

# Lauren Elizabeth Nadler, PhD

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## ACADEMIC APPOINTMENTS

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### Postdoctoral fellow

*Norwegian University of Life Sciences*  
Supervisor: Dr. Øyvind Øverli

Oslo, Norway  
April 2018 – present

### Visiting scholar

*Scripps Institution of Oceanography*  
Supervisor: Prof. Ryan F. Hechinger

San Diego, CA, USA  
April 2018 – present

### Postdoctoral scholar

*Scripps Institution of Oceanography*  
Supervisor: Prof. Ryan F. Hechinger

San Diego, CA USA  
Oct. 2016 – April 2018

### Research assistant

*James Cook University*  
Supervisor: Prof. Morgan S. Pratchett

Townsville, Australia  
July – Oct. 2016

### Research officer

*James Cook University*  
Supervisor: Prof. Philip L. Munday

Townsville, Australia  
Jan. – Mar. 2014

### Program assistant

*Cornell Cooperative Extension Scallop Restoration Program*  
Supervisor: Prof. Christopher F. Smith

Southold, NY, USA  
May – Aug. 2010

### Research assistant

*Boston University*  
Supervisor: Prof. Tom Kunz

Boston, MA, USA  
May – Aug. 2006

## EDUCATION

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### Ph.D. Marine Biology

*James Cook University*  
Thesis: Behavioural and physiological effects of shoaling in a coral reef fish  
Supervisors: Prof. Mark I. McCormick, Prof. Philip L. Munday, Dr. Paolo Domenici

Townsville, Australia  
Jan. 2013 – Dec. 2016

### Master of Research (With Distinction)

*University of Glasgow*  
Major: Marine and Freshwater Ecology and Environmental Management  
Dissertation 1: Lipid composition of oil extracted from Norway lobster (*Nephrops norvegicus*) heads and comparison with oil extracted from Antarctic krill (*Euphausia superba*)  
Dissertation 2: Effect of habitat characteristics on the distribution and abundance of damselfish within a Red Sea reef  
Supervisors: Prof. Douglas M. Neil, Prof. David M. Bailey

Glasgow, Scotland  
Sept. 2010 – Nov. 2011

## Bachelor of Arts (Cum Laude)

Boston University

Boston, MA, USA

Aug. 2003 – May 2007

Major: Biology with a specialization in Marine Sciences/Minor: Photojournalism

Dissertation: Effect of light and salinity on recovery of injuries in the Scleractinian coral *Pocillopora damicornis*

Supervisor: Prof. Les S. Kaufman

## TRAINING COURSES

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### Pathways to Scientific Teaching

UC San Diego

Certificate in Scientific Teaching for Undergraduate Education

San Diego, CA USA

Jan. 2018 – April 2018

### Fish Swimming

Friday Harbor Laboratories

Specialized training course in fish kinematics, ecomorphology, behavior & environmental physiology

Friday Harbor, WA, USA

July – Aug. 2013

## PUBLICATIONS

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**Nadler LE**, Killen SS, Domenici P, McCormick MI. (2018) Role of water flow regime in the swimming behaviour and escape performance of a schooling fish. *Biology Open*. 7: bio031997. DOI: 10.1242/bio.031997

\*Article featured in the “First person” series in *Biology Open*

Pratchett MS, Cowan ZL, **Nadler LE**, Hoey AS, Messmer V, Ling SD. (2017) Body size and substrate type modulate movement by the western Pacific crown-of-thorns starfish, *Acanthaster solaris*. *PLoS One*. 12: e0180805.

DOI: 10.1371/journal.pone.0180805

Pratchett MS, Caballes CF, Wilmes JC, Matthews S, Mellin C, Sweatman HPA, **Nadler LE**, Brodie J, Thompson CA, Hoey J, Bos AR, Byrne M, Messmer V, Fortunato SAV, Chen CCM, Buck ACE, Babcock RC, Uthicke S. (2017) Thirty years of research on crown-of-thorns starfish (1986-2016): Scientific advances and emerging opportunities. *Diversity*. 9: 41. DOI: 10.3390/d9040041

Killen SS, Marras S, **Nadler LE**, Domenici P. (2017) The role of physiological traits in assortment among and within fish shoals. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 372:20160233. DOI: 10.1098/rstb.2016.0233

