

Dana C. Price, Ph.D.

Associate Research Professor
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Professional Preparation

<u>Institution</u>	<u>Major/Area</u>	<u>Degree and Year</u>
Rutgers University	Biology	B.S., 2001
Rutgers University	Entomology	Ph.D., 2015

Professional Appointments:

- I. Associate Research Professor. 2015–present. Department of Plant Biology (2015-2019), Department of Entomology (2019-present) Rutgers University, New Brunswick, NJ 08901.
- II. Laboratory Researcher IV. 2010-2015. Department of Ecology, Evolution and Natural Resources, Rutgers University, New Brunswick NJ 08901.
- III. Graduate Assistant. 2008-2010. Department of Entomology / Center for Vector Biology, Rutgers University, New Brunswick NJ 08901
- IV. UNIX Systems Administrator. 2001-2008. Rutgers University, New Brunswick NJ 08901

Skills and interests:

- Biology, ecology and genomic analyses of arthropod disease vectors; novel arboviral surveillance techniques
- Insect evolution, systematics and taxonomy as studied through genome analysis
- Metagenomic analyses and functional genomic classification of insect-microbiome interactions
- Next-generation sequencing (Illumina, PacBio) library preparation, quantitation and quality control using manufacturer-approved and custom wetlab protocols.
- Insect, algal and protist laboratory culture.
- Bioinformatic analysis of next-generation sequence data using high-performance computing infrastructure. Skills include but are not limited to:
 - Genome/transcriptome library assembly and functional annotation
 - Shotgun metagenome sequencing, binning, functional and taxonomic classification
 - Differential expression e.g., RNAseq analysis
 - Adaptive evolutionary (natural selection) analyses
 - Single-cell genome analysis techniques (k-mer spectral analyses, read correction, assembly)
 - Phylogenetic/phylogenomic evolutionary analyses
 - Server hardware and software maintenance; Management of multiple clustered and stand-alone linux operating system based HPC servers for bioinformatic analysis.
- Scripting languages: Perl, PHP, R, Javascript, MySQL database.
- Excellent written, verbal and team-oriented communication skills.
- Personnel management; serves as hiring manager, first-level supervisor and mentor of both full-time (Type 1) and part-time University employees

Courses taught:

- Mosquito Biology (16:370:504) Spring 2020 (ID component); co-taught with D. Fonseca.
- Insect classification (11:370:409) / Insect taxonomy (16:370:524); taught every Fall.
- Functional Genomics for Research (11:776:485); taught every other Fall.
- Fundamentals of Genomics (11:216:423:03) Spring 2014 – 2019; Co-taught with D. Bhattacharya.
- Using Genomics to Study Microbial Diversity (11:090:101 Byrne Seminar series) Fall 2018; Co-taught with D. Bhattacharya.

Guest lectures:

- Comparative Virology (11:126:407) “Vector-borne viruses” Fall 2021
- Advanced Technologies in Biosciences (11:126:444) “Genome sequencing and gene prediction” and “Differential Expression and Metagenomics” Spring 2017 and 2018
- Concepts in Biotechnology and Genomics (16:137:615) “Genome sequencing and gene prediction” Spring 2017
- Algal Genomics for Environmental and Algal Biofuel Research (16:215:599) “Genome sequencing and gene prediction”, “Single cell genomics” Spring 2011 and 2012

Mentorship:

- Advisorships: Zoe Narvaez (Ph.D. advisor), Margherita (Daisy) Porfirio (M.S. advisor), Incoming USDA-NIFA funded graduate postdoctoral research associate (Fall '21).
- Undergraduate advising:
 1. Douglas Project for Rutgers Women in Math, Science & Engineering (SUPER) mentor, Spring 2018
 2. Bloustein School of Planning and Public Policy internship supervisor, Spring 2018
 3. Aresty Summer Science faculty mentor: Spring 2019, 2020, 2021
 4. Undergraduate research internship advisor: Spring 2020, Fall 2020, Spring 2021
 5. George H. Cook undergraduate scholars program: Fall 2021

Funded Grants and Awards:

