Byrnes, J.E.K.**, Reed, D.R. 2015. Effects of five southern California macroalgal diets on growth and gonad weight in the purple sea urchin *Strongylocentrotus purpuratus*. *PeerJ* 3:e719 [doi]
24. **Byrnes, J.E.K.**, J. S. Lefcheck, L. Gamfeldt, J. N. Griffin, F. Isbell, and A. Hector. 2014. Multifunctionality does not imply that all functions are positively correlated. *PNAS*. E5490. [doi]
23. Gamfeldt, L., J. S. Lefcheck, **J. E. K. Byrnes**, B. J. Cardinale, J. E. Duffy, and J. N. Griffin. 2014. Marine biodiversity and ecosystem functioning: what's known and what's next? *Oikos*. [doi]
22. **Byrnes, J.E.K.**, Ranganathan, J., Walker, B., and Faulkes, Z. 2014. To crowdfund their research, scientists must build an audience for their work. *PLoS One*. 9:e110329 [doi]
21. **Byrnes, J. E. K.**, E. Baskerville, B. Caron, C. Neylon, C. Tenopir, M. Schildhauer, A. Budden, L. Aarssen, and C. J. Lortie. 2014. The four pillars of scholarly publishing: The future and a foundation. *Ideas in Ecology & Evolution* 7:27-33. [doi]
20. Balvanera, P., Siddique, I., Dee, L. , Paquette, A., Isbell, F., Gonzalez, A. **Byrnes, J.E.K.** O'Connor, M. I. , Hungate, B. A. and J. N. Griffin. 2014. Linking Biodiversity and Ecosystem Services: Current Uncertainties and the Necessary Next Steps. *Bioscience*. 64: 49-57.[doi]
19. Stewart, J.S. Hazen, E.L., Bograd, S.J., **Byrnes, J.E.K.**, Foley, D.G., Gilly, W.F., Robison, B.H., Field, J.C. 2014. Combined climate and prey-mediated range expansion of Humboldt squid (*Dosidicus gigas*), a large marine predator in the California Current System. *Global Change Biology*. 6:1832-1843. [doi]
18. **Byrnes, J. E. K.**, L. Gamfeldt, F. Isbell, J. S. Lefcheck, J. N. Griffin, A. Hector, B. J. Cardinale, D. U. Hooper, L. E. Dee, and J. E. Duffy. 2014. Investigating the relationship between biodiversity and ecosystem multifunctionality: Challenges and solutions. *Methods in Ecology and Evolution* 4:111-124. [doi]
17. Bowen, J. L., **Byrnes, J. E. K.** , Weisman, D. and C. Colaneri. 2013. Functional gene pyrosequencing and network analysis: an approach to examine the response of denitrifying bacteria to increased nitrogen supply in salt marsh sediments. *Frontiers in Microbiology* 4.
16. Griffin, J. N., **Byrnes, J. E. K.**, and Cardinale, B. J. 2013. Effects of predator richness on prey suppression: a meta-analysis. *Ecology*. 94:2180-2187. [doi]
15. **Byrnes, J.E.K.**, Cardinale, B.J., and Reed, D.R. 2013. Sea urchin grazing increases with prey diversity on temperate rocky reefs. *Ecology*. 94:1636-1646. [doi]

14. Wheat, R. E., Wang, Y., **Byrnes, J. E.**, Ranganathan., J. 2013. 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. 2012. Biodiversity loss ranks as a major driver of ecosystem change. *Nature*. 286: 105-108. [doi]
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 & Preprints*



1. **Byrnes J.E.K.**, Johnson L.E., Connell S.D. et al. 2013. The sea urchin – the ultimate herbivore and biogeographic variability in its ability to deforest kelp ecosystems. *PeerJ PrePrints*, 1, e174v1. [doi]
2. Dunic, J.C.<sup>‡</sup>, Elahi, R., Hensel, M.J.S.<sup>‡</sup>, Kearns, P.J., O'Connor, M.I., Acuña-Hurtado, D., Honig, A., Wilson, A.R., **Byrnes, J.E.K.**, In Review. Human activities influence the direction and magnitude of local biodiversity change over time. bioRxiv 162362. [doi] Ecology.
3. **Byrnes, J.E.K.**, Brown, A., Sheridan, K., Peller, T., Lawlor, J., Beaulieu, J., Muñoz, Jenny, Hesketh, A., Pereira, A., Knight, N. S., others 2022. Notes from the Past Show How Local Variability can Stymie Urchins and the Rise of the Reds in the Gulf of Maine. *EcoEvoRxiv*.
4. **Byrnes, J.,E.K.** Dissly, L., Bosma, K. (2022). Surprising Abundant Mussel Beds in the Center of Boston Harbor in the Midst of a Regional Die-Back. *EcoEvoRxiv*.

