

# Clinton A. Oakley

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## Professional Appointments

- Senior Research Fellow and Principal Investigator** 2024  
Te Kura Mātauranga Koiora, School of Biological Sciences  
Te Herenga Waka Victoria University of Wellington, Aotearoa New Zealand  
My research team and I integrate “omics” methods, organismal physiology, and ecophysiology to investigate the responses of corals and reef organisms to climate change, explore how symbioses are established, maintained, and disrupted, explain how symbioses are essential for ecosystem function, and improve the survival trajectory of coral reefs.
- Teaching Fellow** 2022–2024  
School of Biological Sciences  
Te Herenga Waka Victoria University of Wellington
- Research Fellow in Marine Biology** 2013–2023  
Mentor Prof. Simon Davy, School of Biological Sciences  
Te Herenga Waka Victoria University of Wellington
- Research Assistant** 2007  
PI Prof. Johanna Schmitt, Dept. of Ecology, Evolution and Organismal Biology  
Brown University, Providence, RI, USA
- Field Technician** 2006  
PI Prof. James Clark, Nicholas School of the Environment  
Duke University, Durham, NC, USA
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## Education

- Ph.D.**, Biology. 2013  
University of Georgia, Athens, GA, USA  
Dissertation title: Photosynthetic and respiratory responses to thermal stress in the coral symbiont *Symbiodinium*.
- B.S.**, Biology, *magna cum laude*. 2006  
Washington & Lee University, Lexington, VA, USA
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## Research Funding & Fellowships

- Royal Society Te Apārangi Marsden Fund, \$1,083,000NZD, Principal Investigator.** 2024  
Associate Investigators Prof. David Suggett, King Abdullah University of Science & Technology; AProf. Ed Chouchani, Harvard University; & Dr. Phil Cleves, Carnegie Institution of Science.  
“What makes a coral ‘super’? Challenging the oxidative theory of coral bleaching to solve the coral reef crisis.” Press release in [English](#) or [te reo Māori](#). The Marsden Fund success rate is 12%.
- Strategic Faculty Research Grant, Victoria University of Wellington, \$16,700NZD. 2020  
**Principal Investigator.** “Identifying target genes for intervention in the coral reef crisis.”
- Royal Society Te Apārangi Marsden Fund, \$1,104,000NZD, Research Fellow.** 2020  
Principal Investigator Prof. Simon Davy, Victoria University of Wellington. Assoc. Investigators Prof. Arthur Grossman, Stanford University; Prof. Virginia Weis, Oregon State University; & AProf. David Suggett, University of Technology of Sydney.  
“The language of success: Inter-kingdom communication in the coral-algal symbiosis and the adaptation of coral reefs to climate change.”

- Royal Society Te Apārangi Marsden Fund**, \$1,000,500NZD, Research Fellow. 2018  
Principal Investigator Prof. Simon Davy, Victoria University of Wellington. Assoc. Investigators Prof. Arthur Grossman, Stanford University; Prof. Virginia Weis, Oregon State University.  
“From parasitism to mutualism: symbiosis interaction states and the adaptability of reef corals to climate change.”
- L’Institut des Récifs Coralliens du Pacifique Grant**, €4,500, **Principal Investigator**. 2017  
“The proteome and molecular functions of the coral surface mucus layer and its role in coral ecology in Mo’orea.”
- University of Georgia Innovative and Interdisciplinary Research Grant, \$1,500USD 2012
- USA EPA Science to Achieve Results (STAR) Ph.D. Fellowship**, \$111,000USD 2010  
“Carbon fixation of the diverse coral symbiont *Symbiodinium* in a high-CO<sub>2</sub> ocean.”

### **Funding applications under review:**

- New Zealand Mana Tūānuku Research Leader Fellowship**, \$1,160,000NZD. 2024  
This 4-year fellowship is awarded to 10 research leaders per year across all academic fields in Aotearoa New Zealand.
- 150 Years of Scientific Collaboration Small Grants Program, \$9,000USD, 2024  
United States Embassy New Zealand.
- Royal Society Te Apārangi Marsden Fund**, \$1,104,000NZD, **Associate Investigator**. 2024  
PI Prof. Simon Davy, Victoria University of Wellington. AIs Prof. Arthur Grossman, Stanford University; Prof. Virginia Weis, Oregon State University; & Prof. David Suggett, King Abdullah University of Science & Technology.  
“Evading digestion in the coral-algal symbiosis: establishing a mechanism for improved coral reef survival in warming seas”.

