

F. JOSEPH POLLOCK

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PhD Candidate 2010 to 2014

IPRS

School of Marine and Tropical Biology

Supervised by:

Prof. Bette Willis

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Understanding white syndrome coral disease in the Indo-Pacific

Joe grew up in Charleston, West Virginia (USA) among the majestic hills and valleys of America's Appalachian Mountains and more than 1000 kilometres from the nearest coral reef. He was first drawn to marine research as an NSF-funded undergraduate fellow at Mote Marine Laboratory where he helped to develop a restoration plan for Florida's ailing Atlantic Bay scallop populations. After graduating summa cum laude in Biology from the University of Kentucky, Joe expanded his interests in marine science through short-term fellowships at the Smithsonian Tropical Research Institute (Panama) and the Hawaii Institute of Marine Science (USA).

Armed with new expertise in genetics and molecular biology, Joe was awarded a Fulbright scholarship to travel to Australia where he developed the first quantitative PCR assay to detect a known coral pathogen. Joe was granted a joint MSc for this work through the College of Charleston (USA), the Australian Institute of Marine Science, and James Cook University. His passion for coral disease research and two excellent supervisors, Dr. David Bourne and Prof. Bette Willis, lured him back to Australia to continue this work. As an AIMS@JCU PhD student, Joe is currently employing the latest techniques in microbiology, genetics, histopathology, and disease ecology to untangle the interplay between the complex coral host, dynamic ocean environment, and poorly understood pathogens that leads to coral disease on Indo-Pacific reefs.



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In the past decade, a virulent group of coral diseases known as white syndromes have impacted reefs throughout the Indo-Pacific, including the Great Barrier Reef, Christmas Island, Rowley Shoals, the Marshall Islands, Palau, American Samoa and the Northwest Hawaiian Islands. However, the lack of a detailed case study of white syndrome, combining field-based disease monitoring with laboratory-based analyses of coral and seawater samples, represents a major impediment to the development of management options for minimizing the occurrence and impacts of these diseases.

Joe's research aims to characterize the environmental (e.g. water temperature, light intensity, sediment load, turbidity); host (e.g. immune status, population density, zooxanthellae clade); and microbial (e.g. coral-associated bacterial community, pathogen strain) factors that contribute to white syndrome pathogenesis. This work will provide a comprehensive case definition for white syndrome based on field observations and laboratory analyses, which will be used to compare white syndrome cases throughout the Indo-Pacific. More at: www.FJPollock/Research

Founding Aboriginals and Torres Strait Islanders in Marine Science (ATSIMS) is perhaps my most exciting accomplishment as a PhD student. ATSIMS aims to build deeper connections between Indigenous High School students and their traditional Sea Country and to empower future Indigenous leaders to protect these precious marine resources through careers in marine science and management. Specifically, by providing engaging, field-based science programs to predominantly Indigenous High School students, we aim to bolster the interest, experience, and hands-on skills that Aboriginals and Torres Strait Islanders will need to initiate, and succeed in, tertiary studies and careers in the field of marine science. More at: ATSIMS.com

Publications

- "Katz S., Pollock F.J., Bourne D.G., Willis B.L. In press. Crown-of-thorns seastar predation and physical injury promote brown band disease on corals. *Coral Reefs*.
- Pollock, F.J., Katz, S.M., Willis, B.L., Bourne, D.G. 2013. Cymo melanodactylus crabs slow white syndrome coral disease. *Coral Reefs*. DOI: 10.1007/s00338-012-0978-9.
- Cohen, Y., Pollock, F.J., Rosenberg, E., Bourne, D.G. 2012. Phage therapy treatment of the coral pathogen *Vibrio coralliilyticus*. *MicrobiologyOpen*. DOI: 10.1002/mbo3.52.
- Pollock, F.J., Morris, P.J., Willis, B.L., Bourne, D.G. 2011. The urgent need for robust coral disease diagnostics. *PLoS Pathogens*. DOI: 10.1371/journal.ppat.1002183. Journal cover article.
- Pollock, F.J., Wilson, B., Johnson, W.R., Morris, P.J., Willis, B.L., Bourne, D.G. 2010. Phylogeny of the cosmopolitan coral pathogen *Vibrio coralliilyticus*. *Environmental Microbiology Rep* 2, 172-178.
- Pollock, F.J., Morris, P.J., Willis, B.L., Bourne, D.G. 2010. Detection and quantification of the coral pathogen *Vibrio coralliilyticus* by real-time PCR with TaqMan fluorescent probes. *Applied and Environmental Microbiology* 75, 5282-5286.

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Publications in review

- Pollock, F.J., Lamb, J.B., Field, S.N., Heron, S.F., Schaffelke, B., Shedrawi, G., Bourne, D.G., Willis, B.L. In review. Sediment and turbidity associated with offshore dredging increase coral disease prevalence on nearby reefs. *PLoS ONE*.
- Pollock, F.J., Wood-Charlson, E.M., van Oppen, M.J.H., Bourne, D.G., Willis, B.L., Weynberg, K.D. In review. Abundance and morphology of virus-like particles associated with the coral *Acropora hyacinthus* differ between healthy and white syndrome-infected states. *Marine Ecology Progress Series*.
- Huete-Stauffer, C., Wilson, B., Pollock, F.J., Vezzulli, L., Bourne, D.G. In review. Comparative analysis of virulence traits within the coral pathogen *Vibrio coralliilyticus*. *PLoS ONE*.
- Sköld H.N., Pollock F.J., Torda G. In review. Do corals age? A study of telomere length and protein health in *Porites lobata*. *Coral Reefs*.
- Bourne, D.G., Ainsworth, T.D., Pollock, F.J., Willis, B.L. In review. Classification of white syndromes on Indo-Pacific coral reefs. *Coral Reefs*.
- Bridge T.C.L., Pollock F.J., In review. White syndrome disease affects *Acropora* corals in the biodiversity hotspot of West Papua, Indonesia. *Coral Reefs*.