Albalat A, **Nadler LE**, Foo N, Dick JR, Watts AJR, Philp H, Neil DM, Monroig O. (2016) Lipid composition of oil extracted from wasted Norway lobster (*Nephrops norvegicus*) heads and comparison with oil extracted from Antarctic krill (*Euphasia superba*). *Marine Drugs*. 14:219. DOI: 10.3390/md14120219

**Nadler LE**, Killen SS, McCormick MI, Watson S-A, Munday PL. (2016) Effect of elevated carbon dioxide on shoal familiarity and metabolism in a coral reef fish. *Conservation Physiology*. 4: cow052. DOI: 10.1093/conphys/cow052

**Nadler LE**, Killen SS, McClure EC, Munday, PL, McCormick MI. (2016) Shoaling reduces metabolic rate in a gregarious coral reef fish species. *Journal of Experimental Biology*. 219: 2802-2805. DOI: 10.1242/jeb.139493

\*Article featured on the journal cover and in the “Inside JEB” popular science section

Palacios MM, Killen SS, **Nadler LE**, White JR, McCormick MI. (2016) Top predators negate the effect of mesopredators on prey physiology. *Journal of Animal Ecology*. 85: 1078-1086. DOI: 10.1111/1365-2656.12523

Snyder S, **Nadler LE**, Bayley JS, Svendsen MBS, Johansen JL, Domenici P, Steffensen JF. (2016) Effects of closed *v.* intermittent-flow respirometry on hypoxia tolerance in the shiner perch *Cymatogaster aggregata*. *Journal of Fish Biology*. 88: 252-264. DOI: 10.1111/jfb.12837

**Nadler LE**, McNeill DC, Alwany MA, Bailey DM. (2014) Effect of habitat characteristics on the distribution and abundance of damselfish within a Red Sea reef. *Environmental Biology of Fishes*. 97: 1265-1277. DOI: 10.1007/s10641-013-0212-9

Schacter CR, Albright LB, Dubofsky EA, Fitzsimmons JN, Focht R, **Nadler LE**, Sandercock M, Taylor L, Walfoort D, Whitten T, Williams LJ, Rosenthal GG. (2014) Risk-sensitive resource defense in a territorial reef fish. *Environmental Biology of Fishes*. 97: 813-819. DOI: 10.1007/s10641-013-0181-z

*Reports:*

**Nadler LE**, Doo S, Madin EMP, Watson S-A. (2016) Science-based policy plan for Australia's coral reefs. *Australian Coral Reef Society submission*. Invited policy document for the Office of Hon Bill Shorten MP, Leader of the Australian Labor Party.

*Popular science:*

**Nadler LE**. (in press) Serotonin: Octopus love potion? *Journal of Experimental Biology* (Outside JEB section).

**Nadler LE**. (2014) Fish schools: Not all seats in the class are equal. *Naked Scientists*.

*In review/revision:*

**Nadler LE**, Killen SS, McCormick MI. (in review) Evidence of physiological assortment among wild schools of a coral reef fish. *Marine Biology*.

Killen SS, **Nadler LE**, Grazioso K, Cox A, McCormick MI. (in review) The effect of minimum and maximum metabolic rate on sociability and choice of social group size in a coral reef fish. *Physiology and Behavior*.

Johansen JL\*, **Nadler LE\***, Habary A, Bowden AJ, Rummer JL. (in revision) Thermal acclimation of tropical fishes to global warming: coordinated responses of multiple physiological performance traits over time. *Global Change Biology*.

\*These authors contributed equally to this manuscript

*To be submitted (within three months):*

**Nadler LE**, Domenici P, Johansen JL, McCormick MI. Familiarity improves fast-start escape performance in schooling fish. Target journal: *Proceedings of the National Academy of Sciences*.

**Nadler LE**, Bengston E, Eliason EJ, Hassibi C, Helland-Riise SH, Johansen IB, Kwan GT, Øverli Ø, Tresguerres M, Turner AV, Weinersmith KL, Hechinger RF. How a brain-infecting parasite alters energy metabolism in a shoaling fish: implications for conditioned fear responses and mechanisms of behavior-modification. Target journal: *Proceedings of the Royal Society of London B: Biological Sciences*.

**Nadler LE**, Binning SA, Domenici P, Johansen IB, Killen SS, Øverli Ø. Role of directly versus indirectly transmitted pathogens in the tradeoffs of sociality. Target journal: *Journal of Animal Ecology*.

