

# SARAH J. NANCOLLAS

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## EDUCATION

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|-------------------|--|------|
| <b>PhD</b>        | <b>Animal Biology</b> University of California, Davis, USA   | 2023 |
|                   | Dissertation: Hot days and Heatwaves: How Environmental Complexity Shapes the Physiological Responses of Mussels to Climate Change<br>Advisor: Dr. Anne Todgham                  |      |
| <b>MSc</b>        | <b>Biology</b> Memorial University of Newfoundland, Canada   | 2020 |
|                   | Thesis: The Importance of Tidal Acclimation When Assessing the Physiological Responses of <i>Carcinus maenas</i> to Environmental Stressors<br>Advisor: Dr. Iain McGaw           |      |
| <b>BSc (Hons)</b> | <b>Marine Biology</b> University of Plymouth, UK   | 2012 |
|                   | Thesis: Nature vs Nurture: Understanding the Role of Environmental Conditions and Maternal Care in Shaping Thermal Performance in Marine Amphipods<br>Advisor: Prof. John Spicer |      |

## PUBLICATIONS

### Book Chapters

1. **Nancollas, S.J.**, Spicer, J.S., (2024). Chapter 9: Emersion and Hypoxia. In McGaw & Weihrauch (Eds.), *Ecophysiology of the green shore crab Carcinus maenas and closely related species*. 1<sup>st</sup> Edition. Elsevier.

### Peer-Reviewed Journals

12. **Nancollas, S. J.**, & Todgham, A. E. (In press). Understanding the role of habitat, thermal predictability, and food availability in shaping the thermal performance of the California mussel. *Marine Ecology Progress Series*.
11. Haworth, L., **Nancollas, S. J.**, Landa, S., Todgham, A. E., & Tanner, R. (In press). Invasion stress mitigates climate stress in brackish marsh amphipod. *Journal of Applied Ecology*.
10. **Nancollas, S. J.**, & Todgham, A. E. (2022). The influence of stochastic temperature fluctuations in shaping the physiological performance of the California mussel, *Mytilus californianus*. *Journal of Experimental Biology*, 225(14), jeb243729.  
**Featured media spotlight:** Knight, K. (2022). Unpredictability is key for mussels' seashore resilience. *Journal of Experimental Biology*, 225 (14), jeb244718.
9. **Nancollas, S. J.**, & McGaw, I. J. (2021). Acclimation to tidal conditions alters the physiological responses of the green shore crab, *Carcinus maenas*, to subsequent emersion. *Journal of Experimental Biology*, 224 (15), jeb242220.

8. **Nancollas, S. J.**, & McGaw, I. J. (2021). The role of tidal acclimation on the physiological responses of the green shore crab, *Carcinus maenas*, to thermal stress. *Journal of Experimental Marine Biology and Ecology*, 545, 151630.
7. McGaw, I. J., & **Nancollas, S. J.** (2021). Patterns of heart rate and cardiac pausing in unrestrained resting decapod crustaceans. *Journal of Experimental Zoology Part A: Ecological and Integrative Physiology*, 335(8), 678-690
6. Wilson, C. H., **Nancollas, S. J.**, Rivers, M. L., Spicer, J. I., & McGaw, I. J. (2021). Effects of handling during experimental procedures on stress indices in the green shore crab, *Carcinus maenas* (L). *Marine and Freshwater Behaviour and Physiology*, 54(2), 65-85.
5. Sheehan, E. V., Bridger, D., **Nancollas, S. J.**, & Pittman, S. J. (2020). PelagiCam: A novel underwater imaging system with computer vision for semi-automated monitoring of mobile marine fauna at offshore structures. *Environmental Monitoring and Assessment*, 192(1), 11.
4. McGaw, I. J., & **Nancollas, S. J.** (2018). Experimental setup influences the cardiovascular responses of decapod crustaceans to environmental change. *Canadian Journal of Zoology*, 96(9), 1043-1052.
3. Jackson, E. L., Cousens, S. L., Bridger, D. R., **Nancollas, S. J.**, & Sheehan, E. V. (2016). Conservation inaction in action for Essex seagrass meadows?. *Regional Studies in Marine Science*, 8, 141-150.
2. Sheehan, E.V., Vaz, S., Pettifer, E., Foster, N.L., **Nancollas, S.J.**, Cousens, S., Holmes, L., Facq, J.V., Germain, G. and Attrill, M.J. (2016). An experimental comparison of three Towed Underwater Video Systems using species metrics, benthic impact and performance. *Methods In Ecology And Evolution*, 7(7).843-852.
1. Sheehan, E. V., Cousens, S. L., **Nancollas, S. J.**, Stauss, C., Royle, J., & Attrill, M. J. (2013). Drawing lines at the sand: Evidence for functional vs. visual reef boundaries in temperate Marine Protected Areas. *Marine Pollution Bulletin*, 76(1), 194-202.