#### Book Chapters

3. O'Connor, M.I. and **Byrnes, J. E.K.** Biodiversity and Ecosystem Function in Marine Ecosystems. 2014. In *Marine Community Ecology and Conservation*, M. Bertness, J. Bruno, B. Silliman, and J. Stachowicz, eds.
2. Fox, J., **Byrnes, J.**, Boker, S., and Neale, M. 2011. 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.

#### Reports

3. Intergovernmental Panel on Climate Change. In Preparation. Chapter 4: Plausible futures of nature, its contributions to people and their good quality of life. In IPBES Global Assessment on Biodiversity and Ecosystem Services (Deliverable 2c). Government draft to be submitted for approval at the IPBES 7th Plenary, May 2019, Paris.  
\*-Contributing authors are not listed in main citation as per IPBES policy
2. Cavender-Bares, J., Arroyo, M.T.K., Abell, R., Ackerly, D., Ackerman, D., Arim, M., Belnap, J., Castañeda Moya, F., Dee, L., Estrada-Carmona, N., Gobin, J., Isbell, F., Köhler, G., Koops, M., Kraft, N., Mcfarlane, N., Martínez-Garza, C., Metzger, J. P., Mora, A., Oatham, M., Paglia, A., Pedrana, J., Peri, P. L., Piñeiro, G., Randall, R., Robbins, W. W., Weis, J., and Ziller, S. R. 2018. Chapter 3 Status and trends of biodiversity and ecosystem functions underpinning nature's benefit to people. In: The IPBES regional assessment report on biodiversity and ecosystem services for the Americas. Rice, J., Seixas, C. S., Zaccagnini, M. E., Bedoya-Gaitán, M., and Valderrama, N. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. <https://www.ipbes.net/assessment-reports/americas>  
\*-Contributing authors are not listed in main citation as per IPBES policy

1. Kirshen, P., K. Thurson, B. McMann, C. Foster, H. Sprague, H. Roberts, M. Borelli, **J. E. K. Byrnes**, R. Chen, L. Lockwood, C. Watson, K. Starbuck, J. Wiggins, A. Novelly, K. Ulterwyk, K. Bostoma, E. Holmes, Z. Stromer, J. Famely, A. Shaw, B. Hoffnagle, Di Jin, R. Herst, E. Moothart,

and C. Humphries. 2018. Feasibility of Harbor-wide Barrier Systems. Sustainable Solutions Lab, University of Massachusetts Boston.

*Software:*

piecewiseSEM - Analysis of structural equation models using local area estimation techniques in R. Co-author/contributor as of version 2.0. <http://jslefcche.github.io/piecewiseSEM/>

multifunc - Analysis of simultaneous change in multiple ecosystem functions in R. <http://github.com/jebyrnes/multifunc>

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

*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.

*Online*

2016 - Present. Deep Sea News. <http://deepseanews.com> Ocean science outreach blog. Contributor.

2014 - Present. Floating Forests Blog. <http://blog.floatingforests.org/> Outreach and communications portion of online citizen science project to discuss kelp forest biology and ecology.

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.

***Online Projects:***

2014 - Present. Floating Forests. <http://www.floatingforests.org/> Online citizen science project to identify trends in global kelp abundance using satellite imagery.

2011 - Present. The #SciFund Challenge. A large-scale effort to attempt to get scientists to crowdfund their research. <https://experiment.com/institutions/scifund> and <http://scifundchallenge.org/> for projects and for the project blog. Project raised \$307,825 in 4 rounds. 182 scientists participating. Six publications from projects as of 8/1/2014.

**Personnel Mentored & Current Positions:**

UMass Boston Postdocs: Alison Haupt (Assistant Professor, California State University Monterey Bay), Christian Alsterberg (current Environmental Coordinator på Catchment Partnership of Kävlingeån), Meredith McPherson

*UMass Boston PhD Students:* Marc Hensel (Research Assistant Professor at the University of Florida), Breckie McCollum (Assistant Professor at Berklee College of Music), Michael Roy (Data Science Lead for the New York State Department of Public Health), Brianna Shaughnessy (NOAA Communications Specialist with the Fisheries Office of Communications and Seafood Literacy Coordinator), Issac Rosenthal (Postdoc at Amherst College), Alexis Wilkes, Daniel Lopez, Curtis Morris