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## **Publications**

*\*Advised student, †Equal authorship*

- | <b><u>Summary</u></b>                      |    |   |
|--|----|---|
| Publications:                              | 37 | Citations ( <a href="#">Google Scholar</a> ): 1,974 |
| As 1 <sup>st</sup> or senior author:       | 12 | <i>h</i> -index: 20                                 |
| Student advisee as 1 <sup>st</sup> author: | 16 | <i>i10</i> -index: 22                               |
- 2024 **CA Oakley**†, AG Mashini\*†, AR Grossman, L Peng, AR Grossman, VM Weis, SK Davy. [Proteomes of native and non-native symbionts reveal responses underpinning host-symbiont specificity in the cnidarian–dinoflagellate symbiosis](#). *The ISME Journal* wrac122.
- 2023 **CA Oakley**, GI Newson\*, L Peng, SK Davy. [The \*Symbiodinium\* proteome under thermal and nutrient stress](#). *Plant and Cell Physiology* pcac175.
- 2023 AG Mashini\*, **CA Oakley**, S Beepat, L Peng, VM Weis, AR Grossman, SK Davy. [The influence of symbiosis on the proteome of the \*Exaiptasia\* endosymbiont \*Breviolum minutum\*](#). *Microorganisms* 11:2 292.
- 2023 M Wuerz\*, CA Lawson, **CA Oakley**, M Possell, SP Wilkinson, AR Grossman, VM Weis, DJ Suggett, SK Davy. [Symbiont identity impacts the microbiome and volatilome of a model cnidarian–dinoflagellate symbiosis](#). *Biology* 12:1014.
- 2023 SW Davies, ... **CA Oakley**, *et al.* [Building consensus around the assessment and interpretation of \*Symbiodiniaceae\* diversity](#). *PeerJ* 11:e15023.
- 2023 IM Ashley\*, SA Kitchen, LM Gorman\*, AR Grossman, **CA Oakley**, DJ Suggett, VM Weis, SL Rosset, SK Davy. [Genomic conservation and putative downstream functionality of the phosphatidylinositol signalling pathway in the cnidarian–dinoflagellate symbiosis](#). *Frontiers in Microbiology* 10.3389/fmicb.2022.1094255.

