

TRAVIS TAI

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Motivation

Global climate change affects marine resources and the goods and services provided to society. Our understanding of how climate change and resource utilization interacts to impact ecosystems is limited, challenging the future sustainability of these natural resources. My research interests are on how to measure and project these interacting impacts on marine fisheries, and determine the effects on target and non-target species, ecosystems, and human society. I have interests in the biological responses to global climate change and exploitation, including changes in life histories, population dynamics, and distribution and abundance. Additionally, I have interests in the societal responses, investigating changes in the economy and livelihoods of those dependent on marine fisheries resources. One of the biggest challenges is linking these diverse but connected disciplines, but this can be solved through building interdisciplinary frameworks and collaborative teams. My research interests span a broad range of topics—including oceanography, physiology, biology, ecology, fisheries, and socioeconomics of fisheries—and I am most compelled by how these interact with each other and how we can connect them to create solutions that benefit both natural and social systems.

Education

- 2015/09 – 2019/08 Doctor of Philosophy, Oceans and Fisheries, University of British Columbia
Supervisors: Dr. William Cheung; Dr. Rashid Sumaila
Thesis title: Building tools to model the effects of ocean acidification and how it scales from physiology to fisheries
- 2011/09 – 2014/10 Master of Science, Biology, University of Victoria
Supervisor: Dr. Bradley Anholt
- 2006/09 – 2010/06 Bachelor of Science Honours, Biology, University of Western Ontario

Recognitions and Awards

- 2019/01 Mitacs Accelerate Intern – 10,000 (CAD)
- 2018/10 Institute for the Oceans and Fisheries Student Society travel award – 500 (CAD)
- 2018/10 PICES Annual meeting 2018 – Early career scientist award – 1,000 (CAD)
North Pacific Marine Science Organization (PICES)
- 2018/06 PICES Effects of climate change on world's oceans – Early career scientist award – 1,000 (USD)
- 2018/06 IRES Graduate student travel grant – 500 (CAD)
- 2017/05 PICES Early Career Science Conference Award – 660 (CAD)
- 2016/08 Summer school travel award – 1,000 (USD)
Integrated Marine Biosphere Research project (IMBeR) ClimEco5
- 2016/08 MEOPeer (HQP) Researcher Development Funding – 2,000 (CAD)
MEOPAR
- 2013/09 Bamfield Marine Sciences Centre Fall Teaching Assistant Scholarship – 2,000 (CAD)
- 2013/06 Bamfield Marine Sciences Centre Graduate Student Awards – 1,500 (CAD)
- 2012/09 Bamfield Marine Sciences Centre Fall Teaching Assistant Scholarship – 2,000 (CAD)
- 2010/05 NSERC Undergraduate Summer Research Awards – 4,500 (CAD)
University of British Columbia

Publications

Peer reviewed

- Tai TC**, Sumaila UR, Cheung WWL. (2021). Ocean acidification amplifies multi-stressor impacts on global marine invertebrate fisheries. *Frontiers in Marine Science*. 8:596644. <https://doi.org/10.3389/fmars.2021.596644>
- Sumaila UR, **Tai TC**. (2020). End overfishing and increase the resilience of the ocean to climate change. *Frontiers in Marine Science*. 7:523. <https://doi.org/10.3389/fmars.2020.00523>
- Wilson TJB, Cooley SR, **Tai TC**, Cheung WWL, Tyedmers PH. (2020). Potential socioeconomic impacts from ocean acidification and climate change effects on Atlantic Canadian fisheries. *PLoS ONE*. 15:1–29. [Open Access]. <https://doi.org/10.1371/journal.pone.0226544>
- Tai TC**, Steiner N, Hoover C, Cheung WWL, Sumaila UR. (2019). Evaluating present and future potential of Arctic fisheries in Canada. *Marine Policy*. 108:103637. <https://doi.org/10.1016/j.marpol.2019.103637>
- Steiner NS, Cheung WWL, Cisneros-Montemayor AM, Drost H, Hayashida H, Hoover C, Lam J, Miller L, Mortenson E, Sou T, Sumaila UR, Suprenand P, **Tai TC**, VanderZwaag DL. (2019). A framework linking climate models to subsistence fisheries: Impacts of the changing ocean sea-ice system on the key forage species Arctic cod (*Boreogadus saida*) in the Western Canadian Arctic. *Frontiers in Marine Science*. *Frontiers in Marine Science*. 6:179. [Open Access]. <https://doi.org/10.3389/fmars.2019.00179>
- Sumaila UR, **Tai TC**, Lam VWY, Cheung WWL, Bailey M, Cisneros-Montemayor AM, Chen OL, Gulati SS. (2019). Benefits of the Paris Agreement to ocean life, economies, and people. *Science Advances*. 5:eaau3855. [Open Access]. <https://doi.org/10.1126/sciadv.aau3855>
- Tai TC**, Robinson JPW. (2018). Enhancing climate change research with open science. *Frontiers in Environmental Science*. 6: Article