1. USDA-NIFA 2021-67015-34461, 2021-2024. Functional genomics to mitigate the threat of the invasive Asian longhorned tick, *Haemaphysalis longicornis*. (P.I) \$500,000.
2. NIH-NIAID 1R21AI159459-01, 2021 – 2023. Non-invasive approaches to mosquito-borne pathogen surveillance using excreta. (P.I) \$353,022.
3. USDA-NIFA Hatch/Multistate NE1943, 2020. Biology, Ecology & Management of Emerging Disease Vectors. (consortium) \$5,000 per annum.
4. New Jersey Department of Environmental Protection, State Mosquito Control Commission, 2019-2020. Emerging West Nile Virus strains in New Jersey. (P.I) \$19,887.
5. Rutgers Office of Research and Economic Development Faculty Research Grant Program, 2019-2020. Genotyping and spatial distribution of New Jersey West Nile virus in response to the 2018 transmission cycle. (P.I.) \$2,900.
6. National Aeronautics and Space Administration 18-EXO-0014, 2019 – 2021. Elucidating the transition to eukaryotic phototrophy. Co-P.I. (D. Bhattacharya, P.I) \$996,423.

7. Rutgers Office of Research and Economic Development Busch Biomedical Grant Program, 2017 – 2019. A Functional Genomic Classification of the Mosquito Microbiome. P.I. \$25,000.
8. The American Mosquito Control Association, 2017 – 2019. Assessing the arboviral landscape via metagenomic analyses of sentinel FTA cards. P.I. \$42,500.

Gifts:

1. Hunterdon Healthcare Foundation, 2020. In support of tick-borne disease surveillance in Hunterdon County, NJ. \$17,500.

Trainee Record:

2021 – Arsala Khan (undergraduate); Aresty Research Assistant program – currently a sophomore

2021 – Margherita Porfirio (graduate master's student); currently pursuing her master's degree.

2021 – Miranda Barnes (undergraduate); Rutgers Aresty Summer scholars program – currently a junior, presenting work and national ESA meeting this year.

2020 – Zoe Narvaez (graduate Ph.D. student); currently pursuing her Ph.D.

2020 – Shani Hood (undergraduate); Microbiology intern – graduated.

2019 – Evanna Jaramillo (undergraduate); George H. Cook Scholars Program – currently a graduating senior.

2018 – Julia Brennan (undergraduate); Rutgers Aresty Summer scholars program – currently a graduating senior.

2017 – Camille Cancino (undergraduate); Rutgers Douglass Project for Women in STEM (Project SUPER) – Advisor – Currently Associate Scientist at Pfizer.

2013 – Nicole Wagner (staff); Supervisor – sequencing lab technologies – Currently Principal Lab Technician at Rutgers University.

2012 – Ehud Zelzion (staff); Supervisor – bioinformatics – Currently Sr. Scientist at Rutgers Office for Advanced Research and Computing (OARC).

Refereed Publications:

1. Price, D.C., Brennan, J., Wagner, N.E., Egizi, A. 2020. Diversity of the tick holobiont defined via shotgun metagenome sequencing of Ixodes scapularis ticks from New Jersey. *In revision*.
2. Zhang, X., et al. 2020. Parthenogenesis increases the global transmission of pathogens vectored by Asian longhorned tick. *Under review*.
3. Ferreira, F.C., Fonseca, D.M., Hamilton, G., Price, D. 2020. Metagenomic analysis of human-biting cat fleas in urban northeastern United States of America reveals an emerging zoonotic pathogen. *Sci Rep.* 10: 15611.
4. Lhee, D., Lee, J., Ettahi, K., Cho, C., Ha, J., Chan, Y., Zelzion, U., Stephens, T.G., Price, D.C., Gabr, A., Nowack, E.C.M., Bhattacharya, D., Yoon, H.S. 2020. Amoeba genome reveals dominant host contribution to plastid endosymbiosis. *Mol. Biol. Evol.* 38: 344-357.
5. Egizi, A.M., Occi, J., Price, D.C., Fonseca, D.M. 2019. Leveraging the Expertise of the New Jersey Mosquito Control Community to Jump Start Standardized Tick Surveillance. *Insects* 10: 219.
6. Price, D.C., Goodenough, U., Roth, R., Lee, J., Kariyawasam, T., Mutwil, M., Ferrari, C., Facchinelli, F., Ball, S.G., Cenci, U. et al. 2019. Analysis of an improved Cyanophora paradoxa genome assembly. *DNA Res.* 26: 287-299.
7. Rossoni, A.W., Price, D.C., Seger, M., Lyska, D., Lammers, P., Bhattacharya, D., and Weber, A.P.M. 2019. The genomes of polyextremophilic Cyanidiales contain 1% horizontally transferred genes with diverse adaptive functions. *eLife* 8:e45017.

