

# Samuel Thompson

DATA SCIENTIST / PHD CANDIDATE

School of Biological Sciences, University of Western Australia

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## About me

I use novel sampling methods, computers and large genetic datasets to answer biological questions, typically in marine vertebrates. My research has focused on the development and deployment of a novel sampler capable of simultaneously collecting environmental DNA (eDNA), stereo-video imagery and oceanographic data, investigating the spatial distribution of marine vertebrate species in the context of anthropogenic change; especially the presence of restricted-access marine areas such as Marine Parks and offshore infrastructure. I am particularly passionate about the development of novel software tools to standardise and automate the analysis, reporting and display of ecological data, particularly eDNA metabarcoding data.

## Education

### University of Western Australia

Perth, Australia

PHD

2020-present

- Environmental DNA (eDNA) metabarcoding PhD with the Marine Ecology Fisheries Research Group and the Jarman lab
- Developed a sampling system capable of collecting 360-degree stereo-video, water samples and oceanographic data at depths up to 600m
- Designed a family-specific eDNA metabarcoding primer set for Lutjanidae (snapper)
- Developed multiple bioinformatic pipelines and data science tools for processing genetic, visual and oceanographic datasets
- Worked extensively with industry (BHP) and fishing industry

### University of Southampton

Southampton, United Kingdom

MASTER OF OCEANOGRAPHY

2017-2018

- Studied all forms of oceanography with a focus on biological oceanography and deep-sea ecology
- Research project focussed on characterising deep-sea megafauna of the Kiribati region with towed-camera systems (published in *Frontiers in Marine Science* 2019)

### University of Kent

Kent, United Kingdom

BACHELOR OF BIOCHEMISTRY (FIRST CLASS WITH HONOURS)

2010-2014

- Studied general life sciences with a focus on genetics and molecular biology
- Research project focussed on using novel bioinformatic tools to understanding genome duplication events in chordate species

## Employment

### Curtin University

Perth

RESEARCH ASSOCIATE

2024-present

- Data scientist / Bioinformatician for eDNA Frontiers at Curtin University
- Contributing data science expertise to the Fish Ecology Laboratory at Curtin University
- Communications manager for the eDNA for Global Environment Studies (eDGES) project at Curtin University
- Building an interactive software application (Shiny Apps) to automate the analysis, curation and storage of large eDNA datasets

### Curtin University

Perth

DATA SCIENTIST (PART-TIME)

2023-2024

- Data scientist / Bioinformatician for eDNA Frontiers at Curtin University
- Building an interactive software application (Shiny Apps) to automate the analysis, curation and storage of large eDNA datasets
- Building software applications for automating client report generation
- Building an interactive online data portal for displaying spatial eDNA datasets to clients

### Minderoo Foundation

Perth

RESEARCH ASSISTANT (PART-TIME)

2021-present

- Research assistant with the Minderoo OceanOmics team during offshore expeditions
- Working onboard the Pangaea Ocean Explorer, conducting environmental and genomic DNA sampling, extraction, amplification, purification, sequencing and data analysis
- Opportunity to undertake knowledge transfer of eDNA techniques to traditional ranger groups
- Has provided me with a unique opportunity to conduct end-to-end sampling to sequencing on an offshore vessel
- Conducting onboard bioinformatics analysis using a high-performance computing system

## University of Western Australia

LABORATORY DEMONSTRATOR (PART-TIME)

- BIOL1131: Plant and Animal Biology
- Laboratory demonstrator and tutor for both face-to-face and online delivery formats
- Marker for marine and genetics components
- Guest Lecturer: Amphioxus: A model for developmental biology

Perth

2021-2022

## RPS MetOcean

DATA SCIENTIST / OCEANOGRAPHER

- Working in the data sciences department
- Work processing, QCing and interpreting large oceanographic datasets through a linux environment, custom software and shell scripts
- Data from instruments including: ADCPs, CTDs, LIDAR buoys, Wave rider buoys

