

Timothy Stephens

Curriculum vitae

Personal summary

I am a computational biologist working on understanding the forces that govern the interactions between organisms in ecologically critical environments, such as coral reefs, and the forces that drive major evolutionary transitions, such as the one that gave rise to the first photosynthetic Eukaryotes.

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Education

2016 — 2019 PhD, Institute for Molecular Bioscience, The University of Queensland
2015 — 2015 Honours, Institute for Molecular Bioscience, The University of Queensland
2012 — 2015 Bachelor of Biotechnology, Institute for Molecular Bioscience, The University of Queensland

Research Experience

2019 — present Post Doctoral Associate, Department of Biochemistry and Microbiology, Rutgers University
2016 — 2019 PhD, Institute for Molecular Bioscience, The University of Queensland
2015 Honours Project, Institute for Molecular Bioscience, The University of Queensland
2014 Undergraduate Researcher Project, School of Biological Sciences, The University of Queensland
2013 Paid Research Assistant, School of Biological Sciences, The University of Queensland
2012 — 2013 Undergraduate Research Project, Institute for Molecular Bioscience, The University of Queensland

Teaching experience

2020 — present Guest lecturer
Rutgers University
Design and conducted lectures on de novo next-generation genome and transcriptome sequencing, metabolomics, proteomics, metagenomics, phylogenetics, and phylogenomics in a joint undergraduate and postgraduate course titled “Fundamentals of Microbial Genomics”. Duties include designing and marking student exam questions and oral presentations.

2018 Head Practical Tutor
University of Queensland
Duties included designing and developing assessment material for the course and organising marking of assignments.

2016 — 2017 Practical Tutor
University of Queensland
Duties included assisting students with the completion of set questions and marking of assignments.

Professional development

2017 Research Commercialisation Workshop, University of Queensland
2017 UQ Idea Hub, University of Queensland

Awards and honours

2021 2019 Dean's Award for Outstanding Higher Degree by Research Theses, University of Queensland
2016 Research Training Program (RTP) scholarship, University of Queensland
2012 Dean's Commendation for Academic Excellence (achieved a GPA over 6.6), University of Queensland
2011 Merit Scholarship for academic achievement, University of Queensland

Select Publications

2023 *Williams A., ***Stephens T. G.**, Shumaker A., and Bhattacharya D. Peeling back the layers of coral holobiont multi-omics data. *iScience*, 2023. *Co-first authorship
2023 **Stephens T. G.**, Strand E. L., Putnam H. M., and Bhattacharya D. Ploidy variation and its implications for reproduction and population dynamics in two sympatric Hawaiian coral species. *Genome Biology and Evolution*, evad149, 2023. [[Preprint](#)] [[URL](#)]
2023 Etten J. V., **Stephens T. G.**, and Bhattacharya D. A *k*-mer-based approach for inferring phylogenetic relatedness of environmental genomic data. *Systems Biology*, syad037, 2023. [[URL](#)]
2023 Etten J. V., Benites F. L., **Stephens T. G.**, Yoon H. S., and Bhattacharya D. Algae obscura: The potential of rare species as model systems. *Journal of Phycology*, 59(2):293-300, 2023. [[URL](#)]
2022 **Stephens T. G.**, Lee J., Jeong Y., Yoon H. S., Putnam H. M., Majerova E., and Bhattacharya D. High-quality genome assemblies from key Hawaiian coral species. *GigaScience*, 11:giac098, 2022. [[URL](#)]
2022 Benites L. F., **Stephens T. G.**, and Bhattacharya D. Multiple waves of viral invasions in Symbiodiniaceae algal genomes. *Virus Evolution*, 8:veac101, 2022. [[Preprint](#)] [[URL](#)]
2022 Bhattacharya D., Etten J. V., Benites L. F., and **Stephens T. G.** Endosymbiotic ratchet accelerates divergence after organelle origin. *BioEssays*, e2200165, 2022. [[URL](#)]
2022 *Gabr A., ***Stephens T. G.**, and Bhattacharya D. Loss of key endosymbiont genes may facilitate early host control of the chromatophore in *Paulinella*. *iScience*, 25:104974, 2022. *Co-first authorship [[URL](#)]
2022 Meng Z., Williams A., Liau P., **Stephens T. G.**, Drury C., Chiles E. N., Su X., Javanmard M., and Bhattacharya D. Development of a portable toolkit to diagnose coral thermal stress. *Scientific Reports*, 12:14398, 2022. [[URL](#)]
2022 Bhattacharya D., **Stephens T. G.**, Tinoco A., Richmond R., and Cleves P. A. Life on the edge: Hawaiian model for coral evolution. *Limnology and Oceanography*, 67:1976-1985, 2022. [[URL](#)]
2022 *Calatrevia V., ***Stephens T. G.**, Gabr A., Grossman A. R., and Bhattacharya D. Retrotransposition facilitated the establishment of a primary plastid in the thecate amoeba *Paulinella*. *PNAS*, 119:e2121241119, 2022. *Co-first authorship [[URL](#)]
2022 *Gabr A., ***Stephens T. G.**, and Bhattacharya D. Hypothesis: *Trans*-splicing generates evolutionary novelty in the photosynthetic amoeba *Paulinella*. *Journal of Phycology*, 58:392-405, 2022. *Co-first authorship [[URL](#)]

