

Vengatesen THIYAGARAJAN (RAJAN)

Current Position: Associate Professor (Tenured), The University of Hong Kong (HKU)

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Education: Ph.D. (University of Madras, 2000)



Research Experience: I have >19 years of research experience in environmental science, specifically in interdisciplinary marine science. Worked in **13** GRF/UGC-HK funded projects

Professional activities: Academic Editor: *Aquaculture Environment Interaction and PLoS ONE*; Editor (review): *Aquatic Biology* and; Council Member: Hong Kong Proteomic Society

Academic member in a **State Key Laboratory of Marine Pollution (SKLMP)**

Research Interests: Biomineralization; Biomineral analysis; Environmental Proteomics; Ocean acidification; Oyster aquaculture.

Research supervision: Current supervision (*as principal*): 1 Post-doc, 5 PhDs; *co-supervision*: 2 PhDs; graduated: 3 PDF, 6PhDs & 2 MPhils

Most significant contributions to interdisciplinary marine science

I am a marine biologist who applies interdisciplinary tools borrowed from mechanical engineering, molecular biology and materials science to understand adaptive and tolerance mechanisms of various commercially important marine biofouling or aquaculture species to multiple climate change drivers such as ocean acidification (OA), warming and hypoxia. From 2008 to 2016, I have got 6 GRF/RGC grants in a row (100% success rate), which has given me an opportunity for cross-disciplinary research experience and has also allowed me to pursue avenues that were otherwise unfeasible. With this platform, my team has developed multiplex proteomic technologies for the identification of novel proteins, metabolic pathways and protein-protein networking involved in adaptive responses of oysters to climate change. Recently, I have also developed an international multidisciplinary collaboration involving ocean acidification, crystallography, and oyster aquaculture experts to systematically study mechanisms of oyster adaptation to climate change.

Research Achievements

- Interdisciplinary research approach: I have successfully established an interdisciplinary research team with several outstanding graduate students (1st class honors students from engineering, biomedical and science faculties) to cross traditional disciplinary boundaries to expand their expertise in the research field of marine science, biomineralization and oyster aquaculture.
- Excellent research output: My research efforts over the past 6 years have been very productive resulting in 60 research articles during this period.
- I have been invited as KEY NOTE speaker to >14 international meetings to discuss the future of OA research and to establish international links - it is rewarding to know that our collaborative research is being recognized internationally by scientists working in the OA field and is a testament to our dedicated interdisciplinary approach.
- Conference and Workshop series: My research team has started 1st Interdisciplinary Symposium on Climate Change and Ocean Acidification (1st

ISOACC) in 2012, the 2nd ISOACC is in 2016; similarly we have organized 1st World is Our Oysters (1st WOO), the 2nd WOO is in 2017.

SCI Journal Publications (Total **100** since 2000) *Corresponding author; Journal publications up to 1st November 2018 (h-index: 32 with 2,600 total citations (Google Scholar); Number of peer-reviewed SCI journal papers: 100

Section A (Papers highly related to this proposal):

1. Meng Y, Guo Z, Fitzner SC, Upadhyay A, Chan VBS, Li C, Cusack M, Yao H, Yeung KWK, **Thiyagarajan V*** (In press) Ocean acidification reduces mechanical properties of the Portuguese oyster shell with impaired microstructure: a hierarchical analysis. **Biogeosciences** (I.F. 4.10)
2. Meng Y, Guo Z, Yao H, Yeung KWK, **Thiyagarajan V*** (In press) Calcium carbonate crystal unit realignment acts as compensatory physiological mechanism for acidification tolerance in the estuarine edible oyster species. **Marine Pollution Bulletin** (I.F. 3.2)
3. Meng Y, Fitzner SC, Chung P, Li C, **Thiyagarajan V***, Cusack M* (2018) Crystallographic Interdigitation in Oyster Shell Folia Enhances Material Strength. **Crystal Growth & Design** 18: 3753-3761(I.F. 4.0)
4. Fu J, Zhang H, Guo Z, Feng D, **Thiyagarajan V**, Yao H (2018) Combat biofouling with microscopic ridge-like surface morphology: a bioinspired study. *Journal of the Royal Society Interface* 15: 20170823 (I.F. 3.3)
5. Sunday JM, Fabricius KE, Kroeker KJ, Anderson KM, Brown NE, Barry JP, Connell SD, Dupont S, Gaylord B, Hall-Spencer JM, Klinger T, Milazzo M, Munday PL, Russell BD, Sanford E, **Thiyagarajan V**, Vaughan ML, Widdicombe S and Harley CDG (2017) Ocean acidification can mediate biodiversity shifts by changing biogenic habitat. **Nature Climate Change** 7, 81–85 (I.F. 20)

Section B:

1. Fitzner SC, Chan VBS, Meng Y, Chandra Rajan K, Michio S, Not C, Toyofuku T, Falkenberg L, Bryne M, Harvey B, De Wit P, Cusack M, Gao KS, Taylor P, Dupont S, Hall-Spencer J, **Thiyagarajan V*** (In press) Established and emerging techniques for characterising the formation, structure and performance of calcified structures under ocean acidification. **Oceanography and Marine Biology** (I.F. 5.1)
2. Li C, Chan VBS, He C, Yao H, Shih K, **Thiyagarajan V*** (2014). Weakening mechanisms of the serpulid tube in a High-CO₂ world. **Environment Science and Technology** 48: 14158-14167 (I.F. 5.25)
3. Dineshram R, Chandramouli K, Ginger KWK, Zhang H, Qian PY, Ravasi T, **Thiyagarajan V*** (2016). Quantitative analysis of oyster larval proteome provides new insights into the effects of multiple climate change stressors. **Global Change Biology** 22: 2054–2068 (I.F. 8.8)
4. Li C, Meng Y, He C, Chan VBS, Yao H* and **V. Thiyagarajan*** (2016) Mechanical robustness of the calcareous tubeworm *Hydroides elegans*: warming mitigates the adverse effects of ocean acidification. **Biofouling** 32, 191-204 (I.F. 3.8)
5. Lane A*, Campanati C, Dupont S, **Thiyagarajan V*** (2015). Trans-generational responses to low pH depend on parental gender in a calcifying tubeworm. **Scientific Reports** 5, Article number: 10847 (I.F. 5.6)