- 2022 C Pogoreutz, **CA Oakley**, N Rådecker, Anny Cárdenas, G Perna, L Peng, SK Davy, DK Ngugi, CR Woolstra. Coral holobiont cues prime *Endozoicomonas* to a symbiotic lifestyle. *The ISME Journal* 16: 1883–1895.
- 2022 E Camp, T Kahlke, B Signal, **CA Oakley**, A Lutz, D Suggett, W Leggat. Proteome, metabolome and transcriptome data for three Symbiodiniaceae under ambient and heat stress conditions. *Scientific Data* 9: 153.
- 2022 **CA Oakley**, S Pontasch, PL Fisher, SP Wilkinson, RA Keyzers, T Krueger, S Dove, O Hoegh-Guldberg, W Leggat, SK Davy. Thylakoid fatty acid composition and response to short-term cold and heat stress differs between high-latitude Symbiodiniaceae. *Coral Reefs* 41: 343–353.
- 2022 M Wuerz\*, CA Lawson, M Ueland, **CA Oakley**, AR Grossman, VM Weis, DJ Suggett, SK Davy. Symbiosis induces unique volatile profiles in the model cnidarian *Aiptasia*. *Journal of Experimental Biology* doi/10.1242/jeb.244600.
- 2022 AG Mashini\*, **CA Oakley**, AR Grossman, VM Weis, SK Davy. Immunolocalisation of metabolite transporter proteins in a model cnidarian–dinoflagellate symbiosis. *Applied and Environmental Microbiology*, e00412–22.
- 2022 LM Gorman\*, G Cui, M Aranda, **CA Oakley**, AR Grossman, VM Weis, SK Davy. Symbiosis with dinoflagellates alters cnidarian cell-cycle gene expression. *Cellular Microbiology* 3330160.
- 2022 MR Nitschke, SL Rosset, **CA Oakley**, SG Gardner, EF Camp, DJ Suggett, SK Davy. The diversity and ecology of Symbiodiniaceae: a trait-based review. *Advances in Marine Biology* 92: 55–127.
- 2022 G Tortorelli, **CA Oakley**, SK Davy, MJH van Oppen, GI McFadden. Cell wall proteomic analysis of the coral photosymbionts *Breviolum minutum* and *Cladocopium goreaui*. *Journal of Eukaryotic Microbiology* 69:e12870.
- 2022 JL Matthews\*, R Cunning, R Witson-Williams, **CA Oakley**, A Lutz, U Roessner, AR Grossman, VM Weis, RD Gates, SK Davy. The metabolic significance of symbiont community composition in the coral-algal symbiosis. *Appl Env Metabolomics* 211–229.
- 2022 JK Kihika, SA Wood, L Rhodes, KF Smith, MR Miller, X Pochon, L Thompson, J Butler, J Schattsschneider, **CA Oakley**, KG Ryan. Cryopreservation of six Symbiodiniaceae genera: assessment of fatty acid profiles in response to increased salinity treatments. *Scientific Reports* 12:12408.
- 2022 TC LaJeunesse, J Wiedenmann, P Casado de Amezúa, I D’Ambra, K Turnham, M Nitschke, **CA Oakley**, C Spano, V Cubillos, SK Davy, DJ Suggett. Revival of *Philozoon* Geddes for host-specialized dinoflagellates, ‘zooxanthellae’, in animals from coastal temperate zones of Northern and Southern Hemispheres. *Eur J Phycol* 57: 2 166–180.
- 2021 SL Rosset, **CA Oakley**, C Ferrier-Pagès, DJ Suggett, VM Weis, SK Davy. The molecular language of the cnidarian–dinoflagellate symbiosis. *Trends in Microbiology* 4: 320–333.
- 2021 Beepat S, SK Davy, **CA Oakley**, A Mashini, L Peng, JJ Bell. Increased cellular detoxification, cytoskeletal activities and protein transport explain physiological stress response mechanisms in a lagoon sponge. *Journal of Experimental Biology* 224: jeb242820.
- 2020 LM Gorman\*, SP Wilkinson, **CA Oakley**, AR Grossman, VM Weis, SK Davy. Phylogenetic analysis of cell-cycle regulatory proteins within the Symbiodiniaceae. *Scientific Reports* 10:20473.
- 2020 JL Matthews\*, R Cunning, R Ritson-Williams, **CA Oakley**, A Lutz, U Roessner, AR Grossman, VM Weis, RD Gates, SK Davy. Metabolite pools of the reef-building coral *Montipora capitata* are unaffected by Symbiodiniaceae community composition. *Coral Reefs* 39 (6), 1727–1737.
- 2020 AE Sproles\*, **CA Oakley**, T Krueger, AG Grossman, VM Weis, A Meibom, SK Davy. Sub-cellular imaging shows reduced photosynthetic carbon and increased nitrogen assimilation by the heterologous endosymbiont *Durusdinium trenchii* in the model cnidarian *Aiptasia*. *Environmental Microbiology* 22:9 3741–3753.
- 2019 **CA Oakley**†, AE Sproles\*†, JL Matthews\*, L Peng, VM Weis, JG Owen, AR Grossman, SK Davy. Proteomics quantifies protein expression changes in a model cnidarian colonized by a thermally tolerant but suboptimal symbiont. *The ISME Journal* 13: 2334–2345.