115. [Open access]. <https://doi.org/10.3389/fenvs.2018.00115>
- Cisneros-Montemayor AM, Cashion T, Miller DD, **Tai TC**, Talloni-Álvarez N, Weiskel HW, Sumaila UR. (2018). Achieving sustainable and equitable fisheries resources requires nuanced policies not silver bullets. *Nature Ecology and Evolution*. 2:1334. <https://doi.org/10.1038/s41559-018-0633-0>
- Tai TC**, Harley CDG, Cheung WWL. (2018). A mechanistic approach for modelling the biophysical impacts of ocean acidification: defining mechanisms, limitations, and uncertainties. *Ecological Modelling*. 385:1-11. <https://doi.org/10.1016/j.ecolmodel.2018.07.007>
- Cisneros-Montemayor AM, Harper S, **Tai TC**. (2018). The market and shadow value of informal fish catch: a framework and application to Panama. *Natural Resources Forum*. 42(2):83-92. <http://doi.org/10.1111/1477-8947.12143>
- Tai TC**, Cashion T, Lam VWY, Swartz W, Sumaila UR. (2017). Ex-vessel fish price database: disaggregating prices for low-priced species destined for reduction fisheries. *Frontiers in Marine Science*. 4:1-10. [Open access]. <http://dx.doi.org/10.3389/fmars.2017.00363>

Under review

- Tai TC**, Calosi P, Gurney-Smith HJ, Cheung WWL. *Scientific Reports*. *Under review*.
- Cheung WWL, Frölicher TL, Lam VWY, Oyinlola M, Reygondeau G, Sumaila UR, **Tai TC**, Teh L, Wabnitz C. *Science Advances*. *Under review*.
- Cashion T, **Tai TC**, Lam VWY, Pauly D, Sumaila UR. Low cost conservation: Fisheries gear threats to marine species. *Nature Sustainability*. *Under review*.
- Talloni-Alvarez N, Cheung WWL, Lam VWY, **Tai TC**, Sumaila UR. Projected benefits of mitigating climate change to marine ecosystems, fishers and seafood consumers in Canada. *Canadian Journal of Fisheries and Aquatic Sciences*. *Under review*.

Reports

- Steiner NS, Cheung W, Drost H, Hoover C, Lam J, Miller L, Cisneros-Montemayor A, Sou T, Sumaila UR, Suprenand P, **Tai T**, Vanderzwaag DL. (2019). Changing ocean impacts on the key forage fish species Arctic cod in the Western Canadian Arctic – A framework linking climate model projections to subsistence fisheries. Arctic Monitoring and Assessment Programme Assessment 2019: Annex 6. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway (www.amap.no).

Book chapters

- Tai TC**, Palacios J, Cheung WWL, Sumaila UR et al. (2020). Changing oceans: rapid changes in Canada's marine environments. OceanCanada Partnership book.: Ch.6., University of British Columbia Press. Vancouver, BC, Canada. *In prep*.
- U Rashid Sumaila, William WL Cheung, Philippe M Cury and **Travis C Tai**. (2017). Climate change, marine ecosystems and global fisheries. Building a Climate Resilient Economy and Society—Challenges and Opportunities.: Ch.9., Edward Elgar Publishing. Cheltenham, UK and Northampton, USA.

Dissertations

- Tai TC**. The extraordinary sex ratios in the splash pool copepod *Tigriopus californicus*. (2014). University of Victoria. Master's Thesis. 95 pp. Supervisor: Dr. Bradley Anholt.

Presentations

* = presenter

Invited

- Tai TC***, Sumaila UR, Cheung WWL. (2017). Projections of biophysical responses to ocean acidification and its impacts on global fisheries. MEOPAR Ocean Acidification workshop, Ottawa, Canada. Workshop oral [National].

