

CURRICULUM VITAE

1. Erika Jeannine Edwards

Professor of Ecology and Evolutionary Biology
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2. Home address

New Haven, CT

3. Education

2000-2005 PhD in Ecology and Evolutionary Biology, Yale University, Dissertation title: *Pereskia* (Cactaceae) and the origin of the cactus life form.
1993-1998 B.S. in Earth Systems, Stanford University

4. Professional appointments

2018-current Director, Marsh Botanical Garden, Yale University
2017-current Professor of Ecology and Evolutionary Biology, Yale University
2017-current Curator of Botany, Peabody Museum of Natural History
2014 Distinguished Visiting Professor, Kyushu University, Japan

2013-2017 Associate Professor of Ecology and Evolutionary Biology, Brown University
2011-2013 Richard and Edna Salomon Assistant Professor of Ecology and Evolutionary Biology, Brown University
2008-2017 Director, Brown University Herbarium, Brown University
2007-2011 Assistant Professor of Biology, Brown University
2005-2007 Post-doctoral research associate, Geography Department, University of California at Santa Barbara

5. Completed publications

a. Books/monographs (authored and/or edited volumes)

Feild T and EJ Edwards, editors. 2012. Major transitions in angiosperm ecology and functional biology. Special issue of *International Journal of Plant Sciences* 173: 559-733.

b. Refereed book chapters

2. Forrestel, EJ and **EJ Edwards**. 2019. The future biogeography of C3 and C4 grasslands. In Newman J., and D. Gibson (eds.). *Grasslands and Climate Change/ Ecological Reviews*, Cambridge University Press, Cambridge.

1. Davis C, **EJ Edwards**, and MJ Donoghue. 2010. A clade's eye view of global climate change. In Bell, M. A., D. J. Futuyma, W. F. Eanes, and J. S. Levinton (eds.) *Evolution since Darwin: the First 150 Years*, Sinauer Associates, Sunderland, MA.

c. Refereed journal articles

88. Moeglein MK, D Chatelet, MJ Donoghue, **EJ Edwards**. Evolutionary dynamics of genome size in a clade of woody plants. *American Journal of Botany*, in press.

87. Landis MJ, **EJ Edwards**, MJ Donoghue. Modeling phylogenetic biome shifts on a planet with a past. *Systematic Biology*, in press.

86. Griffith D, C Osborne, **EJ Edwards**, S Bachle, D Beerling, W Bond, T Gallaher, B Helliker, C Lehmann, L Leatherman, J Nippert, S Pau, F Qiu, W Riley, M Smith, C Stromberg, L Taylor, M Ungerer, CJ Still. Lineage functional types (LFTs): characterizing functional diversity to enhance the representation of ecological behavior in Earth Systems models. *New Phytologist*, in press.

85. Landis MJ, DAR Eaton, WL Clement, B Park, EL Spriggs, PW Sweeney, **EJ Edwards**, MJ Donoghue. Joint phylogenetic estimation of geographic movements and biome shifts during the global diversification of *Viburnum*. *Systematic Biology*, in press.

84. Nurk, N, P Linder, R Onstein, M Larcombe, C Hughes, L Fernandez, P Schluter, L Valente, C Beierkuhnlein, V Cutts, MJ Donoghue, **EJ Edwards**, R Field, S Flantua, S Higgins, A Jentsch, S Liede-Schumann, MD Pirie. 2020. Diversification in evolutionary arenas- assessment and synthesis. *Ecology and Evolution* 10: 6163-6182.

83. Gilman I, **EJ Edwards**. CAM Photosynthesis. 2020. *Current Biology* 30: R57-R62.

82. Ferrari RC, PP Bittencourt, MA Rodrigues, JJ Moreno-Villena, FRR Alves, VD Gastaldi, SF Boxall, LV Dever, D Demarco, SCS Andrade, **EJ Edwards**, J Hartwell, L Freschi. 2020. C4 and crassulacean acid metabolism photosynthesis within a single leaf: deciphering key components behind a rare photosynthetic adaptation. *New Phytologist* 225: 1699-1714.

81. Hancock LP, JAM Holtum, **EJ Edwards**. 2019. The evolution of CAM photosynthesis in Australian *Calandrinia* reveals lability in C3+CAM phenotypes and a possible constraint to the evolution of strong CAM. *Journal of Integrative and Comparative Biology* 59: 517-534.
80. **Edwards EJ**. 2019. Evolutionary trajectories, accessibility, and other metaphors: the case of C4 and CAM photosynthesis. Invited Tansley Review, *New Phytologist* 223: 1742-1755.
79. Spriggs EL, C Schlutius*, DAR Eaton, B Park, P Sweeney, **EJ Edwards**, MJ Donoghue. 2019. Differences in flowering time maintain species boundaries in a continental radiation of *Viburnum*. *American Journal of Botany* 106: 833-849.
78. Winter K, RF Sage, **EJ Edwards**, A Virgo, JAM Holtum. 2019. Facultative CAM in a C3-C4 intermediate. *Journal of Experimental Botany* 70: 6571-6579.
77. Heyduk K, JJ Moreno-Villena, I Gilman, PA Christin, **EJ Edwards**. 2019. The genetics of convergent evolution: insights from plant photosynthesis. *Nature Reviews Genetics* 20: 485-493.
76. Donoghue MJ, **EJ Edwards**. 2019. Model clades are vital for comparative biology, and ascertainment bias is not a problem in practice – a response to Beaulieu and O’Meara. *American Journal of Botany* 106: 327-330.
75. Spriggs EL, DAR Eaton, PW Sweeney, C Schlutius*, **EJ Edwards**, MJ Donoghue. 2019. RADSeq data reveal a cryptic *Viburnum* species on the North American coastal plain. *Systematic Biology* 68: 187-203.
74. Olson ME, D Soriano, JA Rosell, T Anfodillo, MJ Donoghue, **EJ Edwards**, C Leon-Gomez, T Dawson, JJ Martinez, M Castorena, A Echeverria, CI Espinosa, A Fajardo, A Gazol, S Isnard, RS Lima, CR Marcati, R Mendz-Alonzo. 2018. Plant height and hydraulic vulnerability to drought and cold. *Proceedings of the National Academy of Sciences USA* 115: 7551-7556.
73. Thulin M, A Larsson, **EJ Edwards**, AJ Moore. 2018. Phylogeny and systematics of *Kewa* (Kewaceae). *Systematic Botany* 43: 689-700.
72. Hancock LP, F Obbens, AJ Moore, K Thiele, JM de Vos, J West, JAM Holtum, **EJ Edwards**. 2018. Phylogeny, evolution, and biogeographic history of *Calandrinia* (Montiaceae). *American Journal of Botany* 105: 1021-1034.
71. Li M, H An, R Angelovici, C Bagaza, A Batushansky, L Clark, V Coneva, MJ Donoghue, **EJ Edwards**, D Fajardo, H Fang, MH Frank, T Gallaher, S Gebken, T Hill, S Jansky, B Kaur, PC Klahs, LL Klein, V Kuraparthi, J Londo, Z Migicovsky, A Miller, R Mohn, S Myles, CN Topp, A Van Deynze, K Zhang, L Zhu, BM Zink, DH Chitwood. 2018. Topological data analysis as a morphometric method: using persistent homology to demarcate a leaf morphospace. *Frontiers in Plant Science* 9:553.