- 2022 Dougan K. E., Gonzalez-Pech R. A., **Stephens T. G.**, Shah S., Chen Y., Ragan M. A., Bhattacharya D., and Chan C. X. Genome-powered classification of microbial eukaryotes: focus on coral algal symbionts. *Trends in Microbiology*, 30:831-840, 2022. [[URL](#)]
- 2021 Williams A., Pathmanathan J. S., **Stephens T. G.**, Su X., Chiles E. N., Conetta D., Putnam H. M., and Bhattacharya D. Multi-omic characterization of the thermal stress phenome in the stony coral *Montipora capitata*. *PeerJ*, 9:e12335, 2021. [[Preprint](#)] [[URL](#)]
- 2021 **Stephens T. G.**, Gabr A., Calatreva V., Grossman A. R., and Bhattacharya D. Why is primary endosymbiosis so rare?. *New Phytologist*, 231:1693-1699, 2021. [[URL](#)]
- 2021 Gonzalez-Pech, R. A., **Stephens T. G.**, Chen Y., Mohamed A. R., Cheng Y., Shah S., Dougan K. E., Fortuin M. D. A., Lagorce R., Burt D. W., Bhattacharya D., Ragan M. A., and Chan C. X. Comparison of 15 dinoflagellate genomes reveals extensive sequence and structural divergence in family Symbiodiniaceae and genus *Symbiodinium*. *BMC Biology*, 0.842361111, 2021. [[Preprint](#)] [[URL](#)]
- 2020 **Stephens T. G.**, Gonzalez-Pech R. A., Cheng Y., Mohamed A. R., Burt D. W., Bhattacharya D., Ragan M. A., and Chan C. X. Genomes of the dinoflagellate *Polarella glacialis* encode tandemly repeated single-exon genes with adaptive functions. *BMC Biology*, 18:56, 2020. [[Preprint](#)] Featured by [IMB News](#) [[URL](#)]
- 2019 Chen Y., Gonzalez-Pech R. A., **Stephens T. G.**, Bhattacharya D., and Chan C. X. Evidence that inconsistent gene prediction can mislead analysis of dinoflagellate genomes. *Journal of Phycology*, 56:6-10, 2019. [[Preprint](#)] [[URL](#)]
- 2018 **Stephens T. G.**, Ragan M. A., Bhattacharya D., and Chan C. X. Core genes in diverse dinoflagellate lineages include a wealth of conserved dark genes with unknown functions. *Scientific Reports*, 8:17175, 2018. [[URL](#)]
- 2018 Liu H., **Stephens T. G.**, Gonzalez-Pech R. A., Beltran V. H., Lapeyre B., Bongaerts P., Cooke I., Aranda M., Bourne D. G., Foret S., Miller D. J., van Oppen M. J. H., Voolstra C. R., Ragan M.A., and Chan C.X. *Symbiodinium* genomes reveal adaptive evolution of functions related to coral-dinoflagellate symbiosis. *Communications Biology*, 0.107638889, 2018. [[Preprint](#)] Featured by multiple outlets: [IMB News](#), [GBRF](#), [Video Feature](#), [IMB 2018 year in review](#) [[URL](#)]

