

Reef Ecology & Evolutionary Biology Laboratories
Department of Biological Sciences
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TAY Ywee Chieh 郑毓洁

Research Interests

My research interests include various aspects of molecular ecology, particularly in the discovery, conservation, and assessment of biodiversity, and population genomics. In recent years, I have been exploring these aspects with the power of high-throughput DNA sequencing. I also have a keen interest in developing molecular methods to enhance research in these areas.

Educational Qualifications

National University of Singapore (Dec 2012)

PhD. Thesis title: Connectivity of Coral Populations within the Singapore Strait
Received the World Future Foundation PhD Prize in Environmental Sustainability Research

National University of Singapore, Science Faculty (June 2006)

BSc. (Hons) in Life Sciences – First Class
Cumulative Average Point (CAP): 4.63/5.00

Professional Experience

Reef Ecology & Evolutionary Biology Laboratories, NUS - Postdoctoral Research Fellow (Jan 2016 - present)

Research projects:

- Metabarcoding of environmental DNA to assess species diversity and as biomonitoring tool
- Population genomics of marine species
- DNA barcoding of marine fauna

Evolutionary Biology Laboratory, NUS

- Postdoctoral Research Fellow

(Mar 2013 - Dec 2015)

Research projects:

- Population genetics and genomics of freshwater and marine fauna
- Metabarcoding of environmental DNA in freshwater reservoirs
- DNA barcoding of the Nee Soon Swamp Forest

Tropical Marine Science Institute, NUS

- Research Assistant

(Jun 2012 - Feb 2013)

Comprehensive Marine Biodiversity Survey

General role and Duties:

- Sampled and managed tissues for cryogenic collection
- Field surveys involving intertidal specimen collections and dredging
- Taxonomic identification of cephalopods

Department of Biological Sciences, NUS

- Research Assistant

(Mar 2011 - Jun 2012)

Impacts of climate change on the biodiversity in Singapore

General role and Duties:

- Investigated potential impacts of climate change on biodiversity through literature reviews and model predictions

Teaching Experience

Mentoring & Co-supervision of researchers at different levels

(2013 - present)

- (Co)-supervision and training of various undergraduate (6) and internship (4) research projects in the laboratory. Also trained other students in molecular bench and analytical skills
- Training of researchers at different levels in laboratory and analytical methods, including post-doctoral researchers (2), graduate (2), and undergraduate students, research assistants and interns

Lecturing

- National University of Singapore

(2017 - 2018)

- Guest lectures on *Marine Connectivity* for the module Marine Biology (LSM4261)

Part-time Teaching Assistant

- National University of Singapore

(Jan 2007 - Dec 2010)

- Conducted classes in small groups, mainly for practical and tutorial sessions of several undergraduate modules, to complement lecturer's teaching
- Modules taught: Biodiversity, Ecology, Field Studies in Biodiversity, Biophysical Environment of Singapore

Publications

Tay, Y.C., Ng, D.J.J., Loo, J.B., Huang, D., Cai, Y., Yeo, D.C.J., Meier, R. (in review). Roads to isolation: similar genomic history patterns in two freshwater crab species of contrasting environmental tolerances and range sizes.

Kutty, S.N., Wang, W.Y., Ang, Y., Tay, **Y.C.**, Ho, J.K.L. & Meier, R. (accepted). Next-generation identification tools For Nee Soon Swamp Forest. Gardens' Bulletin Singapore.

Ng, N.S.R., Wilton, P.R., Prawiradilaga, D.M., **Tay, Y.C.**, Indrawan, M., Garg, K. & Rheindt, F. 2017. The effects of Pleistocene climate change on biotic differentiation in a montane songbird clade from Wallacea. *Molecular Phylogenetics and Evolution*, **114**: 353–366. DOI: 10.1016/j.ympev.2017.05.007

Poquita-Du, R.C., Ng, C.S.L., Loo, J.B., Afiq-Rosli, L., **Tay, Y.C.**, Todd, P.A., Chou, L.M. & Huang, D. 2017. New evidence shows that *Pocillopora 'damicornis'*-like corals in Singapore are actually *Pocillopora acuta* (Scleractinia: Pocilloporidae). *Biodiversity Data Journal*, 5: e11407.

Lim, N.K.M., **Tay, Y.C.**, Srivathsan, A., Tan, J., Kwik, J., Baloğlu, B., Meier, R. & Yeo, D. 2016. Next-generation freshwater bioassessment in the tropics: eDNA reveals high species richness and reservoir-specific species communities. *Royal Society Open Science*, DOI: 10.1098/rsos.160635.

Tay, Y.C., Chng, M.W.P., Sew W.W.G., Rheindt F.E., Tun, K.P.P. & Meier, R. 2016. Beyond the Coral Triangle: High genetic diversity and near panmixia in Singapore's populations of the broadcast spawning sea star *Protoreaster nodosus*. *Royal Society Open Science*, 3: 160253. DOI: 10.1098/rsos.160253.

Fautin, D.G., Tan, R., Yap, N.W.L., Tan, S.H., Crowther, A., Goodwill, R., Sanpanich, K. & **Tay, Y.C.** 2015. Sea anemones (Cnidaria: Actinaria) of Singapore: shallow-water species known also from the Indian subcontinent. *Raffles Bulletin of Zoology*, 44–59.