### Manuscripts in Preparation

3. **Nancollas, S. J.**, & Todgham, A. E. Heatwaves in the intertidal zone: How habitat, thermal predictability, and food availability structure the physiological responses of the California mussel to repeated thermal stress events. *Planned submission to Global Change Biology in Oct 2024.*
2. Shukla, P., **Nancollas, S. J.**, Burge, C., & Grosholz, E. Stress Hardening Selectively Influences the Responses of Three Commercially Important Oyster Species to a Simulated Marine Heatwave.
1. Shukla, P., **Nancollas, S. J.**, Burge, C., & Grosholz, E., Stress Hardening May Impact Pacific Oyster (*Magallana gigas*), but not Kumamoto Oyster (*Crassostrea sikamea*), Responses to an OshV-1 Outbreak in Tomales Bay, CA.

### RESEARCH EXPERIENCE

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**Postdoctoral Scholar**, Todgham Lab, UC Davis, USA

2023-Present

Developing high throughput phenotyping of early developmental stages of shellfish and fishes with the goal to better characterize the changes in development and physiological performance of early life stages of organisms to environmental stressors.

- PhD student**, Todgham Lab, UC Davis, USA 2018-2023  
Using metabolic and biochemical techniques to understanding how natural unpredictable temperature fluctuations interact with various environmental stressors to shape physiological performance of marine mussels to acute and chronic (heatwave) thermal stress. Created innovative experimental design systems to control multiple environmental factors using Arduino microcontrollers.
- MSc Student**, McGaw Lab, Memorial University of Newfoundland, Canada 2015-2017  
Understanding the role of tidal air exposure in shaping the physiological responses to other environmental stressors focusing on whole organismal physiological measures.
- Project Support Officer**, University of Plymouth, UK 2012-2015  
Investigating how Marine Protected Areas aide the recovery and conservation of temperate marine assemblages. Involved several months of inshore and offshore boat field work deploying towed and baited camera arrays, as well as infauna cores. Role included extensive video analysis and writing reports, as engaging with multiple stakeholders (fishers, government) and outreach.
- Biologist Intern**, National Marine Aquarium, UK 2012  
Animal husbandry and system maintenance of all tropical tanks. Implemented growth rate project to understand in white spotted eagle rays.
- Laboratory Assistant**, NERC project, University of Plymouth 2010-2012  
Assistant in the construction and maintenance of experimental systems during my undergraduate degree. Ran a number of experiments investigating physiological tolerance of amphipods to environmental stressors.

## SELECTED CONFERENCE PRESENTATIONS

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\* Oral # Poster

12. **Nancollas, S.J.#**, Todgham, A.E. 2023. Does a hot day equal a heatwave? Comparing physiological performance of *Mytilus californianus* to acute and multiday thermal stress events. Society of Experimental Biology Annual Meeting. Edinburgh, UK.
11. **Nancollas, S.J.#**, Todgham, A.E. 2023. In the hot seat: How multiple environmental drivers shape physiological performance of mussels in a warming world. Society of Experimental Biology Annual Meeting. Edinburgh, UK.
10. **Nancollas, S.J.\***, Todgham, A.E. 2022. Heatwaves in the intertidal: How microhabitat, thermal unpredictability, and food availability shape food availability in mussels. 4<sup>th</sup> International Symposium for advances in Marine Mussel Research. Exeter, U.K.
9. **Nancollas, S.J.\***, Todgham, A.E. 2022. Heatwaves in the intertidal: How microhabitat, thermal unpredictability, and food availability shape food availability in mussels. American Physiological Society, Comparative Physiology: From Omics to Organisms in an Uncertain World. San Diego, California.
8. **Nancollas, S.J.\***, Todgham, A.E. 2022. Heatwaves in the intertidal: How microhabitat, thermal unpredictability, and food availability shape food availability in mussels. Society of Experimental Biology Annual Meeting. Montpellier, France.