8. Ferrari, C., Proost, S., Janowski, M, Becker, J., Nikoloski, Z., Bhattacharya, D., Price, D., Tohge, T., Bar-Even, A., Fernie, A., Stitt, M. and Mutwil, M. 2019. Kingdom-wide comparison reveals conserved diurnal gene expression in Archaeplastida. *Nature Comm.* 10:737.
9. Shumaker, A., Putnam, H.M., Qiu, H., Price, D.C., Zelzion, E., Harel, A., Wagner, N.E., Gates, R., Yoon, H.S., and Bhattacharya, D. 2019. Genome analysis of the rice coral *Montipora capitata*. *Sci Rep.* 9:2571.
10. Bhattacharya, D., Qiu, H., Lee, J.M., Yoon, H.S., Weber, A.P.M., and Price, D. 2018. When less is more: red algae as models for studying gene loss and genome evolution in eukaryotes. *Crit Rev Plant Sci.* 37: 81-99.
11. Zhang, N., Cai, G., Price, D.C., Crouch, J.A., Gladieux, P., Hillman, B., Khang, C.H., LeBrun, M., Lee, Y., Luo, J., Qiu, H., Veltri, D., Wisecaver, J., Zhu, J., and Bhattacharya, D. Genome wide analysis of the transition to pathogenic lifestyles in Magnaporthales fungi. 2018. *Sci Rep* 8: 5862.
12. Chan, C.X., Vaysberg, P., Price, D.C., Pelletreau, K.N., Rumpho, M.E., and Bhattacharya, D. 2018. Active host response to algal symbionts in the sea slug *Elysia chlorotica*. *Mol Biol Evol.* Ahead of print.
13. Price, D.C. and Bhattacharya D. 2016. Robust Dinoflagellata phylogeny inferred from public transcriptome databases. *J Phycol* 53: 725-729.
14. Zhang, R., E. C. Nowack, D. C. Price, D. Bhattacharya, and A. R. Grossman. 2016. Impact of light intensity and quality on chromatophore and nuclear gene expression in *Paulinella chromatophora*, an amoeba with nascent photosynthetic organelles. *Plant J.* 90: 221-234.
15. Price, D. C., N. Farinholt, C. Gates, A. Shumaker, N. E. Wagner, P. Bienfang, and D. Bhattacharya. 2016b. Analysis of *Gambierdiscus* transcriptome data supports ancient origins of mixotrophic pathways in dinoflagellates. *Environ Microbiol* 18: 4501-4510.
16. Nowack, E. C., D. C. Price, D. Bhattacharya, A. Singer, M. Melkonian, and A. R. Grossman. 2016a. Gene transfers from diverse bacteria compensate for reductive genome evolution in the chromatophore of *Paulinella chromatophora*. *Proc Natl Acad Sci U S A* 113: 12214-12219.
17. Bhattacharya, D., S. Agrawal, M. Aranda, S. Baumgarten, M. Belcaid, J. L. Drake, D. Erwin, S. Foret, R. D. Gates, D. F. Gruber, B. Kamel, M. P. Lesser, O. Levy, Y. J. Liew, M. MacManes, T. Mass, M. Medina, S. Mehr, E. Meyer, D. C. Price, H. M. Putnam, H. Qiu, C. Shinzato, E. Shoguchi, A. J. Stokes, S. Tambutté, D. Tchernov, C. R. Voolstra, N. Wagner, C. W. Walker, A. P. Weber, V. Weis, E. Zelzion, D. Zoccola, and P. G. Falkowski. 2016. Comparative genomics explains the evolutionary success of reef-forming corals. *Elife* 5.
18. Price, D., and D. Fonseca. 2015. Genetic divergence between populations of feral and domestic forms of a mosquito disease vector assessed by transcriptomics. *PeerJ* 3: e807.
19. Foflonker, F., D. C. Price, H. Qiu, B. Palenik, S. Wang, and D. Bhattacharya. 2015. Genome of the halotolerant green alga *Picochlorum* sp. reveals strategies for thriving under fluctuating environmental conditions. *Environ Microbiol* 17: 412-426.
20. Karkar, S., F. Facchinelli, D. C. Price, A. P. Weber, and D. Bhattacharya. 2015. Metabolic connectivity as a driver of host and endosymbiont integration. *Proc Natl Acad Sci U S A* 112: 10208-10215.
21. Price, D. C., A. Egizi, and D. M. Fonseca. 2015a. Characterization of the doublesex gene within the *Culex pipiens* complex suggests regulatory plasticity at the base of the mosquito sex determination cascade. *BMC Evol Biol* 15: 108.
22. Perrineau, M. M., D. C. Price, G. Mohr, and D. Bhattacharya. 2015. Recent mobility of plastid encoded group II introns and twintrons in five strains of the unicellular red alga *Porphyridium*. *PeerJ* 3: e1017.
23. Price, D. C., A. Egizi, and D. M. Fonseca. 2015b. The ubiquity and ancestry of insect doublesex. *Sci Rep* 5: 13068.
24. Qiu, H., D. C. Price, E. C. Yang, H. S. Yoon, and D. Bhattacharya. 2015. Evidence of ancient genome reduction in red algae (Rhodophyta). *J Phycol* 51: 624-636.

