# Dr Scarlett Raine

Chief Investigator and Lecturer (US: Assistant Professor)
QUT Centre for Robotics

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# CURRICULUM VITAE

## OVERVIEW

**Research Expertise**
- Published researcher in computer vision and artificial intelligence for robotics and environmental monitoring (AAAI/RAL/JOE/WACV/CVPRW/DICTA); SAGE best paper award; Executive Dean's Commendation for Outstanding Doctoral Thesis
- Highly experienced in designing novel deep learning approaches, especially for applied data-constrained and weakly labelled problems

**Experienced Teacher and Communicator**
- Ability to communicate complex specialized concepts and domain-specific information to diverse and non-technical audiences (QCR 3MT Thesis award winner, 8+ years in Ambassador roles)
- 1,300 hours of teaching experience, highly positive feedback (94% highly satisfactory), awarded QUT EER Outstanding Learning and Teaching award

**Leadership**
- Recognised for research leadership and contributions to representation and inclusion; CICTA Pearcey Rising Star; Highly Commended for Women in Technology Emerging Tech Star; Vice-Chancellor's Award for Excellence; Scholarship Awardee for Science Meets Parliament 2026

## QUALIFICATIONS

**PhD in Artificial Intelligence and Computer Vision** *Aug. 2020 – May 2024*
- Thesis title: "Weakly supervised segmentation of underwater imagery"
- Studied jointly at QUT Centre for Robotics and CSIRO's Data61, Distributed Sensing Systems
- Awarded the *Faculty of Engineering Executive Dean's Commendation for Outstanding Doctoral Thesis*
- Research on novel deep learning algorithms for annotation-efficient automated processing of imagery collected by robotic underwater and surface vehicles.

**Bachelor of Engineering (First Class Honours)** *2016 – 2020*
- Queensland University of Technology; Major in Mechatronics and minor in Computer Science
- Final Grade Point Average (GPA): 6.906 / 7.0; **Valedictorian** of cohort; QUT Excellence Scholarship ($30,000)

## EMPLOYMENT

**Chief Investigator, QUT Centre for Robotics** *Aug. 2025 – current*
**Associate Investigator, QUT Centre for Environment and Society; QUT Centre for Data Science** *Aug. 2025 – current*

**Lecturer, QUT School of Electrical Engineering and Robotics** *Aug. 2025 – current*
- I teach undergraduate engineering units including Introduction to Robotics and Foundations of Electrical Engineering.

**Chief Investigator, Reef Restoration and Adaptation Program, Translation to Deployment** *Aug. 2025 – current*
- The Translation to Deployment sub-program is working to enable prerequisites for intervention deployment, focusing on targeted technology development for coral production in aquaculture and coral reseeding.

**Research Fellow, QUT Centre for Robotics** *Aug. 2024 – Aug. 2025*
- Lead research fellow on collaborative project 'Reef Deployment Guidance System' with the Australian Institute of Marine Science (AIMS) under the Reef Restoration and Adaptation Program (RRAP).
- Project aims to autonomously deploy coral reseeding devices to degraded areas of the Great Barrier Reef, assisting to foster temperature resilience and improve coral coverage.

**Sessional Academic, QUT** *July 2019 – Dec. 2023*
- Sessional Tutor and Computer Lab Demonstrator: I worked as a sessional academic across a range of electrical engineering, control systems, computer science, Artificial Intelligence and engineering design and practice units.

- Completed unit redesign of EGB340 (Design and Practice), including development of lecture slides, practical material, technical support documents, assessment outlines and criteria.

**Policy Officer, Australian Government** *Mar. 2023 – July 2023*

- Department of Climate Change, Energy, the Environment and Water, in the Biodiversity Markets Branch of the Nature Repair Market and Environmental Science Division.
- Planning and execution of an $8 million research grants program to support Innovative Biodiversity Monitoring technologies for the Nature Repair Market.
- Writing planning documents, operating procedures, ministerial briefs, grant guidelines and accompanying application documentation; liaising with departmental teams such as legal, finance and marketing, and external teams including the Minister's Office; launching the grant online; communicating with subject matter experts; managing applicant enquiries; and assessing and moderating applications.

**Research Intern, CSIRO Data61, Distributed Sensing Systems** *Nov. 2019 – Aug. 2020*

- Project: Physiological Sensing for Marine Species
- Design of a deep learning approach for detection of starfish in Moreton Bay, QLD. This method was used as a proof-of-concept solution to the problem of Crown of Thorns starfish detection and mapping for the Great Barrier Reef.