Tay, Y.C., Noreen, A.M.E., Suharsono, Chou, L.M. & Todd, P.A. 2015. Genetic connectivity of the broadcast spawning reef coral *Platygyra sinensis* on impacted reefs, and the description of new microsatellite markers. *Coral Reefs*, **34**(1): 301–311. DOI 10.1007/s0033801412066

Wong, W.H., **Tay, Y.C.**, Puniamoorthy, J., Balke, M., Cranston, P.S. & Meier, R. 2014. 'Direct PCR' optimization yields a rapid, cost-effective, nondestructive and efficient method for obtaining DNA barcodes without DNA extraction. *Molecular Ecology Resources*. DOI: 10.1111/17550998.12275

Chou, L.M., Toh, K.B., **Tay, Y.C.** & Phang, V.X.H. 2012. Coral reefs in Singapore: Past, present and future. *Proceedings of the Asian Conference on Sustainability, Energy and the Environment*. pp. 431–436.

Toh, K.B., Chou, L.M., **Tay, Y.C.** & Phang, V.X.H. 2012. The impacts of climatic extremes on coastal and marine biodiversity in Singapore and management challenges. *Proceedings of the Asian Conference on Sustainability, Energy and the Environment*. pp. 423–430.

Tay, Y.C., Todd, P.A., Per, S.R. & Chou, L.M. 2012. Simulating the transport of coral larvae among the Southern Islands of Singapore. *Aquatic Biology*, **15**(3): 283–297.

Tay, Y.C., Guest, J.R., Chou, L.M. & Todd, P.A. 2011. Vertical distribution and settlement competencies in broadcast spawning coral larvae: Implications for dispersal models. *Journal of Experimental Marine Biology and Ecology*, **409**(1-2): 324-330.

Lim, M.K., Siew, W.L., Zhao, J., **Tay, Y.C.**, Ang, E. & Lehming, N. 2011. Galactose induction of the GAL1 gene requires conditional degradation of the Mig2 repressor. *Biochemical Journal*, **435**: 641-649.

Chou, L.M., Huang, D., Tun, K.P.P., Kwik, J.T.B., **Tay, Y.C.** & Seow, A.L. 2009. Temporal changes in reef community structure at Bintan Island (Indonesia) suggest need for integrated management. *Pacific Science*.

Tay, Y.C. 2009. A Rookie's reflections - thoughts from Singapore. *Reef Encounter*, **37**: 8.

Manuscripts in preparation:

Chang, J.J.M., **Tay, Y.C.**, Meier, R. & Huang, D. *Molecular and morphological analyses reveal a cryptic species complex associated with Peronia verruculata (Gastropoda: Onchidiidae) in a tropical marine environment.*

Ip, Y.C., **Tay, Y.C.**, Gan, S.X., Ang, H.P., Tun, K.P.P., Chou, L.M., Huang, D. & Meier, R. *DNA barcoding and identification of animal diversity at Singapore's first marine park.*

Funding & Awards

- Research grant from the National Parks Board (Singapore), 2016-2018. Performed most of the writing to secure the grant. Main manager of the project and funds. [SGD 534,600]
(Marine population genomics, DNA barcoding and environmental DNA)
- World Future Foundation PhD Prize in Environmental and Sustainability Research, 2013 [USD 10,000]
- Research grant from the National Parks Board (Singapore), 2008-2010. Funding agency offered the grant upon hearing a talk that I gave in the Department of Biological Sciences, National University of Singapore.
(Coral connectivity within Singapore) [SGD 20,000]
- National University of Singapore Research Scholarship, 2007-2010
- Dean's List for meritorious performance in Sem 1, 2002/2003, and 2003/2004

Talks & Workshops

Marine environmental DNA (eDNA) sampling workshop (2 - 5 Jan 2018)

Conducted an eDNA training workshop for government agencies in Singapore. This included field sampling, molecular lab techniques, and metabarcoding data analyses to survey marine biodiversity.

Year	Participation	Activities
2018 (2-5 Jan)	Marine environmental DNA (eDNA) sampling workshop (Singapore)	Workshop opening speaker
2016 (17 Jul)	Workshop on Molecular Evolution (Woodshole, USA)	Participant
2015 (18 Nov)	1st ASEAN Universities Workshop on Conservation Biology (Singapore)	Oral presentation
2015 (27 May)	The Future of Marine Science Workshop (Singapore)	Oral presentation
2012 (12-13 Jul)	2012 Climate Change Conference (Seattle, USA)	Oral presentation
2010 (20-24 Jun)	2nd Asia-Pacific Coral Reef Symposium (Phuket, Thailand)	Oral presentation
2009 (12-13 Oct)	6 th Asia-Pacific Software Conference (organized by DHI Singapore)	Participant
2009 (22-26 June)	28 th Annual Meeting of the Willi Hennig Society (Singapore)	Oral presentation
2009 (12-14 May)	International Symposium on Ocean Science, Technology and Policy (Manado, Indonesia)	Oral presentation
2008 (7-11 July)	11 th International Coral Reef Symposium (Fort Lauderdale, Florida, USA)	Oral presentation
2007 (25-29 Sept)	International Workshop on Tropical Island Biodiversity: Across Land and Sea (Singapore)	Oral presentation