25. Wilkerson, R. C., Y. M. Linton, D. M. Fonseca, T. R. Schultz, D. C. Price, and D. A. Strickman. 2015. Making Mosquito Taxonomy Useful: A Stable Classification of Tribe Aedini that Balances Utility with Current Knowledge of Evolutionary Relationships. *PLoS One* 10: e0133602.
26. Bhattacharya, D., H. Qiu, D. C. Price, and H. S. Yoon. 2015. Why we need more algal genomes. *J Phycol* 51: 1-5.
27. Debashish Bhattacharya, Rajat Roy, Dana C Price, Alexander Schliep. 2014. Studying the single life of eukaryotic microbes: Single cell genomics of marine plankton. *Biochemist* 36(1):16.
28. Cheng, S., D. C. Price, S. Karkar, and D. Bhattacharya. 2014. Exploring biotic interactions within protist cell populations using network methods. *J Eukaryot Microbiol* 61: 399-403.
29. Duanmu, D., C. Bachy, S. Sudek, C. H. Wong, V. Jiménez, N. C. Rockwell, S. S. Martin, C. Y. Ngan, E. N. Reistetter, M. J. van Baren, D. C. Price, C. L. Wei, A. Reyes-Prieto, J. C. Lagarias, and A. Z. Worden. 2014. Marine algae and land plants share conserved phytochrome signaling systems. *Proc Natl Acad Sci U S A* 111: 15827-15832.
30. Perrineau, M. M., E. Zelzion, J. Gross, D. C. Price, J. Boyd, and D. Bhattacharya. 2014a. Evolution of salt tolerance in a laboratory reared population of *Chlamydomonas reinhardtii*. *Environ Microbiol* 16: 1755-1766.
31. Perrineau, M. M., J. Gross, E. Zelzion, D. C. Price, O. Levitan, J. Boyd, and D. Bhattacharya. 2014b. Using natural selection to explore the adaptive potential of *Chlamydomonas reinhardtii*. *PLoS One* 9: e92533.
32. Rockwell, N. C., D. Duanmu, S. S. Martin, C. Bachy, D. C. Price, D. Bhattacharya, A. Z. Worden, and J. C. Lagarias. 2014. Eukaryotic algal phytochromes span the visible spectrum. *Proc Natl Acad Sci U S A* 111: 3871-3876.
33. Roy, R. S., D. C. Price, A. Schliep, G. Cai, A. Korobeynikov, H. S. Yoon, E. C. Yang, and D. Bhattacharya. 2014. Single cell genome analysis of an uncultured heterotrophic stramenopile. *Sci Rep* 4: 4780.
34. Bhattacharya, D., D. C. Price, C. Bicep, E. Bapteste, M. Sarwade, V. D. Rajah, and H. S. Yoon. 2013b. Identification of a Marine Cyanophage in a Protist Single-cell Metagenome Assembly. *J Phycol* 49: 207-212.
35. Bhattacharya, D., D. C. Price, C. X. Chan, H. Qiu, N. Rose, S. Ball, A. P. Weber, M. C. Arias, B. Henrissat, P. M. Coutinho, A. Krishnan, S. Zäuner, S. Morath, F. Hilliou, A. Egizi, M. M. Perrineau, and H. S. Yoon. 2013d. Genome of the red alga *Porphyridium purpureum*. *Nat Commun* 4: 1941.
36. Farajollahi, A., and D. C. Price. 2013. A rapid identification guide for larvae of the most common North American container-inhabiting *Aedes* species of medical importance. *J Am Mosq Control Assoc* 29: 203-221.
37. Qiu, H., D. C. Price, A. P. Weber, F. Facchinelli, H. S. Yoon, and D. Bhattacharya. 2013a. Assessing the bacterial contribution to the plastid proteome. *Trends Plant Sci* 18: 680-687.
38. Qiu, H., D. C. Price, A. P. Weber, V. Reeb, E. C. Yang, J. M. Lee, S. Y. Kim, H. S. Yoon, and D. Bhattacharya. 2013b. Adaptation through horizontal gene transfer in the cryptoendolithic red alga *Galdieria phlegrea*. *Curr Biol* 23: R865-866.
39. Gross, J., S. Wajid, D. C. Price, E. Zelzion, J. Li, C. X. Chan, and D. Bhattacharya. 2013. Evidence for widespread exonic small RNAs in the glaucophyte alga *Cyanophora paradoxa*. *PLoS One* 8: e67669.
40. Bhattacharya, D., K. N. Pelletreau, D. C. Price, K. E. Sarver, and M. E. Rumpho. 2013a. Genome analysis of *Elysia chlorotica* Egg DNA provides no evidence for horizontal gene transfer into the germ line of this Kleptoplastic Mollusc. *Mol Biol Evol* 30: 1843-1852.
41. Bhattacharya, D., D. C. Price, H. S. Yoon, E. C. Yang, N. J. Poulton, R. A. Andersen, and S. P. Das. 2012. Single cell genome analysis supports a link between phagotrophy and primary plastid endosymbiosis. *Sci Rep* 2: 356.
42. Price, D. C., C. X. Chan, H. S. Yoon, E. C. Yang, H. Qiu, A. P. Weber, R. Schwacke, J. Gross, N. A. Blouin, C. Lane, A. Reyes-Prieto, D. G. Durnford, J. A. Neilson, B. F. Lang, G. Burger, J. M. Steiner, W. Löffelhardt, J. E. Meuser, M. C. Posewitz, S. Ball, M. C. Arias, B. Henrissat, P. M. Coutinho, S.