- 2018 JL Matthews\*, **CA Oakley**, A Lutz, KE Hillyer, U Roessner, AG Grossman, VM Weis, SK Davy. [Partner switching and metabolic flux in a model cnidarian–\*Symbiodinium\* symbiosis](#). *Proceedings of the Royal Society B: Biological Sciences* 285: 20182336.
- 2018 **CA Oakley**, SK Davy. Cellular Biology of Coral Bleaching. In: MJH van Oppen, JM Lough, editors. *Coral bleaching: Patterns, processes, causes and consequences*. 2<sup>nd</sup> ed. Berlin: Springer-Verlag Berlin Heidelberg.
- 2018 AE Sproles\*, NL Kirk, SA Kitchen, **CA Oakley**, AR Grossman, VM Weis, SK Davy. [Phylogenetic characterization of transporter proteins in the cnidarian-dinoflagellate symbiosis](#). *Molecular Phylogenetics and Evolution* 120: 307–320.
- 2017 JL Matthews\*, CM Crowder, **CA Oakley**, A Lutz, VM Weis, AR Grossman, E Meyer, U Roessner, SK Davy. [Optimal nutrient exchange and immune responses operate in partner specificity in the cnidarian-dinoflagellate symbiosis](#). *Proceedings of the National Academy of Sciences of the USA* 114:50 13194–13199
- 2017 **CA Oakley**, E Durand, S Wilkinson, L Peng, VM Weis, AR Grossman, SK Davy. [Thermal shock induces host proteostasis disruption and endoplasmic reticulum stress in the model cnidarian \*Aiptasia\*](#). *Journal of Proteome Research* 16: 2121–2134
- 2016 **CA Oakley**, MF Ameismeier, L Peng, VM Weis, AR Grossman, SK Davy. [Symbiosis induces widespread changes in the proteome of the model cnidarian \*Aiptasia\*](#). *Cellular Microbiology* 18:7 1009–1023
- 2015 JL Matthews\*, AE Sproles\*, **CA Oakley**, AR Grossman, VM Weis, SK Davy. [Menthol-induced aposymbiosis rapidly and effectively provides experimental cnidarians for symbiosis investigations](#). *Journal of Experimental Biology* 219: 306–310
- 2014 **CA Oakley**, BM Hopkinson, GW Schmidt. [Mitochondrial terminal alternative oxidase and its enhancement by thermal stress in the coral symbiont \*Symbiodinium\*](#). *Coral Reefs* 33:2 543–552
- 2014 **CA Oakley**, GW Schmidt, BM Hopkinson. [Thermal responses of \*Symbiodinium\* photosynthetic carbon assimilation](#). *Coral Reefs* 33:2 501–512
- 2013 JL Dimond, BL Bingham, G Muller-Parker, **CA Oakley**. [Symbiont physiology and dynamics before and during symbiont shifts in a flexible algal-cnidarian symbiosis](#). *Journal of Phycology* 49:6 1074–1083
- 2013 **CA Oakley**, JS Knox. [Plant species richness increases resistance to invasion by non-resident plant species during grassland restoration](#). *App. Vegetation Science* 16:1 21–28
- 2012 **CA Oakley**, BM Hopkinson, GW Schmidt. [A modular system for the measurement of photosynthetic CO<sub>2</sub> and O<sub>2</sub> gas flux and electron transport in microalgae](#). *Limnology and Oceanography: Methods* 10: 968–977
- 2011 DW Kemp, **CA Oakley**, DJ Thornhill, LA Newcomb, GW Schmidt, WK Fitt. [Catastrophic mortality on inshore coral reefs of the Florida Keys due to severe low-temperature stress](#). *Global Change Biology* 17: 11 3468–3477
- 2010 RJ Newton, LE Griffin, KM Bowles, C Meile, S Gifford, CE Givens, EC Howard, E King, **CA Oakley**, CR Reisch, JM Rinta-Kanto, S Sharma, S Sun, V Varaljay, M Vila-Costa, JR Westrich, MA Moran. [Genome characteristics of a generalist marine bacterial lineage](#). *The ISME Journal* 1:10 1–15

### Edited Volumes

- 2022 [Coral Reef Ecosystems Theme Issue](#), Guest Editor. *Emerging Topics in Life Sciences* 6:1 1-136.