7. **Nancollas, S.J.\***, Todgham, A.E. 2021. The influence of stochastic temperature fluctuations in shaping the physiological performance of the California mussel, *Mytilus californianus*. Society of Experimental Biology Annual Meeting (*Virtual due to Covid-19*).
6. **Nancollas, S.J.\***, Todgham, A.E. 2021. The influence of stochastic temperature fluctuations in shaping the physiological performance of the California mussel, *Mytilus californianus*. Marine Biological Association Annual Meeting (*Virtual due to Covid-19*).
5. **Nancollas, S.J.#**, McGaw, I.J. 2018. The importance of tidal acclimation when assessing the physiological responses of *Carcinus maenas* to emersion. American Physiological Society Annual Meeting. New Orleans.
4. **Nancollas, S.J.\***, McGaw, I.J. 2018. The importance of tidal acclimation when assessing the physiological responses of *Carcinus maenas* to emersion. Canadian Society of Zoologist Annual Meeting. Winnipeg, MB.
3. **Nancollas, S.J.#**, McGaw, I.J. 2017. The importance of tidal acclimation when assessing the physiological responses of *Carcinus maenas* to environmental stressors. Biology Graduate Student Association Annual Meeting. St John's, NL.
2. **Nancollas, S.J.#**, McGaw, I.J. 2016. Green with envy: Uncovering the secrets to green crabs' invasive success. International Marine Conservation Congress. St John's, NL.
1. **Nancollas, S.J.#**, McGaw, I.J. 2016. The importance of tidal acclimation when assessing the physiological responses of *Carcinus maenas* to emersion. Biology Graduate Student Association Annual Meeting. St John's, NL.

## INVITED SYMPOSIUM PRESENTATIONS & SEMINARS

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### Invited Symposium Presentations

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|------|--|
| 2023 | University of Plymouth: Symposium: <i>The Future of Comparative Physiology</i> , Plymouth, UK. Invited symposium speaker.        |
| 2021 | The Malacological Society of London: Symposium: <i>Molluscs in Extreme Environments</i> . London, UK. (virtual due to COVID-19). |

### Invited Seminars

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| 2016 | MPA management: The path to recovery in Lyme Bay. Department of Ocean Sciences Seminar Series, Memorial University of Newfoundland, St. John's, Canada |
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## GRANTS AND AWARDS

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| 2023 | Graduate Studies Travel Award, UC Davis ( <b>\$1500</b> )   |
| 2022 | Henry A. Jastro Graduate Research Award, UC Davis ( <b>\$3000</b> )   |
| 2022 | Graduate Program Fellowship – Animal Biology, UC Davis ( <b>\$900</b> )   |
| 2022 | Hart, Cole & Goss Fellowship, UC Davis ( <b>\$4500</b> )  |
| 2021 | Best Poster (2 <sup>nd</sup> ), Electronics session, 2021 Society of Experimental Biology Annual Meeting ( <b>\$100</b> ) |
| 2021 | Ursula Knight Abbot award, UC Davis ( <b>\$6600</b> )   |
| 2021 | Graduate Program Fellowship – Animal Biology, UC Davis ( <b>\$4200</b> )  |

2021	Hart, Cole & Goss Fellowship, UC Davis ( <b>\$4200</b> )
2021	Henry A. Jastro Graduate Research Award, UC Davis ( <b>\$3000</b> )
2020	Graduate Program Fellowship – Animal Biology, UC Davis ( <b>\$7300</b> )
2020	Hart, Cole & Goss Fellowship, UC Davis ( <b>\$4500</b> )
2020	Henry A. Jastro Graduate Research Award, UC Davis ( <b>\$3000</b> )
2018	Graduate Program Fellowship – Animal Biology, UC Davis ( <b>\$1800</b> )
2017	Graduate Student Development Award, Awarded to Ocean Sciences Graduate Student Association (CA <b>\$2500</b> )
2016	Graduate Student Development Award, Awarded to Ocean Sciences Graduate Student Association (CA <b>\$1800</b> )
2012	Dean’s list, Biological Sciences, University of Plymouth
2011	Dean’s list, Biological Sciences, University of Plymouth
2010	Dean’s list, Biological Sciences, University of Plymouth
2010	Marine Biology Internship Award, University of Plymouth ( <b>£600</b> )

## PROFESSIONAL MEMBERSHIP

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2020 - Present                      Society of Experimental Biology

## TEACHING AND MENTORSHIP EXPERIENCE

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**Teaching Assistant**, Multiple Courses, UC Davis – In person, hybrid, and virtual through zoom                      2018-2023

Part time positions each at 20 hrs/week

**Summary of responsibilities:** Lecturing to a range of class sizes (24 – 300) in both lower and upper division courses; creating content for lectures, labs, and examinations; running review sessions, discussion sessions, and lab sections; grading (lab reports, coursework, and exams), holding office hours, proctoring exams.

### Undergraduate Courses Taught

Animal Physiology (ANS100, Spring 2019)  
 Animal Biochemistry and Metabolism (ANS103, Winter 2022)  
 Introduction to Ecology (BIS 2B, Spring 2021, Winter 2023)  
 Companion Animal Care and Management (ANS 142, Fall 2022)

### STUDENT COURSE EVALUATIONS AT UC DAVIS

*\*Scores based on a scale of 1-5, 5 = Excellent, 1 = Poor*

Quarter	Course	Units	Enrollment	Number of Evaluations	Mean Score of Evaluations of Teaching Effectiveness
Winter 2023	BIS 2B	5	48	48	4.9
Fall 2022	ANS 142	5	59	36	4.6
Winter 2022	ANS 103	5	305	288	4.5
Spring 2021	BIS 2B	5	48	48	4.8
Spring 2019	ANS100	5	288	12	4.4

Part time positions each at 10 hrs/week

**Summary of responsibilities:** Setting up and assisting with lab sections, grading (lab reports and exams), proctoring exams.