- A. Rensing, A. Symeonidi, H. Doddapaneni, B. R. Green, V. D. Rajah, J. Boore, and D. Bhattacharya. 2012. Cyanophora paradoxa genome elucidates origin of photosynthesis in algae and plants. *Science* 335: 843-847.
43. Price, D. C., D. E. Gunther, and R. Gaugler. 2011. First collection records of phlebotomine sand flies (Diptera: Psychodidae) from New Jersey. *J Med Entomol* 48: 476-478.
44. Yoon, H. S., D. C. Price, R. Stepanauskas, V. D. Rajah, M. E. Sieracki, W. H. Wilson, E. C. Yang, S. Duffy, and D. Bhattacharya. 2011. Single-cell genomics reveals organismal interactions in uncultivated marine protists. *Science* 332: 714-717.
45. Pelletreau, K. N., D. Bhattacharya, D. C. Price, J. M. Worful, A. Moustafa, and M. E. Rumpho. 2011. Sea slug kleptoplasty and plastid maintenance in a metazoan. *Plant Physiol* 155: 1561-1565.
46. Farajollahi, A., B. Kesavaraju, D. C. Price, G. M. Williams, S. P. Healy, R. Gaugler, and M. P. Nelder. 2009. Field efficacy of BG-Sentinel and industry-standard traps for *Aedes albopictus* (Diptera: Culicidae) and West Nile virus surveillance. *J Med Entomol* 46: 919-925.

