Email: maxcampbe@gmail.com

MAX CAMPBELL /

- Worked for five years as Research Assistant in ecosystem modelling
- Advanced R programmer (>5 years experience) plus basic MATLAB, Python and SQL
- Two bachelors (applied mathematics and marine ecology) and honours in quantitative ecology
- Strong with statistical models (GLMMs, GAMMs, bayesian regression, PCA, clustering)
- Proficient at data wrangling, data visualisation and working with big datasets
- Familiar with dynamical systems, probabilistic processes, and graph theory
- Seven scientific publications, one as lead author

EDUCATION

2019-2020 **Bachelor of Science (Mathematics)**, WAM of 71.27%, University of New South Wales.

2018 **Bachelor of Science (Honours Class 1)**, GPA of 6.875 out of 7, University of Queensland
Supervisors: Prof. Anthony Richardson and Prof. David Schoeman
Tested three global ecological hypotheses using a large zooplankton dataset (141,000 samples). Frequentist regression models (GLMM) were used to investigate statistical relationships (Campbell et al. 2021).

2014-2017 **Bachelor of Marine Science (Ecology)**, GPA of 6.667 out of 7, Awarded with distinction, Griffith University.

2012-2013 **Diploma of Science** (articulated into Bachelor of Marine Science), GPA of 5.00 out of 7, JCU.

EXPERIENCE

Jan 2021-April 2022 **Research Assistant (Ecosystem Modelling)** supervised by Assoc. Prof. Chris Brown, Griffith University - (Full-time)

- Read scientific literature and researching connectivity, resilience and multistressors in networks
- Used graph theory, dynamical systems, stochastic modelling, bayesian and frequentist regression
- Advanced R (functional programming, metaprogramming, data wrangling & visualisation, shiny apps)
- Collaborated with various PhD students, postdocs and ecologists
- Developed a collaboration framework using GitHub

Jun 2017-Jan 2021 **Research Assistant Positions** for Assoc. Prof. Chris Brown and Prof. Rod Connolly, Griffith University - (Casual)

- Spatio-temporal, multivariate, additive and linear statistical modelling using R
- Researched resilience in complex networks using graph theory, dynamical systems and probability
- Complex matching and manipulation of sensitive datasets and data visualisation using R
- Collected and interpreted information from thousands of scientific journal articles
- Worked at different capacities (5-40hrs per week), in a team environment and remotely from Sydney

July 2017-Jun 2021 **Workshop Tutor**, Griffith University - (Sessional)

- Marine Ecosystem Modelling (third year course, 2021): Mathematical models (logistic growth, Lotka-Voltera models, ODEs, etc.), R coding
- Statistics (first year course, 2017): Statistical concepts, SPSS, supervised exams, marking

Jan 2017-June 2017 **Head Tour Guide**, Australian Kayaking Adventures - (Contractor)

Apr 2015-Jan 2016 **Tutor**, A Team Tuition - (Casual)

Mar 2015-June 2015 **Laboratory Demonstrator**, Science On the GO, Griffith University - (Casual)

Mar 2015-Dec 2015 **Student Mentor**, Griffith University - (Volunteer)

AWARDS

- 2021 Pro Vice Chancellor Research Excellence Team Award (Griffith University)
- 2021 Australian Underwater Federation Queensland Sportsperson of the Year
- 2018 Dean's Commendation for Academic Excellence (University of Queensland)
- 2017 Bachelor of Marine Science (Gold Coast) Final Year Award – Highest achieving student in cohort
- 2017 Griffith Honours College Scholar
- 2015 Team Leader Award A Team Tuition - Awarded for great leadership and strong results
- 2014 & 2015 Griffith Award for Academic Excellence

MATHEMATICS AND STATISTICS SKILLS

- Experienced working with various statistical and mathematical models: Linear (mixed) models (Molinari et al. 2021), logistic regression, GLMMs (Campbell et al. 2021, Molinari et al. 2021), GAMMs (Brown et al. 2020), PCAs (Voser et al. 2022, clustering algorithms (Voser et al. 2022, time-series and spatial models (Campbell et al. 2021, Brown et al. in Prep., Glen et al. in Review), bayesian regression (Brown et al. 2021), Lotka Voltera (ODEs) (Turschwell et al. 2022, Brown et al. in Prep.), graph theory (Brown et al. in Prep.) and stochastic models (Brown et al. in Prep.)
- Comfortable collaborating with people who varied mathematical knowledge as demonstrated by my publications
- Knowledgeable about experimental design, exploratory data analyses, model selection, model validation, hypothesis testing, forecasting and statistical inference
- Mathematical language as demonstrated in my publications (e.g. Turschwell et al. 2022 supplementary material)

COMPUTING SKILLS

- Linux, Windows and Mac OS
- Technologies: R (advanced), Python (basic), MATLAB (basic), SQL (basic), Microsoft excel (advanced), Microsoft office (advanced), LaTeX (basic), RMarkdown (advanced, e.g. my CV), SPSS (strong), git (intermediate) and GitHub (intemediate)
- Functional programming (advanced), OOP (limited), metaprogramming (intermediate), vectorisation (advanced), parallel processing (intermediate), data processing (advanced), statistical modelling (advanced), data structures (advanced), visualisation (advanced), dashboards and apps (basic), data management skills (strong, Github collaboration framework), cloud computing (basic, Griffith High-Performance Computer).
- Packages: base R, tidyr, dplyr, shiny, purrr, numpy, mgcv, nlme, lme4, ggplot2, matplotlib, brms, lubridate, glmmTMB, rlang, parallel, etc.

