

---

---

## JODIE L. RUMMER

---

---

Citizenship: American  
Residency: Australia & USA

jodie.rummer@jcu.edu.au  
www.jodierummer.com

---

### EDUCATION:

---

---

**Ph.D. in Zoology** November 2010  
University of British Columbia, Vancouver, B.C. CANADA

Dissertation Title: A novel mechanism for enhancing tissue oxygen delivery in teleost fishes

**M.S. in Biology** June 2004  
University of West Florida, Pensacola, FL USA

Thesis Title: Physiological and anatomical effects of swimbladder overexpansion and catastrophic decompression on red snapper, *Lutjanus campechanus*

**B.S. in Marine Biology (honours)** August 1999  
University of West Florida, Pensacola, FL USA

---

### CURRENT POSITIONS & HONOURS:

---

---

**Senior Research Fellow** (August 2014 – present)

**ARC Discovery Fellow (DECRA)** (January 2015 – December 2017)

ARC Centre of Excellence for Coral Reef Studies, James Cook University, AUSTRALIA

Supervisor: Prof. Terrance Hughes, Director

Responsibilities: Design and execute research aimed toward assessing the physiological effects of climate change on coral reef fish, communicate findings (scientific publications, media, and public outreach), and supervise post-graduate and honours students' research and thesis writing. Recent student completions: Dennis Heinrich (Honours, First Class), Alyssa Bowden (M.Sc., High Distinction), Sybille Hess (M.Sc., High Distinction), currently advising 2 Ph.D. & 5 M.Sc. students.

*2014–2015 Institut des Récifs Coralliens du Pacifique Research Fellow*

*2015 George A. Bartholomew distinguished young investigator in comparative physiology, biochemistry, and functional and integrative biology*

*2015 Lizard Island Reef Research Foundation Fellow*

---

### RESEARCH INTERESTS:

---

---

#### Ecological, Evolutionary, and Conservation Physiology in Fish

- The physiological performance indicators of stress, acclimation strategies
  - Environmental adaptations related to O<sub>2</sub>, CO<sub>2</sub> exchange, acid-base balance, and ionregulation
  - Evolution of life history strategies, distribution patterns, and biogeography
-

---

**AREAS OF SPECIALIZATION:**

---

- Hyperbaric, thermal, O<sub>2</sub>, CO<sub>2</sub>, pH, water balance, & ionregulation performance assays
- Blood sampling, surgical techniques, O<sub>2</sub> & pH microsensing fiber-optic technology
- Evolutionary reconstructions of physiological traits and phylogenetic comparisons

---

**PUBLICATIONS:**

---

**CHAPTERS IN BOOKS:**

- 30) **Rummer, J.L.**, Isom, L.L. 2014. Communicating Science. In Pritchard, P. & Grant, C. (eds.) Success Strategies from Women in STEM: A Portable Mentor, 2<sup>nd</sup> ed. Elsevier (In press).
- 29) Darling, E. **Rummer, J.L.**, 2014. Social Media. In Pritchard, P. & Grant, C. (eds.) Success Strategies from Women in STEM: A Portable Mentor, 2<sup>nd</sup> ed. Elsevier (In press).
- 28) **Rummer, J.L.**, 2014. Networking. In Pritchard, P. & Grant, C. (eds.) Success Strategies from Women in STEM: A Portable Mentor, 2<sup>nd</sup> ed. Elsevier (In press).
- 27) Brauner, C.J. and **Rummer, J.L.** 2011. Gas Transport and Exchange: Interaction Between O<sub>2</sub> and CO<sub>2</sub> Exchange. In: Farrell A.P., (ed.), Encyclopedia of Fish Physiology: From Genome to Environment, volume 2, pp. 916–920. San Diego: Academic Press. doi:10.1016/B978-0-1237-4553-8.00115-5
- 26) **Rummer, J.L.** Interacting factors affecting release mortality in red snapper with an emphasis on catastrophic decompression and swim bladder form and function. 2007. pp.123-144 in W.F. Patterson, III, J.H. Cowan, Jr., G.R. Fitzhugh, & D.L. Nieland, eds. Red Snapper Ecology & Fisheries in the U.S. Gulf of Mexico, American Fisheries Society Symp. 60, Bethesda, Maryland

**JOURNAL ARTICLES:**

- 25) Ferrari, M.C.O., Munday, P.L., **Rummer, J.L.**, McCormick, M.I., Corkill, K., Watson, S-A., Allan, B.J.M, Meekan, M.G., Chivers, D.P. 2014. Interactive effects of ocean acidification and rising sea temperatures alter prey mortality and predator selectivity in reef fish communities. *Global Change Biology* (accepted 17 Sept. 2014).
- 24) Heinrich, D.D.U., **Rummer, J.L.**, Morash, A.J., Watson, S-A., Simpfendorfer, C.A, Heupel, M.R., Munday, P.L. 2014. A product of its environment: The epaulette shark (*Hemiscyllium ocellatum*) exhibits physiological tolerance to elevated environmental CO<sub>2</sub>. *Conservation Physiology* 2, doi: 10.1093/conphys/cou047.