# FUNDING

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| 2024 – 2025 | **Reef Restoration and Adaptation Program (RRAP) Translation to Deployment Sub-program ($1.3 million)** This grant funds research to help the Great Barrier Reef resist, adapt and recover from the impacts of climate change. As a Research Fellow on this project, I am responsible for designing an AI pipeline which determines which areas of the reef are best suited for coral re-seeding. |
| 2024 | **Internal QUT Research Funding rounds (totalling >$45,000)** |
| 2020 – 2024 | **QUT Centre for Robotics Fully Funded PhD Scholarship ($30,000 p.a.)** |
| 2020 – 2024 | **CSIRO Data61 PhD Top-Up Scholarship ($10,000 p.a.)** |
| 2016 – 2020 | **Vice-Chancellor's Academic Scholarship Recipient ($30,000)** Now known as the QUT Excellence Scholarship, this is QUT's premier offering for high achievers, with only 130 scholarships awarded university-wide each year. |
| 2016 – 2017 | **Women in Engineering Scholarship Recipient ($6,000)** This scholarship recognizes high performing female engineering students who are keen to foster growth and recognition of the contributions of females in engineering roles, and have the potential to take on leadership roles in engineering. |

# AWARDS

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| 2025 | **Vice-Chancellor's Award for Excellence ($6,300)** This award recognises the excellence of the Robotics Reef Restoration team for external partnerships, engagement and impact. |
| 2025 | **CICTA Pearcey Rising Star Award** Inaugural awardee, in recognition of outstanding early-career achievement and leadership in shaping the future of Queensland's digital technology sector. |
| 2025 | **Women in Technology Awards: Highly Commended in the Emerging Tech Star Category** Dual-finalist in the Emerging Tech and Emerging Science Star categories. The WiT Awards recognise the incredible talents, outstanding achievements and the impact of every-day contributions made by change-making Queensland women in STEM who are creating or positively shaping technologically driven innovations. |
| 2024 | **Faculty of Engineering Executive Dean's Commendation for Outstanding Doctoral Thesis ($150)** This award recognises an outstanding contribution to the field of study. To be recognised with the award, the thesis must be nominated by both external examiners for the Outstanding Doctoral Thesis Award. |
| 2024 | **QUT School of Electrical Engineering and Robotics: Cultural and Diversity Champion Award** This was awarded for outstanding ability to champion the culture and diversity across the School. |
| 2024 | **IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Doctoral Consortium Travel Award ($650)** The Doctoral Consortium provides a unique opportunity for students, who are close to finishing or who have recently finished their doctoral degree, to interact with experienced researchers in computer vision. I was accepted to present my thesis research at the Doctoral Consortium and was recognized with a travel award of $400 US (~$650 AUD). |

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| 2022 | **SAGE Higher Degree Research Student Publication Prize ($440)** I was awarded the Faculty of Engineering SAGE Publication Prize for my journal paper entitled "Point Label Aware Superpixels for Multi-Species Segmentation of Underwater Imagery" co-authored with Ross Marchant, Brano Kusy, Frederic Maire and Tobias Fischer. This prize recognises "outstanding research outputs that have been published in high-ranking journals". |
| 2022 | **QUT School of Electrical Engineering and Robotics: Award for Outstanding Learning and Teaching** I was presented this award in recognition of my contributions to learning and teaching. |
| 2022 | **QUT School of Electrical Engineering and Robotics: Award for Engagement and Leadership** I was presented this award in recognition of "leadership roles and outstanding achievements, especially with impact on improving the quality of the HDR student experience". |
| 2021 | **QUT Research in Focus Competition Finalist** My entry into the QUT Research in Focus competition, entitled 'Coral Reef Complexity' was shortlisted as a finalist. This competition recognises technically innovative scientific visualisations produced from impactful research projects at QUT. |
| 2020 | **QUT Centre for Robotics Three Minute Thesis Competition: Winner** I was the winner of the QUT Centre for Robotics internal Three Minute Thesis Competition, held at the 2020 Centre End of Year Retreat. |

# SUPERVISION

Principal supervision of 2 PhD candidates, associate supervision of further 2 PhD candidates. Supervision of VRES (1 completion), Research Assistants (3), Capstone/Honours students (4 completions) and Masters research students (2 completions), leading to senior authorship of IEEE/CVF WACV paper.

# EVIDENCE OF ESTEEM

## KEYNOTES

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| February 2025 | Reducing Label Dependency for Automated Analysis of Underwater Imagery | *12th International Conference on Signal Processing and Integrated Networks* |

## INVITED TALKS

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| February 2026 | Advancing Marine Robotics for a Cleaner Ocean | *Technical University of Munich SeaClear2.0 Winter School* |
| December 2025 | The Ocean's New Ally: Artificial Intelligence for Reef Monitoring and Restoration | *Imperial College London, University of Southampton, NTNU, TUM, University of Girona* |
| June 2025 | AI – The Ocean's New Ally | *QUT Research Showcase* |
| December 2024 | Weakly Supervised Segmentation of Underwater Imagery | *Australian Centre for Robotics and University of Technology Sydney* |
| December 2024 | Applications of Artificial Intelligence for Analysing Underwater Imagery | *Institute of Marine and Antarctic Studies, CSIRO and University of Tasmania* |
| November 2024 | Science in the Pub: Artificial Intelligence in Marine Science | *Australian Marine Science Association* |
| October 2024 | International Women in Robotics Day Panel Event | *University of Queensland Mechatronics and Robotics Society* |
| August 2023 | From Student to Public Servant: Insights from Working in the Australian Public Service | *QUT Centre for Robotics Mid-Year Retreat* |