70. Goolsby EW, AJ Moore, LP Hancock, JM de Vos, **EJ Edwards**. 2018. Molecular evolution of key metabolic genes during transitions to C4 and CAM photosynthesis. *American Journal of Botany* 105: 602-613.
69. Spriggs EL, S Schmerler, **EJ Edwards**, MJ Donoghue. 2018. Leaf form varies along a shared axis across multiple scales in *Viburnum*. *American Naturalist* 191: 235-249.
68. Moore AJ, JM de Vos, LP Hancock, E Goolsby, **EJ Edwards**. 2018. Targeted enrichment of large gene families for phylogenetic inference: phylogeny and molecular evolution of photosynthesis genes in the portulugo (Caryophyllales). *Systematic Biology* 67: 367-383.
67. Holtum JAM, LP Hancock, **EJ Edwards**, K Winter. 2018. Crassulacean Acid Metabolism (CAM) in the Basellaceae (Caryophyllales). *Plant Biology* 20: 409-414.
66. Holtum JAM, LP Hancock, **EJ Edwards**, K Winter. 2017. Facultative CAM photosynthesis in four species of *Calandrinia*, ephemeral succulents of arid Australia. *Photosynthesis Research* 134: 17-25.
65. **Edwards EJ**, DS Chatelet, B Chen, JY Ong, S Tagane, J Kanemitsu, K Tagawa, K Teramoto, B Park, KF Chung, JM Hu, T Yahara, MJ Donoghue. 2017. Convergence, consilience, and the evolution of temperate deciduous forests. *American Naturalist* 190: S87-S104.
64. Obbens FJ, LP Hancock, **EJ Edwards**, KR Thiele. 2017. *Calandrinia holtumii* (Montiaceae), a new and unusual species from arid Western Australia. *Nuytsia* 28: 217-233.
63. Dunning L, JJ Moreno-Villena, MR Lundgren, A Brautigam, **EJ Edwards**, P Nosil, CP Osborne, PA Christin. 2017. Reticulate evolution facilitated the recurrent emergence of C4 photosynthesis within closely related species. *Evolution* 71: 1541-1555.
62. Holtum JAM, LP Hancock, **EJ Edwards**, K Winter. 2017. Optional use of CAM photosynthesis in two C4 species, *Portulaca cyclophylla* and *Portulaca dignya*. *Journal of Plant Physiology* 214: 91-96.
61. **Edwards EJ**, DS Chatelet, EL Spriggs, ES Johnson, C Schlutius*, MJ Donoghue. 2017. Correlation, causation, and the evolution of leaf teeth: A reply to Givnish and Kriebel. *American Journal of Botany* 104: 509-515.
60. Forrestel EJ, MJ Donoghue, **EJ Edwards**, W Jetz, J du Toit, MD Smith. 2017. Different clades and traits yield similar grassland functional responses. *Proceedings of the National Academy of Sciences USA* 114: 705-710.

59. Whitfeld TJS, MC Cooper, **EJ Edwards**. 2016. New England specimens in the Brown University Herbarium. *Rhodora* 118: 415-417.
58. Barish S, M Arakaki, **EJ Edwards**, MJ Donoghue, WL Clement. 2016. Characterization of 16 microsatellite markers for the Oreinotinus clade of *Viburnum* (Adoxaceae). *Applications in Plant Sciences* 4: 1600103.
57. Thulin M, AJ Moore, H El-Seedi, A Larsson, PA Christin, **EJ Edwards**. 2016. Phylogeny and generic delimitation in Molluginaceae, new pigment data in Caryophyllales, and the new family Corbichoniaceae. *Taxon* 65: 775-793.
56. **Edwards EJ**, EL Spriggs, D Chatelet, MJ Donoghue. 2016. Unpacking a century old mystery: winter buds and the latitudinal gradient in leaf form. *American Journal of Botany* 103: 1-4.
55. Scoffoni C, D Chatelet, J Pasquet-Kok, M Rawls, MJ Donoghue, **EJ Edwards**, L Sack. 2016. Hydraulic basis for the evolution of photosynthetic productivity. *Nature Plants* 2: 16072.
54. Bhaskar R, S Porder, P Balvanera, **EJ Edwards**. 2016. Ecological and evolutionary variation in community nitrogen use traits during tropical dry forest secondary succession. *Ecology* 97: 1194-1206.
53. Holtum JAC, L Hancock, **EJ Edwards**, M Crisp, D Crayn, R Sage, K Winter. 2016. Australia lacks stem succulents but is it depauperate in plants with Crassulacean Acid Metabolism (CAM)? *Current Opinion in Plant Biology* 31: 109-117.
52. Yang X, JC Cushman, AM Borland, **EJ Edwards**, and 47 others. 2015. A roadmap for research on crassulacean acid metabolism (CAM) to enhance sustainable food and bioenergy production in a hotter, drier world. *New Phytologist* 207: 491- 504.
51. Ogburn RM and **EJ Edwards**. 2015. Life history lability underlies rapid climatic niche evolution in the angiosperm clade Montiaceae. *Molecular Phylogenetics and Evolution* 92: 181-192.
50. **Edwards EJ**, J de Vos, MJ Donoghue. 2015. Brief Communications Arising: Doubtful pathways to cold tolerance in plants. *Nature* 521, doi:10.1038/nature14393.
49. Spriggs EL, WL Clement, PW Sweeney, S Madrinan, **EJ Edwards**, MJ Donoghue. 2015. *Viburnum* diversification: temperate radiations and dying embers of a tropical past. *New Phytologist* 207: 340-354.
48. Christin PA, M Arakaki, CP Osborne, **EJ Edwards**. 2015. Genetic enablers underlying the clustered origins of C4 photosynthesis in angiosperms. *Molecular Biology and Evolution* 32: 846-858.