## PRESENTATIONS

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**Nadler LE**, Ellis HI, Nelson A, Turner AV, Williams CL, Øverli Ø, Hechinger, RF. (invited speaker, Aug. 2019) Can parasites indirectly benefit final hosts? The role of behavioural manipulation and trophic transmission in the energetic tradeoffs of a host-parasite system. 10th International Congress of Comparative Physiology and Biochemistry. Ottawa, Canada.

**Nadler LE**, Ellis HI, Nelson A, Turner AV, Williams CL, Øverli Ø, Hechinger, RF. (accepted talk, Jan. 2019) Are parasites always detrimental? Costs of infection to final hosts that forage on prey modified by parasites. Society for Integrative and Comparative Biology 2019 Annual Meeting. Tampa, Florida.

**Nadler LE**, Bengston E, Eliason EJ, Hassibi C, Helland-Riise SH, Johansen IB, Kwan GT, Øverli Ø, Tresguerres M, Turner AV, Weinersmith KL, Hechinger RF. (2018) How a brain-infecting parasite alters energy metabolism in a shoaling fish. Society for Experimental Biology annual conference. Florence, Italy.

\*Session chair for "Open animal biology"

**Nadler LE**, Cox A, Domenici P, Killen SS, McCormick MI, Munday PL, Pratchett MS, Watson, S-A. (2017) The effect of elevated CO<sub>2</sub> on swimming performance and schooling in a coral reef species. Society for Experimental Biology annual conference. Gothenburg, Sweden.

**Nadler LE**, Killen SS, Watson SA, Munday PL, McCormick MI. (2016) Shoaling reduces metabolic rate in a gregarious coral reef fish species. Society for Experimental Biology annual conference. Brighton, United Kingdom.

\*Session chair for “The role of individual variation in the behaviour of animal groups”

**Nadler LE**, Killen SS, Watson SA, Munday PL, McCormick MI. (2016) Shoaling reduces metabolic rate in a gregarious coral reef fish species. 13<sup>th</sup> International Coral Reef Symposium. Honolulu, Hawaii, USA.

**Nadler LE**, Killen SS, Domenici P, Munday PL, McCormick MI. (2015) Go with the flow: Flow rate modulates metabolism and escape response in fish shoals on coral reefs. Behaviour2015 Conference. Cairns, QLD, Australia.

**Nadler LE**, Killen SS, Domenici P, Munday PL, McCormick MI. (2015) Metabolism and habitat modulate assorting and escape responses in fish schools on coral reefs. 89<sup>th</sup> Australian Coral Reef Society Conference. Daydream Island, QLD, Australia.

**Nadler LE**, Killen SS, Domenici P, Munday PL, McCormick MI. (2015) Metabolism and habitat modulate assorting and escape responses in fish schools on coral reefs. Society for Experimental Biology annual conference. Prague, Czech Republic.

**Nadler LE**, Domenici P, Johansen JL, Munday PL, McCormick MI. (2014) Fish with friends: Effect of familiarity on schooling behaviour in coral reef fish. Society for Experimental Biology annual conference. Manchester University, Manchester, England.

**Nadler LE**, Domenici P, Johansen JL, Munday PL, McCormick MI. (2014) Fish with friends: Effect of familiarity on schooling behaviour in coral reef fish. International Society for Behavioral Ecology biennial conference. Hunter College, New York, NY, USA. (poster)

**Nadler LE**, Domenici P, Johansen JL, Munday PL, McCormick MI. (2014) Fish with friends: Effect of familiarity on schooling behaviour in coral reef fish. 51st Annual Conference of the Animal Behavior Society. Princeton University, Princeton, NJ, USA.

**Nadler LE**, Domenici P, Johansen JL, Munday PL, McCormick MI. (2014) Fish with friends: Effect of familiarity on schooling behaviour in coral reef fish. 88th Australian Coral Reef Society Conference. Brisbane, QLD, Australia.