### Manuscripts in Review

LM Gorman\*, TR Tivey, EH Raymond, IA Ashley\*, **CA Oakley**, AR Grossman, VM Weis, SK Davy. [Stability of the cnidarian–dinoflagellate symbiosis is primarily determined by symbiont cell-cycle arrest](#). *Proceedings of the National Academy of Sciences of the USA*

## Teaching Experience

*Teaching evaluations available on request.*

- Global Change Biology. Instructor of Record**, Course co-Coordinator. 2023 & 2024  
300-level, 100 students. Victoria University of Wellington (VUW).  
Covers the physics of climate change, the effects of climate change on specific ecosystem such as alpine forests and coral reefs, climate projections, and other anthropogenic impacts (e.g. light pollution) on organisms. Includes a series of group-based research skills workshops, student-led discussions, policy writing to advise government, and a research thesis as the primary assessment.
- Animal Diversity. Instructor of Record** for lectures and laboratory. 2022–2024  
200-level, 140 students. VUW.  
Covers the physiology, diversity, evolution, form, and function of animal taxa. Lectures detail how animal forms are a product of and reflect their evolutionary history, function, and environment, as well as their ecological roles. Laboratory sessions include live presentations and dissections.
- Biology of Animals.** Laboratory Coordinator and Instructor. 2024  
100-level, 340 students. VUW.  
A comprehensive introduction to animal structure, function, and ecology, primarily focused on mammalian and human biology. Laboratories include physiology demonstrations, experiments and dissections.
- Senior Tutor**, School of Biological Sciences, VUW. 2022  
A multifaceted role focused on student and faculty support across multiple courses, assisting dual delivery, online teaching, and Blackboard/Canvas.
- Introductory Marine Ecology. Instructor of Record.** 2018  
200-level, 120 students. VUW.  
Covers the diversity and physiology of marine organisms, biological and physical oceanography, structure of marine ecosystems, and marine conservation.
- Tropical Marine Conservation Practice. Course co-Coordinator** and Field Instructor. 2014 & 2015  
MS-level, 20 students. VUW.  
Field course encompassing the biology, ecology, and conservation of tropical and sub-tropical environments, including North Stradbroke Island and the Great Barrier Reef.
- Biology of Protists.** Laboratory Instructor. 2009 & 2010  
300-level, University of Georgia (UGA).  
Explores the wide diversity of eukaryotic microbes, including physiology, taxonomy, evolutionary biology, and microscopic investigations.
- Tropical Marine Invertebrate Zoology.** Field Instructor. 2008 & 2011  
400-level, UGA.  
A field course on the organismal physiology and ecology of coral reef and seagrass environments of the Florida Keys.
- Plant Taxonomy.** Laboratory Instructor. 2009 & 2010  
MS-level, UGA.  
Taxonomy of species of the southeastern USA, focusing on species-level identification.
- Principles of Plant Biology.** Laboratory Instructor. 2008 & 2009  
100-level, UGA.  
Introductory course for plant biology and related majors, covering organismal physiology and ecology laboratories.

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## Advising and Mentorship

I have formally advised/supervised **12 Ph.D. (7 completed, 5 in progress)** and **4 M.S.** students as either primary or co-supervisor, in addition to informally mentoring 3 Ph.D. and 2 M.S. candidates. I have also mentored 6 visiting students from the University of Munich, Université Pierre et Marie Curie, École Normale Supérieure, University of Southampton, Université de Bretagne Occidentale, and the Université de Côte d'Azur.