Attendee

- Tai TC***, Steiner NS, Cheung WWL, Sumaila UR. (2018). Evaluating current and future Arctic marine fisheries in Canada under different scenarios of climate change. PICES Annual meeting. Conference workshop oral [International].
- Tai TC***, Harley CDG, Cheung WWL, Sumaila UR. (2018). Biophysical responses to ocean acidification and impacts on global fisheries. PICES Effects of Climate Change on World's Oceans. Conference poster [International].
- Tai TC***, Harley CDG, Cheung WWL, Sumaila UR. (2018). Biophysical responses to ocean acidification and impacts on global fisheries. Canadian Meteorological and Oceanographic Society annual meeting. Conference oral [National].
- Tai TC***, Steiner NJ, Cheung WWL, Sumaila UR. (2018). Global ex-vessel fish price database and recent applications. International Institute of Fisheries Economics and Trade. Conference oral [International].
- Tai TC***, Harley CDG, Cheung WWL, Sumaila UR. (2018). Modelling ocean acidification impacts on population biogeography and global fisheries. Pacific Ecology and Evolution Conference, Bamfield, Canada. Conference oral [Local].
- Tai TC***, Sumaila UR, Cheung WWL. (2017). The future of invertebrate fisheries in the face of ocean acidification. PICES Early Career Research Conference, Busan, South Korea. Conference oral [International].
- Tai TC***, Cheung WWL, Sumaila UR. (2017). Fishing in a high CO2 world: ocean acidification impacts on global marine invertebrate fisheries. Pacific Ecology and Evolution Conference, Bamfield, Canada. Conference oral [Local].
- Wilson T*, **Tai TC**, Tyedmers P. (2017). Socioeconomic implications of ocean acidification in Atlantic Canada. MEOPAR Ocean Acidification workshop, Ottawa, Canada. Workshop oral [National].

- Wilson T*, Tyedmers P, Cooley S, **Tai TC**. (2017). Effects of ocean acidification on fisheries in Atlantic Canada: a risk assessment. Dalhousie conference, Halifax, Canada. Conference poster [Local].
- Tai, TC***, Cheung, W.W.L. and Sumaila U.R. (2016). CO₂ or seafood: Ocean acidification and the future of Canadian fisheries. MEOPAR ASM, Ottawa, Canada. Conference poster [National].
- Tai, TC***, Oyinlola, M., Clarke, T., *et al.* (2016). Culture-dependent vulnerability of fisher communities to climate driven resource change: a sociaecological modelling approach to risk assessment. IMBER ClimEco5 Summer School, Natal, Brazil. Conference oral [International].
- Tai, TC***, Cheung, W.W.L. and Sumaila, U.R. (2016). Sizing the impacts of an acidic ocean on shellfish in Canadian waters. *OceanCanada* Partnership conference, Vancouver, Canada. Conference poster [National].
- Tai, TC***. (2016). Techniques and tools used to quantify the impacts of ocean acidification impacts on marine fisheries. International Atomic Energy Agency training, Vancouver, Canada. Invited training presentation [International].
- Tai, TC***, Richardson, J.M.L., Alexander, H., and Anholt, B.A. (2013). Sex ratio selection: a comparison of empirical studies to theoretical models in *Tigriopus californicus*. Canadian Society for Ecology and Evolution. Conference oral [National].

Text interviews

2016/09 MEOPAR funded researcher training and HQP development. <http://bit.ly/2BFYRVL>

Employment

2020/09 – present Post-doctoral research fellow
Climate change risks and impacts modelling; salmon freshwater assessments
Pacific Climate Impacts Consortium, Victoria, Canada

2019/09 – 2020/08 Post-doctoral research fellow
Climate change risks and impacts modelling; digital technologies and fisheries monitoring
Iwate University, Morioka, Japan (*joint position*)
Institute for the Oceans and Fisheries, University of British Columbia, Canada (*joint position*)

2015/06 – 2015/09 Research assistant
Fisheries ex-vessel prices; Simulation modelling
Fisheries Centre/Institute for the Oceans and Fisheries, University of British Columbia

2013/09 – 2014/12 Lab instructor
BIO215 course - Ecology
Biology, University of Victoria

2013/01 – 2014/04 Lab instructor
BIO330 - Study design and analysis
Biology, University of Victoria

2012/09 – 2013/12 Teaching assistant
Directed studies course - Fall Program
Bamfield Marine Sciences Centre

Courses taught

2013/09 – 2014/12 Lab instructor; University of Victoria
Course Title: Principles of Ecology; Course Level: Undergraduate
Number of Students: 48

2013/01 – 2014/04 Lab instructor; University of Victoria
Course Title: Study design and data analysis; Course Level: Undergraduate
Number of Students: 48

2012/09 – 2013/12 Co-instructor/teaching assistant; Bamfield Marine Science Centre
Course Title: Directed studies; Course Level: Undergraduate
Number of Students: 22

2012/09 – 2013/12 Instructor (Course developer); Bamfield Marine Sciences Centre
Course Title: Introduction to coding in R, study design and analysis; Course Level: Undergraduate
Number of Students: 22

Course development

2012/08 – 2012/12 Course developer; Bamfield Marine Science Centre. Introduction to coding in R, study design, and data analysis.