*UMass Boston Masters Students:* Jillian Dunic (Staff at the Department of Fisheries and Oceans, Canada), Ted Lyman (completed degree), Lucy Lockwood (Current PhD Student at UMass Boston with Paul Kirshen), Wendi White (Lead technician in Hughes Lab at Northeastern University)

*UMass Boston Undergraduate:* Amy Jones, Melody Rose, Michael Moscote, Richard Wong (PhD Student at Duke University), Linnea Sturdy (Masters Student at University of New England), Farah Ahmad (Community Impact Programs and Operations Coordinator at United Way of Western CT), Nour Tabidi, Chena Farhat (Law student at Suffolk University), Sarah Strohacker, Nelson Nease, Felicia Horton

*REU and Research Interns.* Madison Lin, Amy Smith, Jillian Hubbard, Alannah Dodd, Laura Dissly, Lianna Greenberg-Nielsen, Sarah McCormak, Katie Bland (Masters student, School of Marine and Environmental Affairs, University of Washington), Conner Donovan (Massachusetts Water Resources Authority), Jeremiah Ets-Hokin (Masters student at San Francisco State University)

*UCSB:* Jocelyn Enevoldsen (California Sea Grant Fellow), Eric Dilley (PhD Student University of Hawaii, Marine Biology), Matt Foster (MS Student UCLA Civil and Environmental Engineering)

*UC Davis:* Jonathan Schram (Essential Fish Habitat Consultation Coordinator at Ocean Associates, Inc.), Cameron Coates (Scientist at Zymergen, Inc.), Tanya Rogers (Ph.D. student, Northeastern University)

## **Teaching:**

2023. Structural Equation Modeling for Ecology and Evolutionary Biology. P.R. Statistics.

2019 - Present. Underwater Research. Shoals Marine Laboratory.

2017. Disentangling Complex Causal Relationships in Spatial and Temporal data with SEM. University of Tromsø.

2017. Disentangling Complex Causal Relationships in Spatial and Temporal data with SEM. University of Tromsø.

2017-Present. BIOL609: Advanced Data Analysis for Biology. UMass Boston. <http://biol609.github.io>

2016-Present. Marine Conservation Biology. Shoals Marine Laboratory.

2016-Present. BIOL355: Introduction to Data Science for Biology. UMass Boston. <http://biol355.github.io>

2014-Present. BIOL310: Marine Biology. UMass Boston.

2014. BIOL697: Introduction to Meta-analysis for Biology. UMass Boston



2012-Present. BIOL607: An Introduction to Computational Data Analysis for Biologists. UMass Boston. <http://biol607.github.io>

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

2011-Present. Using tools from Theater for Science Presentations. Co-taught with Lila Rose Kaplan, International Science Playwriting award winner. NCEAS. Kavli Institute for Theoretical Physics. UMass Boston.

2010-Present. Structural Equation Modeling for Ecologists and Evolutionary Biologists. 3-5 day Workshop. Lovén Center for Marine Sciences. University of Zurich. National Center for Ecological Analysis and Synthesis. Universidad Nacional Autónoma de México, Morelia, University of British Columbia. Virginia Institute of Marine Science, University of Coimbra. UMass Boston, UNC Chapel Hill. University of Swansea. PR Statistics. Bodega Marine Lab, University of Lund <http://byrneslab.net/teaching/sem/>

### Grants and Awards:

2023. Stone Living Lab: Living Seawalls. James M. and Cathleen D. Stone Foundation. \$102,014

2023. Stone Living Lab: Data Management. James M. and Cathleen D. Stone Foundation. \$127,346.

2021-2024. Vulnerability of giant kelp populations to climate change. NASA. \$169,222 as Co-I.

2021 - 2024: Using Hyperspectral Imagery to Assess the Effects of Warming on New England Kelp Forests. NASA MUREP Program. \$742,227.

2021 - 2022. Gathering crucial baseline data for multiple sectors to address knowledge gaps in *Saccharina latissima* (sugar kelp) distribution and environmental services along Massachusetts coasts. UMass Boston Proposal Development Grant. \$19,350.

2021-2022 Detecting and Attributing Synchrony in Cross-Ecosystem Community Dynamics Using Long-Term Observational Data in Coastal Systems. Canadian Institute for Ecology and Evolution. Funding for two virtual workshops.

2020 - 2025. The Stone Living Laboratory. Stone Foundation. \$383,422 as Co-I

2018 - 2022. Renewal: Using Citizen Science to Understand Thirty Years of Change in Global Kelp Cover by Expanding the Zooniverse to NASA Satellite Imagery. NASA. \$804,557 as lead PI.