Book Chapters:

1. Bhattacharya, D. and Price, D.C. 2019. The algal tree of life from a genomics perspective. In T. Larkum et al. (Eds.). *Photosynthesis in Algae: Biochemical and Physiological Mechanisms 2nd Ed.* Springer, Cham. pp 11-24.
2. Price, D., Steiner, J., Yoon, H.S., Bhattacharya, D., Löffelhardt, W. 2016. Glaucophyta. In J.M. Archibald et al. (Eds.). *Handbook of the Protists.* Springer International. pp 23-87.
3. Bhattacharya, D., Price D.C., Chan, C.X., Gross, J., Steiner, J.M., Löffelhardt, W. 2014. Analysis of the genome of *Cyanophora paradoxa*: an algal model for understanding primary endosymbiosis. In W. Löffelhardt (Ed.) *Endosymbiosis* Springer, Wien, pp 135-148.

Presentations and Symposia

- "The vector holobiont: pathogens, parasites, and pop-gen" New Jersey Mosquito Control Association 107th Annual Meeting. Cape May, NJ. 05 March 2020.
- "Turfgrass science in the age of informatics" Rutgers University 29th Annual Turfgrass Symposium. New Brunswick, NJ. 10 January 2020.
- "Assessing the arboviral landscape via shotgun metagenome sequencing of sentinel FTA cards" The American Mosquito Control Association 85th Annual Meeting. Orlando, FL. 28 February 2019.
- "Using PacBio SMRT sequencing to scaffold algal genomes" Waksman Institute Genome Jamboree. Piscataway, New Jersey. 1 November 2018.
- "Recent mobility of plastid encoded group II introns and twintrons in five strains of the unicellular red alga *Porphyridium*." Phycological Society of America 50th Annual Meeting. Philadelphia, Pennsylvania. 12 August 2015.
- "Targets of rapid evolution in the *Culex pipiens* complex proteome and insect sex determination cascade." Ph.D defense seminar. Dept. of Entomology, Rutgers University. New Brunswick, New Jersey. 13 March 2015.
- "Single Cell Genomics: Applications to and Limitations in Biodiversity Research." Illumina next-generation sequencing symposium. Rutgers University, New Brunswick, New Jersey. 24 October 2014.
- "Group II introns in the Rhodophyte alga *Porphyridium cruentum* (poster)." National Academy of Sciences Sackler Colloquium. Irvine, CA. 15-17 October 2014.
- "Proteomic divergence between feral and domestic forms of a mosquito disease vector." Dept. of Entomology. Rutgers University, New Brunswick, New Jersey. November 2013.

- "Genomic organization of doublesex in the mosquito *Culex quinquefasciatus* (poster)." First Joint Congress on Evolutionary Biology. Ottawa, Canada. July 2012.
- "Single-cell genomics applied to the picobiliphytes using next-generation sequencing." Illumina next-generation sequencing symposium. Rutgers University. New Brunswick, New Jersey. December 2011.
- "Single-cell metagenomics provides a snapshot in time of the dynamic world of marine protists. (poster)." Plant & Animal Genome Conference XIX. San Diego, California. January 2011.
- "First collections of Phlebotomine sand flies in New Jersey." New Jersey Mosquito Control Association Annual Meeting. Atlantic City, New Jersey. March 2010.
- "Field efficacy of BG-Sentinel and industry-standard traps for *Aedes albopictus* (Diptera: Culicidae) and West Nile virus surveillance. (poster)" International Symposium on the Asian Tiger Mosquito: ecology, evolution, epidemiology, and control. New Brunswick, New Jersey. 12-13 February 2009.