

Tiffany A. Stephens

Postdoctoral Fellow – University of Alaska, Fairbanks

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Education

- **Doctorate of Philosophy** **University of Otago, New Zealand**
Marine Science 2011 – 2016
Thesis title: Insights into the nitrogen ecophysiology of *Macrocystis pyrifera*.
- **Bachelor of Science, honors** **University of Washington, United States**
Aquatic and Fishery Sciences 2005 – 2009
Thesis title: The feeding preference of *Strongylocentrotus franciscanus* on fresh versus aged kelp.

Research Interests

Algal and seagrass ecology, physiology, and biochemistry | Nutrient subsidies | Benthic-pelagic coupling | Multiple environmental stressors | Sustainable aquaculture | Marine chemistry

I endeavor to stimulate interdisciplinary research and am especially interested in using new investigative tools to challenge current paradigms. Fields compatible with my specialties include food webs studies, evolution and development, biomechanics, ecomechanics, and GIS.

Selected Publications

- **Stephens TA** and Hepburn CH (*in review*) Biomass through space and tide: architecture of a kelp bed and implications for the abiotic environment. *Ecosphere*
- **Stephens TA** (2017) Terminal blades in *Macrocystis* and unexplored links to functional biology. *Ecology*. DOI: 10.1002/ecy.1913.
- **Stephens TA** and Hepburn CH (2016) A kelp with integrity: *Macrocystis pyrifera* prioritizes tissue maintenance in response to nitrogen fertilization. *Oecologia*. DOI 10.1007/s00442-016-3641-2.
- **Stephens TA** and Hepburn CH (2014). Mass-transfer gradients across kelp beds influence *Macrocystis pyrifera* growth over small spatial scales. *Mar Ecol Prog Ser* 515: 97 – 109.
- Desmond MJ, **Stephens TA**, and Hepburn CH (*in prep*) Whole community estimates of macroalgal pigment concentration reveal physiological limits to photoacclimation. *Journal of Phycology*.

Selected Professional Employment

- **June 2017 - Present:** *Postdoctoral fellow.* I am currently working on a NSF-funded Coastal SEES project: Apex Predators, Ecosystems, and Community Sustainability. Principal investigator (APECS). This interdisciplinary research aims to address how sea otters influence the primary and secondary productivity of seagrass beds in SE Alaska, and then how such trophic interactions impact subsistence harvest (i.e. clams, crabs, sea cucumbers) by rural communities. I am assisting with project coordination, report writing, and manuscript preparation. *PI: Dr. Ginny Eckert; University of Alaska Fairbanks.*
- **Apr 2016 - May 2017:** *Postdoctoral fellow.* I worked in the Centre for Seaweed Ecophysiology and Biology, where my research focused on carbon metabolism in a subtidal macroalgal community (35 species). This work also included investigating carbon flux (CO₂ and HCO₃⁻) in CCM and non-CCM red seaweeds treated with saturating and low light. *PI: Dr. Patrick Martone; University of British Columbia.*
- **Aug 2010 - Apr 2011:** *Field and lab technician.* Labwork included extracting novel compounds from invertebrates and algae extract, contributing to the International Cooperative Biodiversity Group's natural product drug discovery project. Fieldwork investigated algal-coral chemical interactions in tropical reefs. *Supervisor: Dr. Mark Hay; Georgia Institute of Technology.*
- **Jun 2009 - Aug 2010:** *Field and lab technician.* The project addressed the effects of shoreline armoring on both beach characteristics and their composition of intertidal species at various Puget Sound locations; data on infauna, sediment grain size and wrack composition were collected and processed. *Supervisors: Dr. Megan Dethier and Helen Berry; University of Washington and WA Department of Natural Resources, respectively.*

Selected Teaching and Mentoring

- **Jul - Aug 2015:** *Full-time.* I co-developed and co-lectured for "Ecology Between and Below Pacific Tides" at Friday Harbor Labs, designed for advanced undergraduate and graduate students. The 5-week course highlighted both intertidal and subtidal theory and methods, where students had the opportunity to earn their AAUS scientific diving certification. All students identified research questions and then conducted independent research, which culminated in public, oral presentations. *Supervisor: Dr. Megan Dethier.*
- **Mar 2012 - Jun 2015:** *3/4-time.* I demonstrated for introductory ecology courses at the University of Otago for five semesters, total. In the last, I was lead demonstrator, which required introductory and summary lectures in each lab session. Undergraduate students utilized a cockle population to learn ecological theory and sampling methods; cockles were brought to the lab to so that students could test an array of environmental and biotic parameters influence cockle feeding and population structure. *Supervisor: Dr. Haseeb Randhawa.*
- **May 2012 - Sep 2014:** *Part-time.* I was a teaching fellow for two programs at the New Zealand Marine Studies Center: GK-12 and Gifted and Talented. School groups from around New Zealand (ages 11-17) would visit the center to obtain hands-on experience with scientific design and critical thinking in both laboratory and field settings; these teaching blocks spanned 3-8 full days per school group. *Supervisor: Steve Cutler.*

Professional Activities

- **Contributions to peer-review:** I am a Review Editor for *Frontiers in Marine Science*, for the Global Change and the Future Ocean section. I have reviewed manuscripts for *Limnology and Oceanography*, *Ecological Research*, *Phycological Research*, *Aquatic Invasions*, *Journal of the Marine Biological Association of the United Kingdom*, and *New Zealand Marine and Freshwater Research*.
- **Guest lectures:** 2017, BLISS seminar series (University of British Columbia); 2013, University of the Third Age (U3A, community education in New Zealand); 2009, ZooBots guest lecture (FHL, University of Washington).