47. Gao L, **EJ Edwards**, Y Zhang, Y Huang. 2014. Major evolutionary trends in hydrogen isotopic fractionation of vascular plant leaf waxes. *PLoS ONE* 9(11): e112610.
46. Donoghue MJ and **EJ Edwards**. 2014. Biome shifts and niche evolution in plants. *Annual Review of Ecology, Evolution, and Systematics* 45: 547-572.
45. Howison M, F Zapata, **EJ Edwards**, CW Dunn. 2014. Bayesian genome assembly and assessment by Markov chain Monte Carlo sampling. *PLoS ONE* 9(6): e99497.
44. Clement, W, M Arakaki, P Sweeney, **EJ Edwards**, MJ Donoghue. 2014. A chloroplast tree for *Viburnum* (Adoxaceae) and its implication for phylogenetic classification and character evolution. *American Journal of Botany* 101: 1029-1049.
43. Spriggs EL*, PA Christin, **EJ Edwards**. 2014. C4 photosynthesis promoted species diversification during the Miocene grassland expansion. *PLoS ONE* 9(5): e97722.
42. Hancock L and **EJ Edwards**. 2014. Phylogeny and the inference of evolutionary trajectories. Special issue of *Journal of Experimental Botany* 65: 3491-3498.
41. Christin PA, M Arakaki, CP Osborne, A Brautigam, RF Sage, JM Hibberd, S Kelley, S Covshoff, GK Wong, L Hancock, **EJ Edwards**. 2014. Shared origins of a key enzyme during the evolution of C4 and CAM metabolism. Special issue of *Journal of Experimental Botany* 65: 3609-3621.
40. Still CJ, S Pau, **EJ Edwards**. 2014. Land surface skin temperature captures thermal environments of C3 and C4 grasses. *Global Ecology and Biogeography* 23: 286-296.
39. **Edwards EJ**, D Chatelet, L Sack, MJ Donoghue. 2014. Leaf lifespan and the global leaf economic spectrum in the context of whole plant architecture. Special issue of *Journal of Ecology* 102: 328-336.
38. Christin PA, EL Spriggs*, CP Osborne, CAE Stromberg, N Salamin, **EJ Edwards**. 2014. Molecular dating, evolutionary rates, and the age of the grasses. *Systematic Biology* 63: 153-165.
37. Christin, PA, SF Boxall, R Gregory, **EJ Edwards**, J Hartwell, CP Osborne. 2013. Biased recruitment of genes for C4 photosynthesis. *Genome Biology and Evolution* 5: 2174-2187.
36. Chatelet DS, MJ Donoghue, W Clement, L Sack, **EJ Edwards**. 2013. The evolution of photosynthetic anatomy in *Viburnum* (Adoxaceae). *International Journal of Plant Sciences* 174: 1277-1291.
35. **Edwards EJ** and MJ Donoghue. 2013. Is it easy to move and easy to evolve? Evolutionary accessibility and adaptation. Special issue of *Journal of Experimental Botany* 64: 4047-4052.

34. Ogburn RM and **EJ Edwards**. 2013. Repeated origin of three-dimensional leaf venation releases constraints on the evolution of succulence. *Current Biology* 23: 722-726.
33. Christin PA, CP Osborne, DS Chatelet, TJ Columbus, G Besnard, TR Hodkinson, LM Garrison, M Voronstova, **EJ Edwards**. 2013. Anatomical enablers and the evolution of C4 photosynthesis in grasses. *Proceedings of the National Academy of Sciences USA* 110: 1381-1386.
32. Pau, S. **EJ Edwards**, CJ Still. 2013. Improving our understanding of environmental controls on the distribution of C3 and C4 grasses. *Global Change Biology* 19: 184-196.
31. Christin PA, MJ Wallace, H Clayton, **EJ Edwards**, RT Furbank, PW Hattersley, RF Sage, TD Macfarlane, M Ludwig. 2012. Multiple photosynthetic transitions, polyploidy, and lateral gene transfer in the grass subtribe Neurachninae. *Journal of Experimental Botany* 63: 6297-6308.
30. Schmerler S*, W Clement, J Beaulieu, D Chatelet, L Sack, MJ Donoghue, **EJ Edwards**. 2012. Evolution of leaf form correlates with temperate/tropical transitions in *Viburnum*. *Proceedings of the Royal Society of London B: Biological Sciences* 279: 3905-3913.
29. Liu, H. **EJ Edwards**, R Freckleton, CP Osborne. 2012. Phylogenetic niche conservatism in C4 grasses. *Oecologia* 170: 835-845.
28. Ogburn RM and **EJ Edwards**. 2012. Quantifying succulence: a rapid, physiologically meaningful measure of plant water storage. *Plant, Cell and Environment* 35: 1533-1542 (cover article).
27. **Edwards EJ** and RM Ogburn. 2012. Angiosperm responses to a low CO₂ world: CAM and C4 photosynthesis as parallel evolutionary trajectories. Special issue of *International Journal of Plant Sciences* 173: 724-733.
26. Christin, PA, **EJ Edwards**, S Boxall, G Besnard, EA Kellogg, J Hartwell, CP Osborne. 2012. Adaptive evolution of C4 photosynthesis through recurrent lateral gene transfer. *Current Biology* 22: 1-5.
25. Christin PA, G Besnard, **EJ Edwards**, N Salamin. 2012. Effect of genetic convergence on phylogenetic inference. *Molecular Phylogenetics and Evolution* 62:921-927.
24. Grass Phylogeny Working Group II* (**EJ Edwards** corresponding author). 2012. New grass phylogeny resolves deep evolutionary relationships and discovers C4 origins. *New Phytologist* 193: 304-312.