## PROFESSIONAL MEMBERSHIPS

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| Institute of Electrical and Electronics Engineers (IEEE) \| Member | ***2020 – present*** |
| Women in Earth and Environmental Science Australasia \| Member | ***2024 – present*** |
| Australian Coral Reef Society (ACRS) \| Member | ***2025 – present*** |
| Australian Marine Science Association (AMSA) \| Professional Member | ***2025 – present*** |
| Australian Coastal Restoration Network (ACRN) \| Member | ***2025 – present*** |

## PEER REVIEWING

Reviewer of journals and high-impact conference publication venues: CVPR (2nd ranked venue all fields, h5-index 450), NeurIPS (7th ranked venue all fields, h5-index 337), ICCV (h5-index of 291), WACV (h5-index 131), IROS (h5-index 92), ICRA (h5-index 129), RSS (h5-index 83), and Remote Sensing (h5-index of 159).

## OUTREACH AND ENGAGEMENT

Robotic Vision Summer School (RVSS) | Organising Committee Member *2025 – present*
Marine Robotics Seminar Series | Creator and Organiser *2024 – present*
ABC Radio Brisbane | Deep Dive Segment *2025*
Higher Degree Research Student and Post-doctoral Research Fellow Representative roles *2021 – 2025*

# PUBLICATIONS

## JOURNAL PAPERS

S. Raine, R. Marchant, B. Kusy, F. Maire, N. Suenderhauf and T. Fischer, "Human-in-the-Loop Segmentation of Multi-species Coral Imagery", *IEEE Journal of Oceanic Engineering*, vol. 51, no. 1, pp. 762 – 779, December 2025. — JOE 2025

S. Raine, R. Marchant, B. Kusy, F. Maire and T. Fischer, "Point Label Aware Superpixels for Multi-Species Segmentation of Underwater Imagery", *IEEE Robotics and Automation Letters,* vol. 7, no. 3, pp. 8291 – 8298, July 2022; impact factor: 5.2; also accepted for **oral presentation** at the IEEE/RSJ Conference on Intelligent Robots and Systems (IROS) 2022 (43% acceptance rate, one of the three leading robotics conferences) — RA-L 2022, 25 citations

## CONFERENCE PROCEEDINGS

S. Raine and T. Fischer, "AI-Driven Marine Robotics: Emerging Trends in Underwater Perception and Ecosystem Monitoring", *AAAI Conference on Artificial Intelligence, 2026* (14% acceptance rate). — AAAI 2026, 2 citations

M. Wille, T. Fischer and S. Raine, "Are All Marine Species Created Equal? Performance Disparities in Underwater Object Detection", *IEEE/CVF Winter Applications on Applications of Computer Vision, 2026.* — WACV 2026

D. Tsai, C. A. Brunner, R. Lamont, F. M. Nordborg, A. Severati, J. Terry, K. Jackel, M. Dunbabin, T. Fischer, S. Raine, "Automated Coral Spawn Monitoring for Reef Restoration: The Coral Spawn and Larvae Imaging Camera System (CSLICS)", *IEEE International Conference on Robotics and Automation, 2026.* — ICRA 2026, 2 citations

S. Raine, R. Marchant, B. Kusy, F. Maire and T. Fischer, "Image Labels Are All You Need for Coarse Seagrass Segmentation", *IEEE/CVF Winter Applications on Applications of Computer Vision 2024,* pp. 5943-5952, (41% acceptance rate; IEEE's premier meeting on applications of computer vision); selected for **oral presentation** (2.6% selection rate) — WACV 2024, 12 citations

S. Raine, R. Marchant, P. Moghadam, F. Maire, B. Kettle and B. Kusy, "Multi-species Seagrass Detection and Classification from Underwater Images ", *Digital Image Computing: Techniques and Applications, 2020.* — DICTA 2020, 31 citations

## WORKSHOP PAPERS

S. Raine, R. Marchant, B. Kusy, F. Maire, N. Suenderhauf and T. Fischer, "Human-in-the-Loop Segmentation of Multi-species Coral Imagery", *IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024, 3rd Workshop on Learning from Limited Labelled Data for Image and Video Understanding.* — CVPRW 2024, 11 citations

M. Wille, D. Miller, T. Fischer and S. Raine, "Why Domain Matters: A Preliminary Study of Domain Effects in Underwater Object Detection", *IEEE International Conference on Robotics and Automation Workshops, 2026.* — ICRAW 2026

## WHITE PAPERS

A. Friedman, K. Shafi, S. Raine, C. Jackett, J. Monk and S. Williams. "Artificial Intelligence and Machine Learning for Australian Marine Science", *National Marine Science Committee White Paper, 2025.*