**Nadler LE**, Albalat A, Edrada-Ebel R, Neil D. (2011) Metabolomics of different tissues from the Norway lobster, *Nephrops norvegicus*: A first approach to determine uses for fishery waste and biomarkers of environmental health in a crustacean. 9th International Conference and Workshop on Lobster Biology & Management. Bergen, Norway. (poster)

**Nadler LE**, Albalat A, Edrada-Ebel R, Neil D. (2011) Metabolomics of different tissues from the Norway lobster, *Nephrops norvegicus*: A first approach to determine uses for fishery waste and biomarkers of environmental health in a crustacean. Marine Alliance for Science and Technology Annual Science Meeting. Oban, Scotland, UK. (poster)

**Nadler LE**, Moore MS, Kunz TH. (2006) Ecological influences on rabies infections in the big brown bat, *Eptesicus fuscus*. Boston University Research Symposium. Boston University. Boston, MA, USA. (poster)

## **GRANTS, FELLOWSHIPS & AWARDS**

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2017 1. Society for Experimental Biology Travel Grant (£170)

2016 1. Company of Biologists Travelling Fellowship (£2500 – declined)  
2. Society for Experimental Biology Young Scientist Award - winner

\*Awarded for talk entitled “Shoaling reduces metabolic rate in a gregarious coral reef fish species”

3. Society for Experimental Biology Travel Grant (£250)
  4. Company of Biologists Travel Grant (£400)
  5. Australian Coral Reef Society Travel Fellowship (\$500AU)
- 2015
1. Society for Experimental Biology Young Scientist Award – finalist  
\*Finalist for talk entitled “Metabolism and habitat characteristics modulate collective escape responses in fish schools on coral reefs”
  2. James Cook University Graduate Research Scheme Grant (\$2,400AU)
  3. Lizard Island Reef Research Foundation International Travel Grant (\$4,000AU)
- 2014
1. Australian Coral Reef Society Student Presentation Award  
\*Awarded for talk entitled “Fish with friends: Effect of familiarity on schooling behaviour in a coral reef fish”
  2. Australian Coral Reef Society Conference Travel Grant (\$380AU)
  3. Company of Biologists Travel Grant (£500)
  4. Society for Experimental Biology Travel Grant (£320)
  5. James Cook University Graduate Research Scheme Grant (\$2,000AU)
  6. Great Barrier Reef Marine Park Authority Science for Management Award (\$1,000AU)
  7. Lizard Island Reef Research Foundation Doctoral Fellowship (\$16,000AU)
- 2013
1. Friday Harbor Laboratory Ragen Scholarship (\$2,000US)
  2. Endeavour International Postgraduate Research Scholarship (\$75,000AU)
  3. Australian Postgraduate Award (\$96,000AU)
- 2011
1. Gilchrist Education Trust Expedition Grant (£500)
  2. Royal Geographical Society (with IBG) Fieldwork Grant (£500)
  3. Blodwen Lloyd-Binns/Glasgow Natural History Society Grant (£800)
- 2006
1. Boston University Undergraduate Research Opportunities Grant (\$2,400US)

## **TEACHING & MENTORING**

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- 2018 Co-Advisor to Angelique Hoffman (Honors student, James Cook University)  
Topic: Transgenerational acclimation of metabolism to elevated temperature in coral reef fish
- Supervisor for four Undergraduate Interns (Scripps Institution of Oceanography)  
Trained and oversaw analysis of videos examining the role of parasites in predator-prey interactions.
- 2017 Guest Lecturer for “Current Research in Marine Biology” (Scripps Institution of Oceanography)  
Created and presented a lecture on social behavior in coral reef fishes.

Mentor for Independent Study for Undergraduates (Scripps Institution of Oceanography)

Mentored an undergraduate student in the design, execution, analysis, and write-up of independent research for course credit.

Mentor for the Summer Training Academy for Research Success (STARS; UC San Diego)

Mentored two STARS fellows through their eight-week summer fellowship, designed to provide rigorous research opportunities to community college students from around the country.

Supervisor for 12 Undergraduate Interns (Scripps Institution of Oceanography)

Trained and oversaw 12 undergraduate interns in the full husbandry protocol for shoals of the California killifish and snail mudflat mesocosms.

2016 Course Coordinator and Lecturer for “Coastal and Catchment Geomorphology” (James Cook University)  
Designed the course curriculum, including planning and executing a trip into the field to teach research techniques. Created and presented weekly lectures and practicals. Graded assignments and exams associated with this coursework.

Teaching Assistant for “Marine Ecology & Environmental Assessment” (James Cook University)

Oversaw in-class practical work, moderated discussions, and graded assignments.

2015 Mentor for the Independent Study Program (School for International Training)

Mentored one undergraduate student through the design, execution, analysis, and write-up of independent research during a study abroad program at the Lizard Island Research Station, on the Great Barrier Reef, Australia.

2007 Teaching Assistant for “Vertebrate Zoology” (Boston University)

Created and presented a lecture on vertebrate locomotion. Oversaw in-class practical work and exams.