2017 - 2018. Using Citizen Science to Understand Thirty Years of Change in Global Kelp Cover by Expanding the Zooniverse to NASA Satellite Imagery. NASA. \$163,972 as lead PI.

2016 - 2018. Improving the environment while protecting our coasts: A holistic accounting of ecosystem services of “Green Infrastructure and Natural and Nature-Based Features (NNBF)” in an urbanized coastal environment. NOAA. \$10,707 as a Co-PI.

2016-2018. Support for student marine research efforts. MPH Foundation. \$36,000 as PI over multiple years.

2015 - 2022. LTER-Plum Island Ecosystems: Dynamics of Coastal ecosystems in a region of rapid climate change, sea-level rise, and human impacts. National Science Foundation. \$360,000 as a contractor.

2016-2018. Evaluating the relationship between kelp forests ecosystems and water temperature in the southern Gulf of Maine. Woods Hole Sea Grant. \$100,119

2015-2017. Feedbacks Between Coastal New England Kelp Beds and Wave Disturbance. MIT SeaGrant. \$150,000

2015-2016. Changes in the Importance of Bird Predation in the Face of Climate Driven Range Shifts in New England. UMB Healey Grant. \$7,500

2014-2016. Food Web Structure as a Driver of Multiple Ecosystem Functions in new England Salt Marsh Ecosystems. MIT SeaGrant. \$165,536

2014-2015. The Role of Large-Scale Kelp Die-Offs in Facilitation of Invasive Species. UMB Healey Grant. \$7,500

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

2010-2012. Nation Center for Ecological Analysis and Synthesis, Postdoctoral Fellowship. Full Stipend.

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.

## **Synergistic Activities:**

### *Working Groups & Organizations*

2023. Causality in Ecology. Johns Hopkins University working group.

2021 - 2022. Detecting and Attributing Synchrony in Cross-Ecosystem Community Dynamics Using Long-Term Observational Data in Coastal Systems. Canadian Institute for Ecology and Evolution. Virtual meetings.

2019. Macroalgal Essential Ocean Variable (EOV) data processing and workflow. Co-Hosted by GOOS and the ARDC. IMAS. Hobart, Australia.

2018. Planning the implementation of a global long-term observing and data sharing strategy for macroalgal communities. Co-Hosted by the Global Ocean Observing System and the Partnership for Observation of the Global Ocean. IMAS. Hobart, Australia.

2017-2019. Scaling Up Productivity Responses to Changes in Biodiversity. NCEAS LTER working group.

2016. Quantifying Biodiversity Change through Time. sDiv working group.

2015. Detection and Attribution of Biodiversity Change. CIEE working group.

2014-Present. Floating Forests Science Team. <http://floatingforests.org>.

2014-Present. Kelp Ecosystem Ecology Network. Network co-ordinator.

2014-Present. Director of the Board, The #SciFund Challenge. A non-profit dedicated to training scientists to use crowdfunding as a tool for outreach.

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

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*

2017. The Kelp Ecosystem Ecology Network of New England. Boston Sea Rovers.

2014. The Biology of our Oceans in a Changing World. Cohasset Student Center for Coastal Research.

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](http://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*

2022. Panelist, NSF Biological Oceanography grants panel.

2022 - 2024. Committee Member. Benthic Ecology Meeting Society.

2021 - Present. Handling Editor. *Journal of Experimental Marine Biology and Ecology*.

2016. Panelist, NCEAS LTER synthesis grant reviews.

2013 - Present. Ad hoc Grant reviewer for NSF, NSERC

2013 - Present. Handling Editor. *Oikos*

2013 - 2019. Handling Editor: *Evolution & Ecology*,

2013 - 2016. Handling Editor. *Axios Reviews*

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

2010 - 2014. Editor, Ecology on the Web. *Bulletin of the Ecological Society of America*.

Reviewer. *Nature Communications, Ecology, Ecological Monographs, Ecology Letters, Journal of Animal Ecology, Oecologia, Oikos, Evolution & Ecology, 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.

#### **Invited Presentations:**

2023. Understanding Drivers of Ecological Change by Applying Causal Analysis to Observational Data. Boston University.

2022. Kelp Forests of New England in an Era of Global Change, Roger Williams University

2021. Understanding Change in Kelp Forests by Applying Causal Analysis to Observational Data, UMass Amherst.

2021. OOPS! I forgot to measure that! Coping with omitted variable bias for the causal analysis of observational data. Ecological Society of America.

2020. Macroalgal (and community) Benthic Monitoring: Can't We All Just Get Along?, Hakai Institute.

2020. Understanding Changes in Kelp Forests Around the World and Around Appledore, Rock Talk Seminar Series, Shoals Marine Lab.