23. Taylor S, P Franks, S Hulme, EL Spriggs*, PA Christin, **EJ Edwards**, I Woodward, CP Osborne. 2012. Photosynthetic pathway and ecological adaptation explain stomatal trait diversity amongst grasses. *New Phytologist* 193: 387-396.
22. Sage RF, PA Christin, **EJ Edwards**. 2011. C4 plant lineages of planet Earth. Special issue of *Journal of Experimental Botany* 62: 3155-3169.
21. Christin, PA, CP Osborne, RF Sage, M Arakaki, **EJ Edwards**. 2011. C4 eudicots are not younger than C4 monocots. Special issue of *Journal of Experimental Botany* 62: 3171-3181.
20. Arakaki M, PA Christin, A Lendel, R Nyffeler, U Eggli, RM Ogburn, EL Spriggs*, M Moore, **EJ Edwards**. 2011. Recent and contemporaneous radiations of the world's succulent plant lineages. *Proceedings of the National Academy of Sciences USA* 108: 8379-8384.
19. Christin PA, T Sage, **EJ Edwards**, RM Ogburn, R Khoshravish, RF Sage. 2011. Complex evolutionary transitions and the significance of C3-C4 intermediate forms of photosynthesis in Molluginaceae. *Evolution* 65: 643-660.
18. Ogburn RM and **EJ Edwards**. 2010. The ecological water use strategies of succulent plants. Invited review, *Advances in Botanical Research* 55: 179-255.
17. **Edwards EJ**‡, CP Osborne‡, CAE Stromberg‡, SA Smith and the C4 Grasses Consortium. 2010. The origins of C4 grasslands: integrating evolutionary and ecosystem science. *Science* 328: 587-591. ‡indicates equal authorship
16. **Edwards EJ** and SA Smith. 2010. Phylogenetic analyses reveal the shady history of C4 grasses. *Proceedings of the National Academy of Sciences USA* 107: 2532-2537.
15. Haberle RC, A Dang, T Lee, C Penaflor, H Cortes-Burns, A Oestreich, L Raubeson, N Cellinese, **EJ Edwards**, ST Kim, WMM Eddie, and RK Jansen. 2009. Taxonomic and biogeographic implications of a phylogenetic analysis of the Campanulaceae based on three chloroplast genes. *Taxon* 58: 715-734.
14. Cellinese N, SA Smith, **EJ Edwards**, ST Kim, RC Haberle, and MJ Donoghue. 2009. Historical biogeography of the endemic Campanulaceae of Crete. *Journal of Biogeography* 36: 1253-1269.
13. Ogburn RM and **EJ Edwards**. 2009. Anatomical variation in the closest relatives of cacti: trait lability and evolutionary innovation. *American Journal of Botany* 96: 1-20. (cover article)
12. Butterworth CA and **EJ Edwards**. 2008. Investigating *Pereskia* and the earliest divergences in Cactaceae. Invited paper, *Haseltonia* 14: 46-53.

11. Nyffeler R, U Egli, RM Ogburn, and **EJ Edwards**. 2008. Variations on a theme: repeated evolution of succulent life forms in the Portulacineae. Invited paper, *Haseltonia* 14: 26-36.
10. **Edwards EJ** and CJ Still. 2008. Climate, phylogeny, and the ecological distribution of C4 grasses. *Ecology Letters* 11: 266-276.
9. **Edwards EJ**, CJ Still and MJ Donoghue. 2007. The relevance of phylogeny to studies of global change. *Trends in Ecology and Evolution* 22: 243-249.
8. **Edwards EJ**. 2006. The correlated evolution of stem and leaf hydraulic traits in *Pereskia* (Cactaceae). *New Phytologist* 172: 479-489.
7. **Edwards EJ** and MJ Donoghue. 2006. *Pereskia* and the origin of the cactus life form. *American Naturalist* 167: 777-793.
6. **Edwards EJ** and M Diaz. 2006. Ecological physiology of *Pereskia guamacho*, a cactus with leaves. *Plant Cell and Environment* 29: 247-256 (cover article).
5. **Edwards EJ**, R Nyffeler, and MJ Donoghue. 2005. Basal cactus phylogeny: implications of *Pereskia* paraphyly for the transition to the cactus life form. *American Journal of Botany* 92: 1177-1188.
4. Riedel SM, HE Epstein, DA Walker, DL Richardson, MP Calef, **EJ Edwards**, and A Moody. 2005. Spatial and temporal heterogeneity of vegetation properties among four tundra plant communities at Ivotuk, Alaska, USA. *Arctic, Antarctic, and Alpine Research* 37: 25-33.
3. Brodribb TJ, NM Holbrook, **EJ Edwards**, and MV Gutierrez. 2003. Relations between stomatal closure, leaf turgor and xylem vulnerability in eight tropical dry forest trees. *Plant Cell and Environment* 26: 443-450.
2. Walker DA, HE Epstein, JG Jia, A Balsar, CD Copass, **EJ Edwards**, WA Gould, J Hollingsworth, J Knudson, HA Maier, A Moody, and MK Reynolds. 2003. Phytomass, LAI and NDVI in northern Alaska: relationships to summer warmth, soil pH, plant functional types, and extrapolation to the circumpolar Arctic. *Journal of Geophysical Research* 108 (D2): 8169 doi:10.1029/2001JD000986.
1. Bell CD, **EJ Edwards**, ST Kim, and MJ Donoghue. 2001. Dipsacales phylogeny based on chloroplast DNA sequences. *Harvard Papers in Botany* 6: 481-499.

*undergraduate author

d. Non-refereed journal articles

4. Ogburn RM, **EJ Edwards**. 2019. Celebrating a new Division of Botany at SICB: An introduction to the Integrative Plant Biology symposium. *Integrative and Comparative Biology* 59: 489-492.

3. Thiele KR, F Obbens, L Hancock, **EJ Edwards**, JG West. 2018. Proposal to conserve the name *Parakeelya* against *Rumic astrum* (Montiaceae). *Taxon* 67: 214-215.