## **SERVICE & LEADERSHIP**

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**Vice Chair of Web and Social Media Engagement**

*UC San Diego Postdoctoral Association (PDA)*

San Diego, CA USA

Jan. 2017 – April 2018

- Led the committee running the PDA’s web and social media activities, including the website, LinkedIn, Twitter, Facebook, and Instagram. Personally ran the PDA Twitter, Facebook, and Instagram accounts.

**Committee Member**

*Expanding Your Horizons (EYH) - San Diego branch*

San Diego, CA USA

Feb. 2017 – present

- Help organize and run hands-on workshops locally for high school and undergraduate aged women interested in careers in science, technology, engineering, and math (STEM).

**Councilor & Social Media Coordinator**

*Australian Coral Reef Society (ACRS)*

Townsville, Australia

June 2014 – June 2016

- Helped in the planning and execution of all ACRS events (including the annual conference) and ran the society’s social media outlets (Facebook and Twitter).

**Delegate**

*Science Meets Parliament*

Canberra, Australia

Feb. 2016

- Worked with Australian politicians to teach them about my research and its implications. Met with Hon Bill Shorten MP (Leader of the Opposition in the Parliament of Australia) and Hon Warren Entsch MP (Member of Parliament for Cairns, Queensland) to advise on policies to aid in the resiliency of Australia’s coral reefs.

**Graduate Student Committee**

*ARC Centre of Excellence for Coral Reef Studies*

Townsville, Australia

January – December 2015

- Worked with a committee of graduate students to plan training, career mentoring, and social events.

- Worked with the university administration to establish policies that promoted graduate student success

## SKILLS & PROFESSIONAL SERVICES

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- **Laboratory experience:** Intermittent-flow respirometry, Carbonate chemistry, CO<sub>2</sub> administration, Temperature-controlled studies, Swim tunnel technology, Visual implant elastomer tagging, High performance liquid chromatography, Tissue cryosectioning, Parasitology
- **Field experience:** 3D Stereo-camera techniques, SCUBA and snorkel survey techniques, Fish collection using: barrier nets, the clove oil extraction technique, seines
- **Analytical techniques:** Linear and non-linear modeling, Mixed effects linear and non-linear modeling, proficiency with programming language R
- **Certifications:** SSI Dive Control Specialist, Emergency First Responder (First Aid and CPR), Emergency Oxygen Administration, Australian Recreational Boat License, Scientific Teaching
- **Journal reviewer for:** *Proceedings of the Royal Society B* (Impact Factor: 4.85), *PLoS One* (Impact Factor: 2.77), *Journal of Experimental Biology* (Impact Factor: 3.18), *Coral Reefs* (Impact Factor: 3.10), *Marine Biology* (Impact Factor: 2.22), *The Science of Nature - Naturwissenschaften* (Impact Factor: 1.79), *Marine Ecology Progress Series* (Impact Factor: 2.28)
- **Professional memberships:** Society for Experimental Biology, Society for Integrative and Comparative Biology, Australian Coral Reef Society, International Society for Reef Studies, Society for Women in Marine Science, American Association for the Advancement of Science

## SELECTED INTERNATIONAL MEDIA OUTREACH

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- Scientific social media engagement via Twitter (@LaurenNadler, 1241 followers) and Instagram (@lauren.e.nadler, 276 followers)
- NRK TV (Norwegian National TV): “Latterlig Smart” (translates to “Ridiculously Smart”) with Erlend Osnes: Standup comedy about parasites, 21 November 2018
- ABC news: Damsel fish feel distress when separated from their 'friends', JCU researchers find, 22 September 2016
- Eco Magazine: Coral Fish Stress, Lose Weight When Separated from 'Shoal-Mates', 26 September 2016
- Brisbane Times: Baby fish less stressed around large ocean predators, 26 April 2016
- The Atlantic: Ocean acidification could be creating friendless fish, 1 July 2014
- Mother Jones: We're screwing up the oceans so much, these fish can't find their BFFs, 1 July 2014
- Science Daily: Climate change could stop fish finding their friends, 30 June 2014
- Others: MSN, Deutschlandfunk (German public radio), ABC Queensland Radio, Naked Scientist, Grist.org

## REFERENCES

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### Professor Ryan Hechinger

Scripps Institution of Oceanography

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### Professor Mark McCormick

James Cook University

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### Dr. Shaun Killen

University of Glasgow

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### Dr. Øyvind Øverli

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