\*extensive media coverage

- 23) Bowden, A.J., Gardiner, N.M., Couturier, C.S., Stecyk, J.A.W., Nilsson, G.E., Munday, P.L., **Rummer, J.L.** 2014. Alterations in gill structure in tropical reef fishes as a result of elevated temperatures. *Comparative Biochemistry and Physiology - A* 175, 64-71. doi:10.1016/j.cbpa.2014.05.011
- 22) Killen, S.S, Mitchell, M.D., **Rummer, J.L.**, Chivers, D.P., Ferrari, M.C.O., Meekan, M., McCormick, M.I. 2014. Aerobic scope predicts dominance during early life in a tropical damselfish. *Functional Ecology* (Advanced online, 16 June 2014). doi:10.1111/1365-2435.12296
- 21) Munday, P.L., Cheal, A., Dixson, D.L., **Rummer, J.L.** Fabricius, K. 2014. Behavioural impairment in reef fishes caused by ocean acidification at CO<sub>2</sub> seeps. *Nature Climate Change* 4, 487-492. doi:10.1038/NCLIMATE2195 \*

\*extensive media coverage

- 20) Randall, D.J., **Rummer, J.L.**, Wilson, J.M. Wang, S., Brauner, C.J. 2014. Review: A unique mode of tissue oxygenation and the success of teleost fish. *Journal of Experimental Biology* 217, 1205-1214. doi:10.1242/jeb.093526
- 19) **Rummer, J.L.**, Couturier, C.S., Stecyk, J.A.W., Gardiner, N.M., Kinch, J.P., Nilsson, G.E., Munday, P.L. 2014. Life on the edge: Thermal optima for aerobic scope of equatorial reef fishes are close to current day temperatures. *Global Change Biology* 20(4):1055-66.\*  
\*extensive media coverage
- 18) **Rummer, J.L.**, Wang, S., Steffensen, J.F., Randall, D.J. 2014. Function and control of the fish secondary vascular system, a contrast to mammalian lymphatic systems. *Journal of Experimental Biology* 217(5):751-757. doi:10.1242/jeb.086348
- 17) **Rummer, J.L.**, McKenzie, D.J., Innocenti, A., Supuran, C.T., Brauner, C.J. 2013. Root effect haemoglobin may have evolved to enhance general oxygen delivery. *Science* 340, 1327-1329. doi:10.1126/science.1233692 \*  
\*extensive media coverage
- 16) Collins, G., Clark, T.D., **Rummer, J.L.**, Carton, A.G. 2013. Hypoxia tolerance is conserved across genetically distinct sub-populations of an iconic, tropical Australian teleost (*Lates calcarifer*) *Conservation Physiology* 1. doi:10.1093/conphys/cot029
- 15) **Rummer, J.L.**, Stecyk, J.A.W., Couturier, C.S., Watson, S-A., Nilsson, G.E., Munday, P.L. 2013. Elevated CO<sub>2</sub> enhances aerobic scope of a coral reef fish. *Conservation Physiology* 1, doi:10.1093/conphys/cot023
- 14) McLeod, I.M., **Rummer, J.L.**, Clark, T.D., Jones, G.P., Wenger, A.S., McCormick, M.I., Munday, P.L. 2013. Climate change and the performance of larval coral reef fishes: the interaction between temperature and food availability. *Conservation Physiology* 1. doi:10.1093/conphys/cot024
- 13) Couturier, C.S., Stecyk, J.A.W., **Rummer, J.L.**, Munday, P.L., Nilsson, G.E. 2013. Species-specific effects of near-future CO<sub>2</sub> on the respiratory performance of two tropical prey fish and their predator. *Comparative Physiology and Biochemistry - A* 166:482-489. doi:10.1016/j.cbpa.2013.07.025
- 12) Roche, D.G., Binning, S.A., Bosiger, Y., Johansen, J.L., **Rummer, J.L.** 2013. Finding the best estimates for metabolic rates in a coral reef fish. *Journal of Experimental Biology* 216, 2103-2110. doi:10.1242/jeb.082925
- 11) Dabruzzi, T.F., Fanguie, N.A., **Rummer, J.L.**, Bennett, W.A. 2013. Juvenile Ribbontail Stingray, *Taeniura lymma* (Forsskål, 1775) demonstrate a unique suite of physiological adaptations to survive hyperthermic nursery conditions. *Hydrobiologia* 701, 37-49.
- 10) **Rummer, J.L.**, Brauner, C.J. 2011. Plasma-accessible carbonic anhydrase at the tissue of a teleost fish may greatly enhance oxygen delivery: *in vitro* evidence in rainbow trout, *Oncorhynchus mykiss*. *Journal of Experimental Biology* 214, 2319-2328. doi:10.1242/jeb.054049 \*  
\*extensive media coverage
- 9) Wang, J., **Rummer, J.L.**, Niu, C.J., Xie, Z., Huang, C. Qian, Y., Liu, Y. 2011. Compensatory growth in juvenile Chinese three-keeled pond turtles, *Chinemys reevesii*. *Journal of the World Aquaculture Society* 42(1): 82-89. doi:10.1111/j.1749-7345.2010.00446.x
- 8) **Rummer, J.L.**, Roshan-Moniri, M., Balfry, S.K., Brauner, C.J. 2010. Use it or lose it? Sablefish, *Anoplopoma fimbria*, a species representing a fifth teleostean group where the  $\beta$ NHE associated with the red blood cell adrenergic stress response has been secondarily lost. *Journal of Experimental Biology* 213, 1503-1512. doi:10.1242/jeb.038844
- 7) Clark, T.D., **Rummer, J.L.**, Sepulveda, C.A., Farrell, A.P., Brauner, C.J. 2009. Reduced and reversed temperature dependence of blood oxygenation in an ectothermic scombrid fish: implications for the evolution of regional heterothermy? *Journal of Comparative Physiology B: Biochemical, Systems, and Environmental Physiology* 180:73-82. doi:10.1007/s00360-009-0388-7