2. **Edwards EJ**. 2014. The inevitability of C4 photosynthesis. *eLife* 3: e03702.

1. Feild T and **EJ Edwards**. 2012. Celebrating giant steps toward a synthetic history of angiosperm evolution. Special issue of *International Journal of Plant Sciences* 173: 559-560.

e. Book reviews

Edwards, EJ. 2009. The Great Cacti: Ethnobotany and Biogeography, by David Yetman. *Quarterly Review of Biology* 84: 108-109.

f. Selected contributed abstracts

2012 “Phylogenetic patterns of highly unusual leaf palisade structure in *Viburnum* (Adoxaceae)”. Evolution meetings, Ottawa ON.

2011 “Of marginal interest: changes in leaf shape during evolutionary shifts between temperate and tropical habitats in *Viburnum* (Adoxaceae). Evolution meetings, Norman OK

2009 “C4 the straw man? Evolution of cold tolerance better explains global distribution of C3/C4 grasslands” Botanical Society of American conference, Snowbird UT

2005 “How the cactus lost its leaves: studies of character evolution can reveal the origins of biological diversity” Diversitas Open Science Conference, Oaxaca, Mexico

2004 “Basal phylogenetic relationships in Cactaceae, and implications for early cactus evolution” Botanical Society of America, Snowbird UT

2004 “Water relations of *Pereskia guamacho*, a cactus with leaves” Botanical Society of America conference, Snowbird UT

2003 “What can *Pereskia* really tell us about early cactus evolution?” Botanical Society of America conference, Mobile AL

2000 “Climate, Vegetation, Soil, and Spectral Reflectance Patterns Across Zonal Vegetation Boundaries in Arctic Alaska” AGU Meetings, San Francisco, CA

g. Invited lectures

Plenary and Keynote Lectures

2017 Invited keynote speaker, 17th International Botanical Congress, Shenzhen China

2017 Invited plenary speaker, “Darwin Day Celebration”, Bridgewater State University

2013 Invited plenary speaker, 16th International Photosynthesis Congress, St. Louis MO, USA

Symposiums

- 2020 '50 Years of Rubisco Oxygenase', University of Illinois, Urbana-Champaign, IL
- 2019 'Adaptation of Dryland Plants', 2019 Botany meetings, Tucson AZ
- 2018 'Revolutionizing Systematics: Herbaria in the Genomics Age', 2018 Botany meetings, Rochester MN
- 2018 Yale Science and Engineering Forum, New Haven CT
- 2018 'Biology of CAM Plants', Desert Botanical Garden, Phoenix AZ
- 2016 'Evolution meets Ecology', 58th Phylogenetic Symposium, Leipzig, Germany
- 2016 ASN Vice Presidential Symposium, Evolution meetings, Austin TX
- 2016 ASN Evolutionary Physiology Symposium, Evolution meetings, Austin TX
- 2016 C4-CAM symposium, 17th International Photosynthesis Congress, Netherlands
- 2015 'From Darwin to Borlaug: biocomplexity in natural and agricultural systems', 1st Joint Fall Symposium, Donald Danforth Plant Science Center and Missouri Botanical Garden, St Louis Missouri
- 2014 'Comparative phylogenetic methods and approaches in plant science', 2014 Botany meetings, Boise, ID
- 2014 'Systems biology and ecology of CAM plants', 34th New Phytologist Symposium, Lake Tahoe, CA
- 2014 'Seeing the forest for the trees: the contributions of synthesis to evolutionary science', 2014 Evolution meetings, Raleigh, NC
- 2014 'Plant Radiations', Institute of Systematic Botany, Zurich, Switzerland
- 2013 'The evolution of plant effects on carbon and nutrient cycling', INTECOL 2013, London, UK
- 2013 'International symposium on C4 and CAM plant biology', Urbana-Champaign, Illinois
- 2012 'International symposium on core Caryophyllales: perspectives in phylogeny and systematics', Moscow State University, Russia
- 2012 'Evolution of physiological traits', Society for Experimental Biology, Salzburg, Austria
- 2011 'Crassulacean Acid Metabolism: evolutionary origins, ecological plasticity, and bioenergy potential', International Botanical Congress, Melbourne, Australia
- 2010 2010 Symposium on C4 plant biology, Shanghai Institutes for Biological Sciences, Shanghai, China
- 2009 'Evolution: the past, present and future of biodiversity', 2nd Diversitas Open Science Conference, Capetown, South Africa
- 2009 'Genetics and genomics of environmental change', American Genetics Association Annual Symposium, Providence, RI
- 2009 'Phylogeny and Ecology' Early Career Scientist Symposium, University of Michigan, Ann Arbor, MI
- 2008 'Systematics and evolution of Cactaceae', IOS-SLCCS-Brazilian Botanical Congress, Natal, Brazil
- 2008 'Phylogeny informs biology: seeing the forest from the trees', Harvard Plant Biology Initiative Annual Symposium, Cambridge, MA
- 2007 'Impact of plant phylogenies on tropical ecology and evolutionary studies', Association of Tropical Biology and Conservation conference, Morelia, Mexico

- 2007 'Integration of spatial and ecological data in evolutionary studies', Botanical Society of America conference, Chicago, IL
- 2005 'Biology of dryland plants', Botanical Society of America conference, Austin, TX

