JAN-HENDRIK EWERS

me@janhendrikewers.uk +447943639273 jh-ewers Glasgow, Scotland English, German

RESEARCH EXPERIENCE

University of Glasgow

Machine Learning Drive Path Planning for Search and Rescue

2021 – Ongoing

- PhD research project with support from Police Scotland Air Support Unit
- Developed a path planning algorithm to outperform state of the art methods using deep reinforcement learning
- Further performance improvement in later iterations of the algorithm which resulted in reducing training times and model size by 76% and 86% respectively through the use of recurrent auto-encoders
- Collaborated with various members of the University of Glasgow Space Exploration Technologies research group resulting in publishable content
- Presented at IEEE/RSJ IROS 2024 and International Federation of Automatic Control World Congress 2023

University of Glasgow

Optimal Path Planning for Search and Rescue

2020 – 2021

- MEng dissertation project in collaboration with Police Scotland Air Support Unit
- Outperformed trained search and rescue pilots with an optimisation-based search planning algorithm using phycological profiling
- Developed a novel technique for polynomial spline trajectory generation along a waypoint path
- Published the results in the peer-reviewed journal *Advanced Control for Applications*

EDUCATION

PhD Aerospace Systems

University Of Glasgow

October 2021 – Ongoing (June 2025)

- Researching "Machine Learning Driven Path Planning For Search and Rescue"
- Supported by Police Scotland Air Support Unit

MEng Aerospace Systems

University Of Glasgow

September 2016 – June 2021

- Graduated with Honours of the First Class
- Active member of the Engineering Society, Computing Science Society and executive committee member of the GUSA Shinty Club (president 2020/2021, treasurer 2018/2020)

EXPERIENCE

Gibson Robotics

Systems Engineer (hybrid)

June 2020 – Ongoing

- Secured DASA and private investment funding through successful development of the flight management system on a fixed-wing counter-UAV prototype
- Continuous development of the counter-UAV mission management system for fixed-wing and multicopter unmanned aerial vehicles using ROS2

Leonardo Electronics

Systems Engineer (full-time contract)

October 2024 – December 2024

- Implemented a novel radar search and track algorithm using reinforcement learning
- Created a full synthetic radar simulation using Python, PyTorch, and StoneSoup
- Developed the businesses understanding of MATLAB and Python for applied machine learning for complex control and autonomy problems

University of Glasgow

Graduate Teaching Assistant (part-time)

September 2019 - Ongoing

- Principal tutor for masters-level project course where students developed custom UAVs for novel applications
- Second supervisor for various masters-level thesis projects
- Tutor for multiple machine learning, navigation, and simulation courses

BAE Systems

Intern (full-time)

June 2019 – September 2019

- Developed tools to assist in complex version change requests for the Eurofighter Typhoon
- Implemented custom tooling to streamline interdepartmental work packages

SKILLS

Python | PyTorch | C/C++ | Linux | PX4 | Git | Github Actions | ROS(2) | ONNX | Docker

PUBLICATIONS

Journal Articles

- **J.-H. Ewers**, D. Anderson, and D. Thomson, "Deep reinforcement learning for time-critical wilderness search and rescue using drones," *Frontiers in Robotics and AI*, vol. 11, p. 1 527 095, Feb. 2025, ISSN: 2296-9144. DOI: 10.3389/frobt.2024.1527095.
- **J.-H. Ewers**, D. Anderson, and D. Thomson, "Optimal path planning using psychological profiling in drone-assisted missing person search," *Advanced Control for Applications*, e167, Sep. 2023, ISSN: 2578-0727, 2578-0727. DOI: 10.1002/adc2.167.

Conference Proceedings

- **J.-H. Ewers**, S. Swinton, D. Anderson, E. McGookin, and D. Thomson, "Enhancing Reinforcement Learning in Sensor Fusion: A Comparative Analysis of Cubature and Sampling-based Integration Methods for Rover Search Planning," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Abu Dhabi, United Arab Emirates: IEEE, Oct. 2024, pp. 7825–7830, ISBN: 9798350377705. DOI: 10.1109/IROS58592.2024.10801978.
- **J.-H. Ewers**, D. Anderson, and D. Thomson, "GIS Data Driven Probability Map Generation for Search and Rescue Using Agents," in *IFAC World Congress 2023*, 2023, pp. 1466–1471. DOI: 10.1016/j.ifacol.2023.10.1834.

Preprints

- **J.-H. Ewers**, D. Anderson, and D. Thomson, *Recurrent Auto-Encoders for Enhanced Deep Reinforcement Learning in Wilderness Search and Rescue Planning*, 2025. DOI: 10.48550/ARXIV.2502.19356.
- **J.-H. Ewers**, D. Cormack, J. Gibbs, and D. Anderson, *Multi-Target Radar Search and Track Using Sequence-Capable Deep Reinforcement Learning*, Feb. 2025. DOI: 10.48550/arXiv.2502.13584. arXiv: 2502.13584 [cs].
- **J.-H. Ewers**, J. Gibbs, and D. Anderson, *Stone Soup Multi-Target Tracking Feature Extraction For Autonomous Search And Track In Deep Reinforcement Learning Environment*, 2025. DOI: 10.48550/ARXIV.2503.01293.
- **J.-H. Ewers**, D. Anderson, and D. Thomson, *Predictive Probability Density Mapping for Search and Rescue Using An Agent-Based Approach with Sparse Data*, 2024. DOI: 10.48550/arXiv.2412.13317. arXiv: 2412.13317.
- S. Swinton, **J.-H. Ewers**, E. McGookin, D. Anderson, and D. Thomson, *A Novel Methodology for Autonomous Planetary Exploration Using Multi-Robot Teams*, May 2024. DOI: 10.48550/arXiv.2405.12790. arXiv: 2405.12790.

GRANTS AND AWARDS

- Awarded the **IMechE Travel Grant** and **IEEE RAS Student Travel Award** to facilitate attendance at IEEE/RSJ IROS 2024
- Recipient of a **full UK Engineering And Physical Sciences Research Council PhD scholarship** in 2021
- Recipient of the **British Aerospace Engineering Systems Prize** for the best industrially relevant final year project in 2021
- Placement on the **University of Glasgow James Watt School Of Engineering Excellence List** from 2017 to 2021