PROFESSIONAL SKILLS

Problem solving skills

- Experience working with complex systems (worked as a marine ecologist)
- Ability understand systems holistically (concept maps, analyse relationships, identify root causes)
- Excellent research skills (honours, research assistant for five years)
- Provide creative solutions (e.g. brought onto projects to help with complex mathematics: King et al. 2022, Turschwell et al. 2022)

Excellent interpersonal skills

- Demonstrated effective communication skills in a range of work, cultural and social contexts, and adaptable to different situations (office and remote work, travel, and involvement in underwater hockey)
- Ability to establish rapport, listen carefully, negotiate tactfully, and build relationships (long-term work and hockey relationships)
- Practised in stakeholder engagement through collaborating with The Nature Conservancy (industry), GLOW team (academic), and with 34 coauthors on my first author paper (Campbell et al. 2021)

Leadership skills

- Supervised and managed team research projects (honours, collaboration framework)
- Adaptable to different roles in a team, including: supporting (primary research assistant for Assoc. Prof. Chris Brown, helped Global Wetlands Project team with quantitative problems), following (working under directions in stages of research assistant roles), or leading (head tour guide, underwater hockey roles: founder, captain, manager, president)

Strong work ethic

- Persistent and resilient under harsh conditions (honours project, Australian level sport)
- Capacity to self-manage and work independently (remote work during UNSW study and COVID-19)
- Training my quantitative skills beyond work and coursework requirements

PUBLICATIONS

In Turschwell et al. (2022) I helped determine the appropriate mathematical methods to investigate changing multistressor relationships over time. I found the analytical solutions to ODEs, undertook the stability analyses and computed the jacobian matrices of the ODE systems, generated the phase diagrams, wrote several mathematical sections of the manuscript and made major restructures of the code.

In King et al. (2022) I helped develop and implement the methods to determine the interactions between multiple stressors over time in four ecological experiments. We first used generalised additive mixed models to capture the effects of stressors through time on two ecological endpoints whilst accounting for pseudoreplication. We then used an empirical bayesian approach to investigate the range of stressor interactions (see code).

In Voser et al. (2022) I was the primary developer of the statistical procedures used in a complex analysis to determine the similarities among over 50,000 molecules. Here we used a two-step modelling approach, first we used a logistic principal component analysis to reduce the number of dimensions of molecular "fingerprints", and then used k-means clustering to determine similarities among molecules.

In Brown et al. (2021) I wrangled and matched complex fisheries catch data from several different countries to create a clean dataset. I then applied the multivariate bayesian regression models in the R package 'boral' to investigate correlations among the catch of different species.

In **Campbell** et al. (2021) I was the lead author in a team of 34 coauthors for a global macroecological analysis. With the help of my supervisors, I researched the topic, wrote the manuscript, processed a large complex plankton dataset, conducted a robust statistical analysis using generalised linear mixed models, created visualisations, managed the project and navigated through the peer review process (see code).

I am a coauthor on several other scientific papers for my work on statistics and computing (Molinari et al. 2021, Brown et al. 2020), and there are several other manuscripts where I am a coauthor in review or preparation.

SPORTING EXPERIENCES

I have played underwater hockey competitively for the past seven years: being selected in the state team five times (once as Captain), playing in many A-grade regional teams (often as Captain or Vice Captain, several gold medals), and being selected as a reserve for the 2020 Australian Team. I have been heavily involved in the management and development of underwater hockey on the Gold Coast, Australia. I co-founded an underwater hockey club (Griffith Marlins), and I have been involved in this club in many different capacities during the last five years. During my time managing and playing underwater hockey, I had to deal with many different situations, including winning grants, negotiating pool time, collecting and distributing money, mediating disagreements among club members, organising team travel and accommodation, dealing with unacceptable behaviour, making team selections, marketing, etc. In late 2021, my partner and I handed this club over to a new management team. I was awarded the 2021 Australian Underwater Federation Queensland Sportsperson of the Year for these efforts.

I also enjoy running and hiking, which has led to me undertaking the following: Gold Coast Marathon, GRUNT Half Marathon (3rd place), Huayna Potosi summit (6088m), Hinchinbrook Island hike (32km), Lara Pinta hike (230km), South Coast Track hike (84km) and Carnarvon Gorge hike (87km).

MEMBERSHIPS

- 2017-2022 Golden Key International Honour Society
- 2017-2022 Griffith University Underwater Hockey Club (founder, president)
- 2015-2022 Tweed Gold Coast Freedivers (vice president, committee member)
- 2015-2022 Griffith Honours College (member, alumni)

CONFERENCES & WORKSHOPS

- Environmental modelling for better predictions and decisions ACEMS symposium (2021), Queensland University of Technology, AUS
- Bayesian Statistics Workshop (2021), Griffith University, AUS
- Virtual International Statistical Ecology Conference (2020)
- Intermediate R (2018) and Advanced R (2019/20) Workshops, University of Queensland, AUS
- D61+ LIVE (2018), CSIRO, AUS
- Metrics of Climate Change in Marine Systems Workshop (2018), Sunshine Coast University, AUS
- Global Alliance of Continuous Plankton Recording Surveys (GACS) workshop (2017), Marine Biological Association, UK
- Workshop on Applications in Natural Resource Mathematics (2017), University of Queensland, AUS

REFEREES

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