Departmental Seminars

- 2020 Melinda Denton Endowed Lecture, Dept Biology, U. Washington, Seattle WA
- 2020 Dept Ecology and Evolutionary Biology, U. Connecticut, Storrs CT
- 2019 Institute of Systematic Botany, University of Zurich, Switzerland
- 2019 Bonnie Templeton Lecture, Department of Botany and Plant Pathology, Oregon State University
- 2018 Department of Organismic and Evolutionary Biology, Harvard University
- 2018 Department of Earth Sciences Colloquium, Wesleyan University
- 2018 Chicago Botanical Garden, Chicago IL
- 2017 Distinguished Lecture Series, University of Wyoming, Laramie WY
- 2017 Comparative Biology Seminar Series, American Museum of Natural History, NY
- 2016 Dept Biology, University of Pennsylvania, Philadelphia, PA
- 2016 Dept Ecology and Evolutionary Biology, Yale University, New Haven CT
- 2016 Dept Organismic and Evolutionary Biology, UMass Amherst, Amherst, MA
- 2014 Dept Biology, Kyushu University, Fukuoka, Japan (2 seminars)
- 2014 Dept Plant Biology, University of Georgia, Athens GA
- 2014 Dept Botany, Claremont Graduate University, Rancho Santa Ana, CA
- 2013 Dept Biology, Kyushu University, Fukuoka, Japan
- 2013 Dept Ecology and Evolution, National Taiwan University, Taipei, Taiwan
- 2013 Dept Ecology and Evolutionary Biology, University of Michigan, Ann Arbor MI
- 2013 Center for Study of Physics and Biology, The Rockefeller University, New York, NY
- 2013 Dept Plant Biology, University of Vermont, Burlington VT
- 2013 Dept Biology, University of Florida, Gainesville FL
- 2012 Dept Botany, Field Museum, Chicago IL
- 2012 Dept Biology, University of Miami, Miami FL
- 2012 Harvard University Herbaria Seminar Series, Cambridge, MA
- 2012 Dept Plant Biology, Cornell University, Ithaca, NY
- 2012 Dept Ecology and Evolutionary Biology, UCLA, Los Angeles, CA
- 2012 Dept Ecology and Evolutionary Biology, Yale University, New Haven, CT
- 2011 Dept Biology, University of Rhode Island, Kingston, RI
- 2011 Dept Ecology and Evolutionary Biology, University of Tennessee, Knoxville TN
- 2010 Dept Biology, Duke University, Durham, NC (elected speaker by graduate students)
- 2010 Dept Biology, Duke University, Durham, NC (elected speaker by graduate students)
- 2009 Marine Biological Laboratories, Woods Hole, MA
- 2009 Dept Ecology and Evolutionary Biology, Western Washington University, Pullman, WA
- 2009 Dept Ecology and Evolutionary Biology, SUNY at Stony Brook, NY
- 2009 Dept Biology, St. Marys University, Halifax, Nova Scotia
- 2008 Dept Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT

2008 Dept Botany, University of Capetown, South Africa
2006 Dept Ecology and Evolutionary Biology, Brown University, Providence RI
2006 Dept Ecology and Evolutionary Biology, Brown University, Providence RI
2006 Dept Botany, University of Hawaii, Honolulu HI
2005 Noel Kempff Mercado Museum of Natural History, Santa Cruz, Bolivia, (in Spanish)
2005 National Herbarium of Bolivia, La Paz, Bolivia (in Spanish)
2004 Jardin Botanico Nacional, Santo Domingo, Dominican Republic (in Spanish)
2002 Universidad Experimental Francisco de Miranda, Coro, Venezuela (in Spanish)

i. Work in review:

Baird AS, SH Taylor, J Pasquet-Kok, C Vuong, Y Zhang, T Watcharamongkol, C Scoffoni, **EJ Edwards**, PA Christin, CP Osborne, L Sack. Developmental basis for the worldwide climatic distribution of grass leaf size. *Nature*, in revision.

Zhom A, J Abraham, L Schwarz, M Restrepo, D Chatelet, MJ Donoghue, Y Stadler, J Schoenenberger, **EJ Edwards**. 3D segmentation of plant bud CT scans support the bud packing hypothesis. *Applications in Plant Sciences*, in review.

6. Research Grants

a. Current grants

2018-2021 Evolution and function of an understudied photosynthetic metabolism: *Portulaca*, the C₄-CAM plant. NSF: IOS: Integrative Ecological Physiology. IOS-1754662. \$722,848.

2016-2020 Collaborative Research: Replicated speciation in the montane neo-tropical radiation of *Viburnum* (Adoxaceae). NSF: DEB: Evolutionary Ecology. DEB-1556698. \$397,253 (of \$996,515 total).

b. Pending grants

c. Completed grants

2009-2010 The dawn of a new era: deciphering the past climatic and ecological changes using integrated DNA and lipid biomarker fingerprints. Brown University SEED Fund. Co-PI; Lead PI Yongsong Huang, \$100,000.

2012 Uncovering biases in gene recruitment during the evolution of C₄ and CAM

- photosynthesis in flowering plants. Brown University Salomon Faculty Research Award, \$15,073.
- 2009-2012 Collaborative Research: The evolution of leaf form in *Viburnum* (Adoxaceae). NSF IOS: Organism-Environment Interactions. IOS-0843231. \$606,347 (of \$937,721 total)
- 2011-2013 Marie Curie Outgoing International Fellowship: Evolvability and drivers of photosynthetic transitions in flowering plants. Co-PI; Acting as outgoing host for lead PI Dr. Pascal-Antoine Christin. €261,334.20.
- 2010-2014 Phylogeny and the evolution of succulence in the Portulacineae (Caryophyllales). NSF DEB: Phylogenetic Systematics. DEB-1026611. \$534,949.
- 2010- 2017 IGERT: Reverse Ecology: Computational Integration of Genomes, Organisms, and Environments. NSF DGE-0966060. Co-PI (of 5 total) \$2,900,000.
- 2017 Sequencing the *Portulaca* genome: developing a new molecular tool for photosynthesis research. Brown University Faculty Research Seed Fund, \$49,882. *Awarded but declined due to move to Yale University.*
- 2012-2017 Collaborative Research: Digitization TCN: Mobilizing New England vascular plant specimen data to track environmental changes. NSF: DBI: Advancing Digitization of Biological Collections. DBI-1208972. Co-PI (of 9 total). \$152,391 (of ~\$2.4 M total)
- 2013-2018 Collaborative Research: Testing a new hypothesis for global patterns in leaf form using *Viburnum* (Adoxaceae). NSF: IOS: Organism-Environment Interactions. IOS-1257262. \$443,728 (of \$696,089 total).
- 2016-2017 Dissertation Research: Phylogeny and evolutionary exploration of the C3-CAM phenotypic space in Australian *Calandrinia* (Montiaceae). NSF: DEB: Phylogenetic Systematics. DEB-1600971. Co-PI (w/ Lillian Hancock). \$20,792.
- 2013-2019 CAREER: Defining the evolutionary trajectory of CAM photosynthesis in the Portulacineae (Caryophyllales). NSF: DEB: Phylogenetic Systematics. DEB-1252901. \$800,000.