- 6) **Rummer, J. L.**, Fangué, N. A. Jordan, H. L. Tiffany, B. N. Blansit, K. J. Galleher, S. Kirkpatrick, A. Kizlauskus, A. Pomory, C. M., Bennett, W. A. 2009. Physiological tolerance to hyperthermia and hypoxia and effects on species richness and distribution of rockpool fishes of Loggerhead Key, Dry Tortugas National Park. *Journal of Experimental Marine Biology and Ecology* 371(2):155-162. doi:10.1016/j.jembe.2009.01.015
- 5) Niu, C.J., **Rummer, J.L.** Brauner, C. J., Schulte, P.M. 2008. Heat shock protein (Hsp 70) induced by mild heat shock inhibits sharp plasma osmolarity increase upon seawater transfer in rainbow trout (*Oncorhynchus mykiss*). *Comparative Biochemistry and Physiology C* 138:437-444. doi:10.1016/j.cbpc.2008.04.011
- 4) Lai, J.C.C., Kakuta, I. Mok, H.O.L. **Rummer, J. L.**, Randall, D. J. 2006. Effects of moderate and severe hypoxia on erythropoietin levels in rainbow trout kidney and spleen. *Journal of Experimental Biology* 209: 2734-2738. doi:10.1242/jeb.02279
- 3) Caldwell, S., **Rummer, J.L.**, Brauner, C.J. 2006. Blood sampling techniques and storage duration: Effects on the presence and magnitude of the red blood cell  $\beta$ -adrenergic response in rainbow trout, *Oncorhynchus mykiss*. *Comparative Biochemistry and Physiology A* 144(2): 188-195. doi:10.1016/j.cbpa.2006.02.029
- 2) **Rummer, J. L.**, Bennett, W.A. 2005. Physiological effects of swim bladder overexpansion and catastrophic decompression on red snapper, *Lutjanus campechanus*. *Transactions of the American Fisheries Society* 134(6): 1457-1470. doi:10.1577/T04-235.1 \*
- 1) Fangué, N. A., Flaherty, K. E. **Rummer, J. L.** Cole, G. Hansen, K. S. Hinote, R. Noel, B. L. Wallman, H., Bennett, W.A. 2001. Temperature and hypoxia tolerance of selected fishes from a hyperthermal rockpool in the Dry Tortugas, with notes on diversity and behavior. *Caribbean Journal of Science* 37(1-2): 81-87. doi:10.1086/589109

**IN REVIEW:** (7 manuscripts currently in review)

**EDITORIAL COMMENTARIES:** (9 total since 2009)

**PRESS AND MEDIA RELEASES:** (262 news stories and multi-media pieces since 2000)\*

**CONFERENCE PRESENTATIONS:** (71 presented papers, 28 invited presentations, within 11 countries)

**GRANTS & FUNDING:** (Cash awards: \$582,565; Donations: \$43,000; **Total: \$625,565** (AUD))

**VOLUNTEER COMMITMENTS & PROFESSIONAL SERVICE:**

**Community Service:** 10 community/civic groups

**Professional society and organization affiliations:** 16 since 1999, including various “women in science” and “women in STEM” organizations (local and international)

**Advising Roles:** Mentored and supervised 25 undergraduates, honour’s, M.Sc., and Ph.D. students and their research projects since August 1999.

**EDITORIAL SERVICE:**

**Academic Editor:** *PLoS One*, *Conservation Physiology*

**Editorial Advisor:** *Success Strategies from Women in STEM: A Portable Mentor*, 2<sup>nd</sup> ed. Elsevier

**Reviewer:** Grant proposals for Marine Fisheries Initiative (USA), SeaGrant (USA), NOAA (USA) and 28 manuscripts for 17 different scientific journals.

---

**REFERENCES AVAILABLE UPON REQUEST**

---