Perth

2019-2019

## Royal Perth Yacht Club

WINDSURFING AND SAILING INSTRUCTOR (PART-TIME)

- Working as a dual qualified windsurfing and sailing instructor at a prestigious Perth yacht club
- Delivering both practical and theoretical lessons to groups of all ages and abilities ranging from age 8 up to 70

Perth

2019-2020

## Mylan

ANALYTICAL CHEMIST

- Key research team member during the ANDA submission to the FDA for a generic Advair drug product
- Conducted inhalation-specific lab techniques including aerodynamic particle size distribution, dissolution and emitted dose testing
- Use, calibration, maintenance and troubleshooting of analytical chemistry instrumentation including HPLCs and Raman spectrometers.
- Worked abroad in Dublin training new staff and setting up equipment in a new, purpose built QC lab

Kent, United Kingdom

2015-2017

## Skills

### Coding languages

R, PYTHON, HTML, CSS, JAVA, BASH

- Shell scripting; building and running pipelines for processing large bioinformatic and oceanographic datasets via command-line
- Highly proficient with the configuration and operation of both native and virtual Linux environments (WSL2)
- Highly familiar with wide variety of R and Python packages, particularly for bioinformatics, ecological statistics and spatial analyses
- Highly familiar with spatial analyses in arcGIS or qGIS
- Highly familiar with multivariate statistical analyses in both R or Primer
- Highly familiar with version control and containerisation systems: Git, Docker and Singularity
- Familiar with HTML and CSS for the design and styling of reports and websites

### Practical Skills

ELECTRICAL, MECHANICAL, WOODWORK, ROPEWORK, BOATWORK

- Highly proficient at building and troubleshooting 12v automotive and marine systems
- Highly proficient at troubleshooting software/hardware related PC issues; I have built multiple desktop PCs and completed many initial OS installs and setups using various windows and linux distributions
- Intermediate mechanical knowledge; especially 4x4 and diesel automotive systems
- Basic ropework / winch operation skills
- I have participated >1000 deployments of marine sampling equipment on a variety of vessels from the Southampton Solent to the Southern Ocean

## Licenses & certifications

### First Aid + Advanced resuscitation

OXYGEN PROVIDER AND CPR

PADI

2023-2024

### 4WD training

RIIVEH201D: OPERATE LIGHT VEHICLE, TLIC1051: OPERATE COMMERCIAL VEHICLE, TLIC2025: OPERATE FOUR WHEEL DRIVE

VEHICLE, TLIF2010: APPLY FATIGUE MANAGEMENT STRATEGIES, RIIVEH305E: DRIVE AND RECOVER A FOUR WHEEL DRIVE

VEHICLE, PMASUP236: OPERATE VEHICLES IN THE FIELD

Drive Safe WA

2020

### Recreational skippers ticket

DOT

2020

### Advanced Open Water Diver

PADI

2017

### Dinghy sailing instructor

RYA

2014

## Safety boat

RYA

2013

## Powerboat level 2

RYA

2012

## Start windsurfing instructor

RYA

2012

## Scientific voyages

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### Sydney -> Brisbane

RESEARCH ASSISTANT - MINDEROO OCEANOmICS / CSIRO

*RV Investigator*

2024 (26 days)

### Perth -> Abrohlos

RESEARCH ASSISTANT - MINDEROO OCEANOmICS / UWA DEEP-SEA RESEARCH CENTRE

*RV naturaliste*

2024 (14 days)

### Perth -> Ningaloo Plateau

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2023 (8 days)

### Christmas Island -> Cocos Keeling Islands -> Fremantle

RESEARCH ASSISTANT - MINDEROO OCEANOmICS / UWA DEEP-SEA RESEARCH GROUP

*Pangaea Ocean Explorer*

2023 (30 days)

### Fremantle -> Abrolhos Islands -> Fremantle

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2023 (10 days)