2020. From kelp foRests to coRonavirus an inteRactive jouRney in doing science with R, University of Rhode Island R Studygroup.

2019. Global Data for Global Kelp Forest Monitoring, Partnernship for Global Oceans Macroalgal EOY Meeting, POGO, Hobart, Tasmania.

2018-2019. Connecting Global Change to Shifts in Biodiversity and Ecosystem Function in Coastal Ecosystems. Global change in marine ecosystems: from foundation species to biodiversity. University of Maine. University of Massachusetts Boston. Texas A&M Corpus Christi

2018. Challenges in understanding kelp forest dynamics at the scale of the planet. Gordon Conference on Ocean Global Change Biology.

2016-2018. Global change in marine ecosystems: from foundation species to biodiversity. University of Maine. University of Connecticut. Bigelow Labs. Bodega Marine Lab

2015. Tools from theater for scientists. UMass Boston Coasts and Communities IGERT seminar with Lila Rose Kaplan.

2015. The future of floating forests in a changing world. Southern Connecticut State College.

2015. Connecting your trainees and visitors to ocean science onshore! National Tall Ships Association Conference.

2014-2016. Of Kelp and Climate Change: Reef Life in your Back Yard. New England Aquarium. Monadnock Summer Lyceum. Salem Sound Coastwatch.

2014. Salt marsh surveys. Nantucket Biodiversity Initiative.

2014. Diversity is the spice of (ocean) life. Cohasset Center for Student Coastal Research.

2014. Of indirect effects, climate change, and crowdfunding science. Woods Hole Oceanographic Institute.

2014. Global change, species diversity, and the future of marine ecosystems. Marine Biological Laboratory.

2013. Crowdfunding Science: Appealing to the online community for research money. American Academy for the Advancement of Science webinar.

2013. Measuring the effects of change in biodiversity on multiple ecosystem functions. Multifunctional landscapes symposium. International Association for Ecology (INTECOL) Congress.

2013. Causes and consequences of ecological complexity. Brown University, Dalhousie University.

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:

2023. Global Change with Forty Years of Data from Intertidal and Subtidal Reefs in Maine, International Temperate Reefs Symposium.

2023. Oh S\*\*T! I forgot to measure that! Coping with omitted variable bias for the causal analysis of observational data, Benthic Ecology Meeting.

2022. Natural History Observations Show Wave Exposure Slowing Urchins and the Rise of the Reds in the Gulf of Maine, Benthic Ecology Meeting, Portsmouth, NH

2019. **Jarrett E.K. Byrnes**, Haupt A.J., Dijkstra J.A., Grabowski J.H., McMahan M., Rasher D., Humphries A.T., Thornber C. Temperature drives declines in kelp forests and biodiversity. Benthic Ecology Meeting. St. John's, Newfoundland, Canada.

2017. **Byrnes, J.E.K.**, Cavanaugh K.C., Haupt, A.J., Trouille, L., Rosenthal, I., Bell, T.W., Rassweiler, A., Pérez-Matus, A., and J. Assis. Using Online Citizen Science to Assess Giant Kelp Abundances Across the Globe with Satellite Imagery. American Geophysical Union.

2016. **Byrnes, J.E.K.**, Krumhansl, K., Okamoto, D.K., Rassweiler, A., Novak, M., Reguero, B., Wernberg, T., Pérez-Matus, A., and Konar, B. The effects of shifting ocean temperatures and wave disturbance on kelp populations. Western Society of Naturalists, Monterey, CA.
2016. **Byrnes, J.E.K.**, Krumhansl, K., Okamoto, D.K., Rassweiler, A., and Novak, M. The role of temperature and wave disturbance for kelp populations in a changing world. Benthic Ecology Meetings.
2015. Pérez-Matus, A., **Byrnes, J.E.K.**, Konar, B., Micheli, F., Low, N., Shears, N. Okamoto, D.K. Changes in fish communities driven by kelp loss: a global meta-analysis. Western Society of Naturalists.
2014. **Byrnes, J.E.K.**, Johnson, L.E., Connell, S.D., Shears, N.T., McMillan, S.M., Irving, A., Buschmann, A.H., Graham, M.H., Kinlan, B.P. Global variation in the propensity of sea urchins to transform kelp forests into barrens. Benthic Ecology Meeting.
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.

## Professional Associations:

Ecological Society of America, Western Society of Naturalists, British Ecological Society,  
American Association for the Advancement of Science, American Academy of Underwater  
Scientists

(updated Sept 10, 2023)