Mentoring activities

2012/05 – 2013/08 Three directed studies students

Volunteer work

2012/01 – present Speaker; Various Vancouver schools to students in grades 3-12.
Various topics including: careers in science, life as a marine scientist, university experiences.

- 2013/06 – 2014/08 Co-organizer; Biodiversity for Earth
Weekend/summer program developed for children aged 5-15 to engage in learning about marine biodiversity and conservation, through hands-on activities and field trips. Targeted towards low income families in Vancouver. <https://biodiversityforearth.wordpress.com/>
- 2010/04 – 2011/08 Volunteer Interpreter; Vancouver Aquarium

Event administration

- 2017/11 – 2018/08 Organizer (HQP); OceanCanada Scientific Meeting Conference, 2018/08, Halifax, Canada
- 2017/06 – 2018/05 Sponsorship committee; Pacific Ecology and Evolution Conference, 2018/02, Bamfield, Canada
- 2016/05 – 2016/12 Co-chair; Biodiversity Research: Integrative Training and Education (BRITE) Spatial Data and Analysis workshop, 2016/10 – 2016/11, UBC, Vancouver, Canada. <http://brite-gis2016.weebly.com/>

Journal review activities

- 2021/01 Journal article; PLOS ONE
- 2021/05 Journal article; Scientometrics
- 2019/06 Journal article; Fisheries Research
- 2016/07 Journal article; Royal Society Open Access

Conference review activities

- 2018/06 Session convener and review; Canadian Meteorological and Oceanographic Society and MEOPAR Annual Science Meeting

Research funding application assessment activities

- 2016/09 – present Chair; Institute for the Oceans and Fisheries Student Society Travel Award Adjudication Committee
- 2017/02 – 2018/09 Committee member (HQP); MEOPAR Research Management Committee

Organizational review activities

- 2016/09 Lead application reviewer; University of British Columbia GIS workshop

Committee memberships

- 2016/09 – 2019/06 Chair; Institute for the Oceans and Fisheries Student Society Travel Award Adjudication Committee
- 2017/02 – 2018/09 Committee member (HQP); MEOPAR Research Management Committee
- 2015/09 – 2017/09 Treasurer; Institute for the Oceans and Fisheries Student Society
- 2016/05 – 2016/12 Co-chair; Biodiversity Research: Integrative Training and Education (BRITE) Spatial Data and Analysis workshop.
- 2015/09 – 2016/09 Co-chair; Institute for the Oceans and Fisheries Student Society
- 2011/09 – 2013/12 Chair; Bamfield Marine Science Centre Graduate Student Association

International collaboration activities

- 2016/08 Co-author; Ghana.
Impacts of ocean acidification on fisheries in Ghana and other countries bordering the Gulf of Guinea. Contribute to a section of a large report on the status and future of fisheries in this region. This report is currently in preparation.
- 2016/08 Lead author; Brazil.
Development of a novel social-ecological approach to incorporating cultural indices for a climate change risk assessment of Brazilian communities.
- 2016/05 Co-author; Panama.
Collaboration with Panama government and fisheries to determine 'shadow' prices and value of unreported fish landings and discards.

Current research affiliations

- 2020/09 Post-doctoral fellow; Pacific Climate Impacts Consortium

Applicable skills

- Computer Coding languages (R, Visual Basic, Fortran, MiniTab, SPSS); Microsoft Office (Word, Excel, Access, Powerpoint); Graphics editing/illustrator (Affinity Designer); Data visualization
- Science Scientific writing/publications; Statistical analyses; Research design; Field work (marine, boat, SCUBA, freshwater); Microscopy; Laboratory study design; Salt and freshwater benthic/limnetic invertebrate sampling and ID; Marine fish ID
- Scientific disciplines Ecology; Economics; Interdisciplinary; Environmental science; Marine biology; Evolution
- Certifications PADI Rescue SCUBA Diver; Pleasure Craft Operators Card (PCOC); Class 5 Drivers license