### Esperance -> Albany

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Immortalis*

2023 (10 days)

### Fremantle -> Cocos Keeling Islands

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2022 (22 days)

### Carnarvon -> Ningaloo Marine Park

RESEARCH LEAD - UWA MARINE ECOLOGY GROUP. SURVEYING PALEOCOASTLINE FEATURES WITH STEREO-BRUVs, NOVEL SAMPLERS, CTDs AND ENVIRONMENTAL DNA

*Keshi Mer*

2022 (12 days)

### Fremantle -> Abrolhos Islands -> Fremantle

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2022 (10 days)

### Esperance -> Israelite bay -> Fremantle

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2022 (14 days)

### Coral Bay -> Exmouth Gulf

RESEARCH ASSISTANT - MINDEROO OCEANOmICS

*Pangaea Ocean Explorer*

2021 (10 days)

### Dongara -> Onslow, WA

PHD STUDENT - UWA MARINE ECOLOGY GROUP. SURVEYING MARINE PARKS, PROPOSED PARK ZONES AND OFFSHORE OIL AND GAS INFRASTRUCTURE USING STEREO-BRUVs, NOVEL SAMPLERS, CTDs AND ENVIRONMENTAL DNA

*Adrianus*

2021 (28 days)

## Presentations

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### Simultaneous eDNA and visual surveying of the marine environment

ECR PRESENTER

*Australia and New Zealand eDNA conference*

2023

### Amphioxus: A model for developmental biology

GUEST LECTURER

*UWA - BIOL1131: Plant and Animal Biology*

2021

### Research update

STUDENT PRESENTER

*UWA - School of biological sciences postgraduate retreat*

2021

### Research proposal

PHD RESEARCH PROPOSAL

*UWA- School of Biological sciences Friday seminar series*

2020

# Awards and Funding

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<b>Grant: Biodiversity and societal benefits of restricted access marine areas</b>	<i>BHP/UWA</i>
WITH PROF. JULIAN PARTRIDGE, PROF. SIMON JARMAN, PROF. GARY KENDRICK, DR. TIM LANGLOIS, DR MATT NAVARRO. TOTAL FUNDING: AUD \$666,524.	2020-2024
<b>Award: CSIRO Early-career researcher conference bursary</b>	<i>CSIRO</i>
GRANT TO ATTEND THE 2023 AUSTRALIA AND NEW ZEALAND EDNA CONFERENCE IN HOBART. TOTAL FUNDING: AUD \$600	2023

# Publications

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<b>A novel drop-sampler for simultaneous collection of stereo-video, environmental DNA and oceanographic data</b>	<i>Molecular Ecology Resources (in review)</i>
S THOMPSON, S JARMAN, K GRIFFIN, C SPENCER, G CUMMINS, J PARTRIDGE, ...	2024
<b>Imagery of Opportunity: Benthic Habitat Maps in Deeper Shelf Waters (30-200 M)</b>	<i>Marine Environmental Research (in review)</i>
G CUMMINS, K GRIFFIN, C SPENCER, S THOMPSON, B GIBBONS, ML NAVARRO, ...	2024
<b>Benthic Observation Survey System (BOSS) to survey marine benthic habitats</b>	<i>Methods in Ecology and Evolution (in review)</i>
T LANGLOIS, C SPENCER, B GIBBONS, S THOMPSON, C ASTON, C GABRIELLE, ...	2024
<b>In vitro passive eDNA sampling provides a cost-effective alternative for large-scale sampling</b>	<i>Environmental DNA (in review)</i>
S THOMPSON, S JARMAN, K GRIFFIN, M HEYDENRYCH, J PARTRIDGE, T LANGLOIS	2024
<b>Preliminary observations of the abyssal megafauna of Kiribati</b>	<i>Frontiers in Marine Science</i>
E SIMON-LLEDÓ, S THOMPSON, A YOOL, A FLYNN, C POMEE, J PARIANOS, ...	2019