Selected Talks

- 2023 **Stephens T. G.**, Chille E., Wong K., Andrade N., Hulett R., Cleves P., Bhattacharya D., Traylor-Knowles N. Shining a light on “dark” proteins in corals. *From Postdoc to Principal Investigator: An NSF Division of Integrative Organismal Systems (IOS) Virtual Colloquium 2023*. 13-14th September 2023, Virtual.
- 2023 **Stephens T. G.**, Calatrava V., Gabr A., Grossman A., and Bhattacharya D. Exploring the origin and evolution of primary plastids using *Paulinella* as a model system. *International Society of Endocytobiology conference 2023*. 10-14th September 2023, Field Museum, Chicago, 2023.
- 2023 **Stephens T. G.**, Chille E., Strand E. L., Putnam H. M., and Bhattacharya D. Multi-omics investigation of coral resilience. *Invited talk at Carnegie Plant Biology Seminar, August 2023*. 25th August 2023, Carnegie Department of Plant Biology, Stanford University, USA.
- 2023 **Stephens T. G.**, Calatrava V., Gabr A., Grossman A., and Bhattacharya D. Exploring the origin and evolution of primary plastids using *Paulinella* as a model system. *New Phytologist Next Generation Scientists Conference 2023*. 3rd July 2023, National University of Singapore, Singapore.
- 2023 **Stephens T. G.**, Calatrava V., Gabr A., Grossman A., and Bhattacharya D. Exploring endosymbiosis and biotic interactions using niche, non-model algae. *Invited talk at SCMB GenGen/ACE Special Seminar*. 10th January 2023, The University of Queensland, Brisbane, Australia.
- 2022 **Stephens T. G.**, Williams A., Shumaker A., and Bhattacharya D. Integration of multi-omics coral data under thermal stress. *4th Institute for Food, Nutrition, and Health*. 4th November 2022, Rutgers University, New Jersey, USA.

- 2022 **Stephens T. G.**, Strand E. L., Putnam H. M., and Bhattacharya D. Differences in ploidy and the prevalence of clonal propagation between *Montipora capitata* and *Pocillopora acuta* from Kane'ohe Bay, Hawai'i. *15th International Coral Reef Symposium*. 3-8th July 2022, Bremen, Germany.
- 2022 **Stephens T. G.**, Etten J. V., McDermott T., and Bhattacharya D. Analysis of environmental meta-omics data from the extremophilic red algae Cyanidiophyceae. *Joint Aquatic Sciences Meeting*. 14-20th May, 2022, Grand Rapids, USA.
- 2021 **Stephens T. G.**, Calatrava V., Gabr A., Grossman A., and Bhattacharya D. Insights into the evolution of a primary endosymbiosis through analysis of the *Paulinella* genome. *75th Annual Meeting of the Phycological Society of America*. 13-22nd July 2021, online.
- 2021 **Stephens T. G.**, Calatrava V., Gabr A., Grossman A., and Bhattacharya D. Insights into the evolution of a primary endosymbiosis through analysis of the *Paulinella* genome. *12th International Phycological Congress*. 22-26th March 2021, Chile.

Grants

- 2023 Rutgers TechAdvance Fund, \$74,842 USD
Funds to continue development of our coral health monitoring toolkit.
Principal Investigators: Debashish Bhattacharya (Rutgers University), Rutgers University
- 2023 Core Facility Utilization Application, \$5,000 USD
Funds for metabolomic profiling of the sex hormone cycle in spawning corals.
Principal Investigators: Debashish Bhattacharya (Rutgers University), Rutgers University
- 2022 Core Facility Utilization Application, \$5,000 USD
Funds for sequencing of coral microbiome samples.
Principal Investigators: Debashish Bhattacharya (Rutgers University), Rutgers University
- 2022 Center for Nutrition, Microbiome, and Health Small Grant FY-22, \$2,000 USD
Characterizing the coral microbiome biogeography across colonies and reefs.
Principal Investigators: Debashish Bhattacharya (Rutgers University), Center for Nutrition, Rutgers University
- 2018 UQ-FAPESP Strategic Research Fund SPRINT (2018/15159-9), \$20,000 (~USD \$14,000)
Integrated genomic approaches to understand stress tolerance in bioethanol-producing yeasts and coral reef symbionts
Principal Investigators: Cheong Xin Chan (UQ) and Jeferson Gross (State University of Sao Paulo), Jointly funded by University of Queensland (UQ) and Sao Paulo State Foundation (FAPESP)

Media coverage

- 2022 Our paper [Retrotransposition facilitated the establishment of a primary plastid in the thecate amoeba *Paulinella*](#) covered by [Rutgers Research](#)
- 2022 Article by [Rutgers Research](#) on our short film [The Coral Holobiont Response to Climate Change](#) which won Best Trailer in the Kiez Berlin Film Festival.
- 2021 Our paper [Why is primary endosymbiosis so rare?](#) was covered by [Rutgers Newsroom](#). We also produced two animated videos: [Video 1](#), [Video 2](#)
- 2020 Our paper [Amoeba Genome Reveals Dominant Host Contribution to Plastid Endosymbiosis](#) covered by [Rutgers Today](#)