Email: maxcampbe@gmail.com

MAX CAMPBELL /

- Worked for five years as Research Assistant in ecosystem modelling
- More than five years of R experience plus two years prior MATLAB experience.
- Two bachelors (Mathematics and Marine Ecology) and honours in Marine Biology.
- Experienced with statistical regression models (GLMMs, GAMs, bayesian regression)
- 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

GOALS

1. To find a position which allows me to pursue my interest in using mathematics and statistical modelling.
2. To continue to expand my knowledge base and further develop my professional skills.
3. To actively contribute to solving important real-world problems with quantitative tools.

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 6.625 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

May 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-May 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)

- Communicated effectively and discussed wildlife with a vast range of social groups
- Directed other tour guides and worked as a team

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

- Tutored university students and secondary school students
- Built client and student rapport

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

- Helped high school students with laboratory work

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

- Organised social events and helped first year students succeed at university

AWARDS

- 2021 Pro Vice Chancellor Research Excellence Team Award (Griffith University)
- 2018 Dean's Commendation for Academic Excellence (UQ)
- 2017 Bachelor of Marine Science (Gold Coast) Final Year Award – Highest achieving student in cohort
- 2017 Griffith Honours College Scholar
- 2014/15 Griffith Award for Academic Excellence

MATHEMATICS AND STATISTICS SKILLS

During my studies I have taken a large number of mathematics and statistics courses, which has given me a solid foundation in mathematics. I can comfortably use the the mathematical language as demonstrated in my publications (e.g. Turschwell et al. 2022 supplementary material). Further, I am able to fill gaps in my mathematical knowledge, as demonstrated by finishing my undergraduate degree in a short time span, and by lots of self study in 2021/2022. I have a solid amount of experience applying mathematical and statistical techniques in a research setting (research assistant positions), and I am used to working with people who have limited mathematical knowledge whilst still maintaining mathematical rigour. Most of my applied experience is in statistics using techniques such as linear models, GLMMs, GAMs, PCAs, cluster analysis, model selection, residual analysis, experimental design and bayesian regression (Voser et al. 2022, Brown et al. 2021, Campbell et al. 2021, Molinari et al. 2021, Brown et al. 2020). However, I also have some experience working with dynamical systems (solving ODE systems, multivariate calculus), probability and graph theory for scientific publications (Turschwell et al. 2022, Brown et al. in preparation).

COMPUTING SKILLS

My primary computing strength is my proficiency coding in R (including functional programming, metaprogramming, vectorisation, parallel processing, data manipulation, statistical and mathematical modelling, spatial mapping, and dashboards: with ggplot2, base R, tidyverse, and R shiny). I have been coding in R for more than five years, and before that in MATLAB for 2 years. I am able to translate this knowledge to another programming language if given sufficient time, as demonstrated by my 94% score in a university Python3 course in 2019. I have substantial experience working with other popular software such as Excel, Microsoft office, LaTeX, RMarkdown, SPSS, git and GitHub. I can use Linux, Windows or Mac OS, I have good data management skills (as demonstrated by the Github collaboration framework), and I have some experience with cloud computing (through the Griffith High Performance Computer).

PROFESSIONAL SKILLS

Problem solving skills
- Experience working with complex systems (worked as a marine ecologist)
- Brought onto projects to help with complex mathematics (King et al. 2022, Turschwell et al. 2022)
- Excellent research skills (honours, research assistant for five years)

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, worked with the coach as captain of the state underwater hockey team, 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 1D analytical solutions of the ODE systems, undertook the stability analyses and computed the jacobian matrices of the 2D 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 models to capture the effects of stressor over 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 zooplankton dataset, conducted a robust statistical analysis using generalised linear mixed models (GLMMs), generated the graphics, managed the project and navigated my way through the peer review process (see code).

I am a coauthor on several other scientific papers for my work on the statistics and computing (Molinari et al. 2021, Brown et al. 2020), and there are several other manuscripts where I am a coauthor in 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. Throughout my time playing underwater hockey I have been heavily involved in the management and development of underwater hockey on the Gold Coast, Australia. I co-founded a new underwater hockey club (Griffith Marlins), and I have been involved in this club at many different capacities during the last five years: as president, team captain, team manager and coach. 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 promising 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, 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 in Brisbane (2021)
- Virtual International Statistical Ecology Conference (2020)
- Intermediate R Workshop (2018), and Advanced R Workshop in Brisbane (2019/2020)
- D61+ LIVE in Brisbane (2018)
- Workshop on Metrics of Climate Change in Marine Systems on Fraser Island (2018)
- Global Alliance of Continuous Plankton Recording Surveys (GACS) workshop in Plymouth, UK (2017)
- Workshop on Applications in Natural Resource Mathematics in Brisbane (2017)

REFEREES

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