Skills and Qualifications

- **Type of data:** seawater macronutrients, algal pigmentation, carbonic anhydrase activity, specific amino acids, stable isotopes, water mass-transfer, photosynthetic efficiency, trace elements (and clean methods), use of flume tanks, DNA extraction and PCR.
- **Getting data:** extensive experimentation in the field and lab, small craft operation, SCUBA – scientific diver via AAUS (USA) and OSH (New Zealand), drysuit and nitrox certifications.
- **Quantifying data:** nutrient auto analyzer, spectrophotometry, high-performance liquid chromatography (HPLC), PAM fluorometry, flow cytometry, membrane inlet mass spectrometry (MIMS), transects and quadrats.
- **Analyzing data:** R analytical package, Primer 6+ PERMANOVA, SPSS, ImageJ, basic understanding of Bayesian mixing models (using MixSIAR).

Honors and Awards

- 2017 – Runner-up, Hilda Canter-Lund photography award (British Phycological Society)
- 2016 – Best student talk (International Seaweed Symposium, Denmark)
- 2016 – Winner of the Hilda Canter-Lund photography award (British Phycological Society)
- 2015 – Travel award; New Zealand Federation of Graduate Women (\$2,500).
- 2015 – Writing bursary; 3 months, University of Otago (\$6,000).
- 2014 – Runner-up best talk; Asian Pacific Phycological Forum.
- 2014 – Travel award; New Zealand Marine Sciences Society (\$1,000).
- 2014 – Travel award; Division of Sciences, University of Otago (\$2,000).
- 2011-2014 – International PhD scholarship; University of Otago (\$75,000).
- 2010 – NSF Graduate Research Fellowship Program, *award recipient* (\$120,000). Declined because I found a PhD program that best fit my professional interests outside of the USA.
- 2009 – NSF Graduate Research Fellowship Program, *honorable mention*.
- 2008 – Scholarship for Pelagic Ecosystems apprenticeship; Mary Gates Endowment (\$3,000).
- 2008 – Scholarship for ZooBot apprenticeship; Mary Gates Endowment (\$3,000).

Conference Presentations

- 2016: *Talk* – Western Society of Naturalists (WSN); Monterey, CA, USA.
- 2016: *Talk* – International Temperate Reef Symposium (ITRS); Pisa, Italy.
- 2016: *Talk* – International Seaweed Symposium (ISS); Copenhagen, Denmark.
- 2016: *Talk* – Northwest Algae and Seagrass Symposium (NWASS); Camp Casey, WA, USA.
- 2014: *Talk* – Western Society of Naturalists (WSN); Tacoma, WA, USA.
- 2014: *Talk* – Asian Pacific Phycological Forum (APPF); Wuhan, China.
- 2014: *Talk* – New Zealand Marine Science Society (NZMSS); Nelson, New Zealand.
- 2011: *Poster* – New Zealand Marine Science Society (NZMSS); Oban, New Zealand.
- 2009: *Poster* – Puget Sound Georgia Basin (PSGB); Seattle, WA, USA.
- 2009: *Poster* – Integrative and Comparative Biology (SICB); Boston, MA, USA.

Referees

- **Dr. Ginny Eckert** **gleckert@alaska.edu**
University of Alaska, Fairbanks
Research mentor; Coastal management and ecosystem services
- **Dr. Patrick Martone** **patrick.martone@botany.ubc.ca**
University of British Columbia
Postdoctoral supervisor; algal biomechanics and biochemistry
- **Dr. Chris Hepburn** **chris.hepburn@otago.ac.nz**
University of Otago
PhD supervisor; aquaculture and algal ecophysiology
- **Dr. Megan Dethier** **mdethier@uw.edu**
University of Washington
Mentor; community dynamics and intertidal ecology
- **Dr. David Duggins** **dduggins@uw.edu**
University of Washington
Co-instructor; kelp bed ecology
- **Dr. Aaron Galloway** **agallow3@uoregon.edu**
University of Oregon
Co-instructed a course at FHL; food-web ecology
- **Dr. Haseeb Randhawa** **hrandhawa@fisheries.gov.fk**
Falkland Islands Fisheries
Supervisor for undergraduate teaching
- **Steve Cutler** **steve.cutler@otago.ac.nz**
New Zealand Marine Studies Center
K-12 teaching mentor