7. Service

To the University

2020-2022	Biological Sciences Tenure Appointments Committee, Yale
2020	Committee chair, Carla Staver promotion to Associate Professor with Tenure
2020	COVID-19 Academic Continuity Committee, Yale
2018-current	Director of Marsh Botanical Garden
2018-current	Director of Graduate Studies, Yale Ecology & Evolutionary Biology Dept
2018-current	Yale School of Forestry and Environmental Studies Standing Advisory and Appointments Committee (SAAC)
2019	committee member, Vanessa Enzenwa appointment to Professor with Tenure
2018	committee member, Carla Staver promotion to Associate Professor on term
2018	selection committee, YIBS Donnelley Postdoctoral Fellowship
2017-2018	panel member: “Environmental and Evolutionary Science”, Yale University Science Strategy Committee
2016	panel member: ‘How to write a successful CAREER grant’, Brown U.
2016-2017	Director of Undergraduate Studies, EEB Dept.
2015-2017	theme leader, Institute at Brown for Environment and Society
2015-2016	Graduate Curriculum Committee, EEB Dept.
2015	Conservation Biology Faculty Search Committee, EEB/IBES
2015-2017	Biology Concentration Advisor
2013-2015	Steering Committee, Institute at Brown for Environment and Society
2013	Graduate Admissions Committee, EEB Dept.
2013	panel member: ‘How to Negotiate a Job Offer’, Brown U.
2013	panel member: ‘The Two-Body Search’, Brown U.
2012	Plant Evolution Faculty Search Committee, EEB Dept.
2012-2013	Drafting committee, Institute at Brown for Environment and Society
2012-2014	First Year Advisor (13 students)
2012	strategic planning meetings, development of Plant Biology Initiative
2010	panel member, Sarah Doyle Women’s Center
2010	Graduate Admissions Committee, EEB Dept.
2009-2011	Graduate Curriculum Committee, EEB Dept.
2009-2011	Writing Advisory Board, Brown U.
2009	First-Readings Seminar Leader
2008-2017	Director, Brown University Herbarium

To the Profession

Elected Offices

President, Society of Systematic Biologists, 2020

President-Elect, Society of Systematic Biologists, 2019

Advisory Council Chair, Botanical Society of America, 2016-2019
Council member, International Society for Phylogenetic Nomenclature, 2013-2016
Council member, Society of Systematic Biologists, 2011-2013

Invited Workshop/Working Group Participant

2018 Evolutionary Arenas, Bayreuth, Germany
2011-2012 Origins of C4 grasslands: a new synthesis of phylogeny, ecology, and paleobiology, NESCent Working Group
2011-2012 Tempo and mode of plant functional evolution, NESCent Working Group
2010 Phylogenetic Ecology, NCEAS Workshop
2010 NSF- Dimensions of Biodiversity Charette, NESCent Workshop
2008 Ecophylogenetics, NCEAS Working Group
2002 Integration of Long Distance Transport Processes in Plants, Harvard Forest

Workshops/working groups/conferences organized

2019 Symposium: Integrative Plant Biology. Society for Integrative and Comparative Biology (SICB) annual meeting, Tampa Florida. Co-organized with R. Mathew Ogburn.
2017 Symposium: Niche Evolution and Biome Assembly Through Time. XIX International Botanical Congress, Shenzhen, China. Co-organized with Michael Donoghue.
2013 C4-CAM 2013: A conference dedicated to the origin, function, and exploitation of C4 and CAM plants (with 7 other co-organizers). U. Illinois at Urbana-Champaign, Aug 6-9 2013.
2010-2011 NESCent Working Group: Grass Phylogeny Working Group II: Inferring the complex history of C4 photosynthesis in grasses. Lead PI (with two co-PI).
2009 NESCent Catalysis Meeting: Toward a New Synthesis of the Evolutionary History and Ecology of C4 Grasses. 3-day meeting bringing together PI's from U.S., Canada, South Africa, U.K., and Switzerland. Lead PI (with two co-PI).

Ad-hoc Reviewer

National Science Foundation (IOS, DEB); American Journal of Botany; Biology Letters; Bradleya; Cell; Ecology Letters; eLife, Evolution; Functional Ecology; Geology; Haseltonia; International Journal of Plant Sciences; Journal of Biogeography; Journal of Experimental Botany; Molecular Ecology Resources; Molecular Phylogenetics and Evolution; Nature; Nature-Communications; Nature-Geosciences; New Phytologist; Plant Cell and Environment; Plant Systematics and Evolution; Proceedings of the National Academy of Sciences; Proceedings of the Royal Society of London B; Science; Tree Physiology.

Panel Service

National Science Foundation, October 2010, April 2012, May 2014, June 2018

Other

2019 Faculty search committee member, Institute of Systematic Botany, Zurich
2017-2019 Associate Editor, American Journal of Botany
2013-2018 Associate Editor, Systematic Biology
2012-2016 Associate Editor, International Journal of Plant Sciences
2011-2012 Scientific Advisory Committee, International Organization for Succulent Plant Study
2010-2011 Scientific Advisory Board, Grass Portal Development Team (www.grassportal.org)

8. Academic honors, fellowships, honorary societies, awards

2020 Fellow of the Connecticut Academy of Scientists and Engineers
2016 Presidential Award for Early Career Scientists and Engineers (PECASE)
2014 Distinguished Visiting Professor, Kyushu University
2011 Richard and Edna Salomon Assistant Professor
2008 NSF ADVANCE Career Development Award, Brown University, \$17,506.
2006 John Spangler Nicholas Prize, Yale University, \$500.
2005 Ph.D. Awarded with Distinction, Yale University
2005 Maynard Moseley Award, Botanical Society of America
2005 Vernon I. Cheadle Student Travel Grant, Botanical Society of America, \$500.
2004 MORPH Graduate Student Travel Grant, \$300.
2003 EEB Department Chair Award, Yale University, \$1500.
2002 YIBS Center for Field Ecology Graduate Research Award, Yale University, \$2925.
2002 Deland Award for Student Research, Harvard University, \$4250.
2000-2005 National Science Foundation Graduate Research Fellowship

9. Teaching

Courses

2007-2008

Biology 1950: Independent Study (supervising Cassidy Metcalf, class of 2008)

2008-2009

Biology 0430: Diversity and Adaptation of Land Plants (sole instructor, enrollment 24)

Biology 1500: Plant Ecology (sole instructor, enrollment 14)

2009-2010

Biology 0430: The Evolution of Plant Diversity (sole instructor, enrollment 26)

GISP 0017: Introductory Mycology: Applications and Ecology of Fungi (faculty sponsor, enrollment 8).