Undergraduate Courses

Animal Physiology (BIOL 3401: Fall 2015;2016)

Cell Biology (BIOL 2250: Spring 2016; 2017)

Introduction to Biology (BIOL 1001: Fall 2015, 2016)

Introduction to Ecology and Evolution (BIOL613: Spring 2016; 2017)

**MENTOR TO JUNIOR SPECIALISTS, UNDERGRADUATE AND GRADUATE STUDENTS**

2017 - present     Mentored 12 individuals on a number of projects that included undergraduate and graduate theses. Mentorship contributions included training for biochemical protocols and laboratory techniques, training for intertidal fieldwork, advising conceptual and experimental aspects of theses, editing and feedback for grants/manuscripts, ongoing advisement for career progression. Mentorship positions have resulted in 3 co-authored publications where the student was first author. Names omitted on website CV for privacy.

**SERVICE AND OUTREACH**

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2024                **Mentor**, Folsom Lake College Internship Program

2023                **Workshop participant** – Understanding the role of phenomics in a changing world, Invited speaker/ contributor. Plymouth, UK

2022                **Conference Co-organiser**, 4th International Symposium for Advances in Marine Mussel Research, Exeter, UK.

2020-Present     **Lead Mentor**, Todgham lab, UC Davis

2018-Present     **Picnic Day Volunteer**, UC Davis

2016-Present     **Ad-Hoc reviewer**, Journal of Experimental Biology, Marine Biology, Comparative Biochemistry and Physiology Part B, Journal of Crustacean Biology, Science of the Total Environment, Northeastern Naturalist.

2020                **Mentor**, Coastal and Marine Sciences Institute, UC Davis

2018-2020        **Animal Biology Graduate Student Association Alternate Representative**, UC Davis

2015-2017        **Ocean Sciences Graduate Student Association Co-founder**, Ocean Sciences, MUN

2015-2017        **Ocean Sciences Graduate Student Association Treasurer**, Ocean Sciences, MUN

2015-2017        **Ocean Sciences Graduate Student Association Seminar Series Co-founder**, Ocean Sciences, MUN

2015-2017        **Ocean Sciences Graduate Student Association Seminar Series Organiser**, Ocean Sciences, MUN

2016                **Conference Volunteer**, International Marine Conservation Congress, St John's, NL.

2015                **Ocean Outreach Coordinator**, Jurassic Coast Fest

2009-2012        **Student Ambassador**, University of Plymouth, UK

2010                **Marine Fisheries Consultant**, Fish2Fork

## **TECHNICAL SKILLSETS**

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### Laboratory

- Protein quantification (BCA and Bradford methods)
- Western blotting and gel electrophoresis
- Enzyme activity assays – spectrophotometric method (MDH, LDH)
- Metabolite extraction and quantification (Glucose, glycogen, lactate, succinate)
- Hemocyanin/haemoglobin quantification
- Blood gas analysis – including venous pH, partial pressure of oxygen and carbon dioxide (PaO<sub>2</sub> and PvCO<sub>2</sub>)

### Experimental

- Creating innovative experimental design systems
  - Plumbing, framing, construction, electrical (wiring and soldering)
- Animal husbandry (for a variety of species, including mussels, crabs, and fish)
- Environmental manipulations
  - Unpredictable and predictable temperature manipulation
  - Thermal ramps for CTMax
  - Hypoxia tolerance (Pcrit and LOE)
  - Food availability
  - Water height for tidal patterns
- Developed automated control of system manipulations using microcontrollers
- Morphometric measurements (variety of species)
- Whole animal respirometry
- Heart rate measurements and analysis

### Fieldwork

- Intertidal and subtidal collections of a variety of species
- Installation of experimental hardware in the intertidal and subtidal
- Intertidal biodiversity sampling (quadrat and transect)
- 800+ hours inshore and offshore boat experience
- Offshore fauna collections
- Deployment of towed and baited and video arrays
- Plankton sampling

### Computing

- Statistical: R, Prism, Sigmaplot, Minitab, PRIMER
- Programming: R, C++; Currently learning: Python, Git and Github
- Video analysis for biodiversity quantification (manually and using motion meercat)
- Arc GIS (beginner), Hypack hydrographic survey software
- Microsoft office suite
- Zoom

### Logistical

- Driver's license for UK (Class C), Canada (Newfoundland, Class 5), and USA (California, Class C)