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## Honors and Awards

University of Georgia Foreign Travel Award, \$2,200	2012
University of Georgia Innovative and Interdisciplinary Research Grant, \$1,500	2012
Plant Biology Graduate Student Research Assistance Award, \$200 & \$500	2009 & 2012
University of Georgia Graduate School Award, \$28,000	2007
Thomas G. Nye Field Biology Research Fellowship, \$3,000	2005
Biology Research Scholar, Washington and Lee University, \$5,000	2003–2006

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## Service and Professional Organizations

International Coral Reef Symposium 2026, Organising Committee  
*Symbiosis*, Associate Editor  
 Maunuhanga Wellington Postdoctoral Society, Founding Committee Member and Chair  
 School of Biological Sciences Ecology and Evolution Seminar Series Coordinator  
 Royal Society of New Zealand Te Apārangi, Professional Member (MRSNZ)  
 International Coral Reef Society, Member  
 International Symbiosis Society, Member  
 Australian Coral Reef Society, Member  
 American Academy of Underwater Scientists

### Grant/manuscript reviewer for:

National Science Foundation USA (OCE, ad hoc), the European Research Council, the German Research Foundation, *Nature Communications*, *Global Change Biology*, *The ISME Journal*, *Trends in Ecology and Evolution*, *Proceedings of the Royal Society B*, *Molecular Ecology*, *Communications Biology*, *Coral Reefs*, *Scientific Reports*, *Frontiers in Marine Science*, *Algal Research*, *BMC Ecology*, *Microbiome*, *Oceanologia*, *PLOS One*, *Journal of Experimental Biology*, *PeerJ*, *Bulletin of Marine Science*.

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## Selected Presentations

- 2024 Multi-omics responses to symbiont identity and thermal stress in the model cnidarian *Aiptasia*. 2024 Australian Coral Reef Symposium, Perth, Australia. **CA Oakley**, B Lust\*, JL Matthews, RE Lewis, H Mendis, L Peng, AR Grossman, VM Weis, SK Davy.
- 2022 Multi-omics comparison of thermal stress and the regulation of gene expression in three Symbiodiniaceae genera. 15<sup>th</sup> International Coral Reef Symposium, Bremen, Germany. **CA Oakley**, MR Nitschke, EF Camp, T Kahlke, MT Ros, W Leggat, SK Davy, DJ Suggett.
- 2018 Multiple -omics investigations of thermal stress and symbiont diversity in the cnidarian-dinoflagellate symbiosis. Invited talk, Climate Change Cluster at University of Technology, Sydney. **CA Oakley**, SK Davy.

- 2018 The host proteome reveals nutrient exchange and cell recognition mechanisms altered by a novel cnidarian-*Symbiodinium* symbiosis. 9<sup>th</sup> International Symbiosis Society Congress. **CA Oakley**, AE Sproles\*, JL Matthews\*, L Peng, VM Weis, AR Grossman, SK Davy.
- 2016 Thermal shock induces host proteostasis disruption and endoplasmic reticulum stress in the model cnidarian *Aiptasia*. 13<sup>th</sup> International Coral Reef Symposium. **CA Oakley**, E Durand\*, S Wilkinson, L Peng, VM Weis, AR Grossman, SK Davy.
- 2015 The effects of symbiotic state on the proteome of the model cnidarian *Aiptasia*. **CA Oakley**, M Ameismeier, L Peng, VM Weis, AR Grossman, SK Davy. 8<sup>th</sup> International Symbiosis Society Congress.
- 2013 Evidence for a mitochondrial alternative terminal oxidase in *Symbiodinium*. **Oakley CA**, BM Hopkinson, GW Schmidt. Australian Coral Reef Society Conference
- 2013 Alternative oxidases in dinoflagellate-cnidarian symbioses. **Oakley CA**, BM Hopkinson, GW Schmidt. Symbiofest 2013, University of Georgia.
- 2012 *Symbiodinium* carbon limitation: parameters and feedback with thermal stress. **Oakley CA**, BM Hopkinson, GW Schmidt. 12<sup>th</sup> International Coral Reef Symposium.
- 2011 A modular system for the simultaneous, real-time measurement of photosynthetic CO<sub>2</sub> and O<sub>2</sub> gas flux and electron transport in microalgae. **Oakley CA**, GW Schmidt. 2011 EPA Science to Achieve Results Fellowship Conference.
- 2010 Temperature effects on photosynthetic and respiratory CO<sub>2</sub> and O<sub>2</sub> exchange of *Symbiodinium*: evidence of functional diversity. **Oakley CA**, WK Fitt, GW Schmidt. Benthic Ecology Meeting 2010.

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## References

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