Biology 1950 (fall 09): Independent Study (Samuel Schmerler, class of 2011)

Biology 1950 (spring 10): Independent Study (Samuel Schmerler, class of 2011)
2010-2011

Biology 0430 was not taught as I had one semester of parental teaching relief.

Biology 1950 (fall 10): Independent Study (Samuel Schmerler, class of 2011, Elizabeth Spriggs, class of 2011)

LDAR 22ST: X-mutations of an infrastructural city. Guest lecturer/advisor in RISD Landscape Architecture course

Biology 1950 (spring 11): Independent Study (Samuel Schmerler, class of 2011, Elizabeth Spriggs, class of 2011)

Biology 1500: Plant Physiological Ecology (sole instructor, enrollment 16)

2011-2012

Biology 0430: The Evolution of Plant Diversity (sole instructor, enrollment 25)

Biology 2980: Graduate Seminar in Tropical Ecology (many instructors, enrollment 9)

Biology 1950 (fall 2011): Independent Study (Alejandro Brambila, Asya Rahlin; class of 2012)

Biology 1950 (spring 2012): Independent Study (Alejandro Brambila, class of 2012)

2012-2013

Biology 0430: The Evolution of Plant Diversity (sole instructor, enrollment 17)

Biology 1500: Plant Physiological Ecology (sole instructor, enrollment 15)

GISP: Introductory Mycology (faculty sponsor, enrollment 3)

2013-2014

Biology 1500: Plant Physiological Ecology (sole instructor, enrollment 19)

Biology 2470: Graduate Seminar in Biome Evolution (sole instructor, enrollment 8)

2015-2016

Biology 0430: The Evolution of Plant Diversity (sole instructor, enrollment 24)

Biology 1585: The Biology of Desert Plants (sole instructor, enrollment 12)

2016-2017

Biology 0430: The Evolution of Plant Diversity (sole instructor, enrollment 25)

Biology 1950 (fall 2016): Independent Study (Andrew Pisaturo, Haley Carter, class of 2017)

2018-2019

E&EB 900/901: Advanced Topics in Ecology and Evolutionary Biology (enrollment 5)

E&EB 550: Responsible Conduct in Research (sole instructor, enrollment 5)

E&EB 326: Plant Structure and Function (sole instructor, enrollment 6)

2019-2020

E&EB 900/901: Advanced Topics in Ecology and Evolutionary Biology (enrollment 5)

E&EB 246/247: Plant Diversity and Evolution (and Lab) (sole instructor, enrollment 22)
E&EB 806: Convergent Evolution seminar (co-instructor, enrollment 16)
2020-2021
E&EB 900/901: Advanced Topics in Ecology and Evolutionary Biology (enrollment 6)
BIOL 104: Principles of Ecology and Evolutionary Biology (enrollment 127)

Advising

Advised post-doctoral researchers: Monica Arakaki, 2009-2012; Pascal-Antoine Christin, 2010-2012; Radika Bhaskar, 2011-2014; David Chatelet 2010-2015; Jurriaan de Vos, 2013-2015; Abigail Moore, 2013-2016; Zachary Lewis, 2016-2017; Eric Goolsby, 2016-2018; Karolina Heyduk, 2018-2019; Jose Moreno-Villena, 2018-present; Haoran Zhou, 2019-present; Anthony Baniaga, 2019-present.

Advised graduate students: R. Matthew Ogburn, 2007-2012; Laura Garrison, 2010-2015; Lillian Hancock, 2012-2017; Morgan Moeglein, 2014-present; Ian Gilman, 2017- present; Anri Chomentowska, 2018-present; Josh Randall, 2020-present.

Graduate student committee member: Caroline Harper (Brown EEB, 2009-2013); Li Gao (Brown Geology, 2010-2012); Beth Forrestel (Yale EEB, 2009-2015); Emily Hollenbeck (Brown EEB, 2012-2018); Elizabeth Spriggs (Yale EEB, 2013-2017); Catriona Munro (Brown EEB, 2013-2018); Brian Park (Yale EEB, 2017-2018); Kyra Pratt (Yale Forestry School, 2017-present); KC Cushman (Brown EEB, 2015-2019); Nicole Bonacorsi (Brown EEB, 2015-2019); Dae-min Kim (Yale EEB, 2018-present); Chantal Parker (Yale EEB, 2019- present); Mansa Srivastav (Yale EEB, 2019- present); Ava Ghezelayagh (Yale EEB, 2020-present); Aleca Borsuk (Yale Forestry, 2020-present).

Undergraduate Honor's Thesis Reader: Adisorn Chang, 2008; Kaya Schmandt 2008; Emily Josephs 2008; Christopher Sinatra 2010, Andre Burnier 2011, Emma Dixon 2013, Rosalyn Price-Waldman 2014, Samuel Church 2015, Jack Dietrich 2016, Dylan Spangle 2016.

Undergraduate Honor's Thesis Advisor: Samuel Schmerler 2011; Elizabeth Spriggs 2011; Anastasia Rahlin 2012; Alejandro Brambila 2012; Eric Kelosa-Kenyon 2015; Regan Lichtenberg 2015; Haley Carter 2017; Andrew Pisaturo 2017; Nora Heaphy, current; Anthony Sarkiss, current.

Summer UTRA Advising: Samuel Schmerler 2009; Anne Williard 2009; Anastasia Rahlin 2010; Arisa Lohemier 2011; Jennifer Cardona 2013; Eric Kelosa-Kenyon 2014; Haley Carter 2017, Andrew Pisaturo 2017.

Updated August 2020.