

Dan Barnes

RESEARCH ASSISTANT · ENGINEERING SCIENCE DPHIL (PHD) STUDENT · APPLIED AI LAB · OXFORD ROBOTICS INSTITUTE · UNIVERSITY OF OXFORD

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Summary

During my studies I have developed a strong interest in applied machine learning for real world computer vision and robotics applications. I am pursuing a DPhil in the Applied AI Lab, University of Oxford, focusing on urban autonomous vehicles and in particular leveraging domain knowledge for self-supervision in scalable robot learning. I am seeking opportunities to expand and apply my knowledge and look forward to attempting to tackle real world problems associated with computer perception in the future.

Education

University of Oxford

Oxford, UK

DPHIL CANDIDATE IN ROBOTICS AND MACHINE LEARNING, APPLIED AI LAB, OXFORD ROBOTICS INSTITUTE

2015 - 2020

- Research student at the Oxford Robotics Institute focusing on utilising self-supervision across perception, planning, mapping and localisation applications for autonomous vehicles. Projects include:
 - Online semantic scene parsing and path prediction with monocular cameras.
 - Increasing robustness of visual odometry with learned motion priors.
 - Self-supervised distractor-free mask learning for robust state-of-the-art radar odometry.
 - Keypoint learning for odometry estimation and metric localisation in radar.
- Helped develop and advance the Institute's core software and data management across robotic platforms and compute servers.

University of Oxford

Oxford, UK

MENG IN ENGINEERING SCIENCE: FIRST CLASS

2010 - 2015

- Two years of General Engineering including: dynamics, modelling concepts, fluid dynamics and material properties.
- Final two years specialising in Information and Electronic Engineering including: machine vision and robotics, machine learning, software engineering, optoelectronics, control systems, semiconductor devices, communications and microelectronics.
- Research work included:
 - Traffic light recognition for autonomous vehicles using geometric priors.
 - Feasibility design of autonomous wheelchairs for mobility.

Exeter School

Exeter, UK

A LEVELS: MATHS (A*), FURTHER MATHS (A*), ELECTRONICS (A*), PHYSICS (A*)

2003 - 2010

Publications

- 2020 **Under the Radar: Learning to Predict Robust Keypoints for Odometry Estimation and Metric Localisation in Radar** *Paris, France*
International Conference on Robotics and Automation (ICRA)
- 2020 **Kidnapped Radar: Topological Radar Localisation using Rotationally-Invariant Metric Learning** *Paris, France*
International Conference on Robotics and Automation (ICRA)
- 2020 **RSL-Net: Localising in Satellite Images From a Radar on the Ground** *Paris, France*
International Conference on Robotics and Automation (ICRA)
- 2020 **The Oxford Radar RobotCar Dataset: A Radar Extension to the Oxford RobotCar Dataset** *Paris, France*
International Conference on Robotics and Automation (ICRA)
- 2019 **Masking by Moving: Learning Distraction-Free Radar Odometry from Pose Information** *Osaka, Japan*
Conference on Robot Learning (CoRL)
- 2019 **The 2016 UK Space Agency Mars Utah Rover Field Investigation (MURFI)**
Planetary and Space Science
- 2018 **Driven to Distraction: Self-Supervised Distractor Learning for Robust Monocular Visual Odometry in Urban Environments** *Brisbane, Australia*
International Conference on Robotics and Automation (ICRA)
- 2017 **Find Your Own Way: Weakly-Supervised Segmentation of Path Proposals for Urban Autonomy** *Singapore, Singapore*
International Conference on Robotics and Automation (ICRA)

- 2017 MURFI 2016 - From Cars to Mars: Applying Autonomous Vehicle Navigation Methods To a Space Rover Mission *Leiden, Netherlands*
Symposium on Advanced Space Technologies in Robotics and Automation (ASTRA)
- 2017 UK Space Agency "Mars Utah Rover Field Investigation 2016"(MURFI 2016): overview of mission, aims and progress *Texas, USA*
Lunar and Planetary Science Conference
- 2015 **Exploiting 3D Semantic Scene Priors for Online Traffic Light Interpretation** *Seoul, South Korea*
Intelligent Vehicles Symposium (IV)

Work Experience

Oxford Robotics Institute, University of Oxford

Oxford, UK

RESEARCH ASSISTANT

Jul. 2019 – present

- Utilising deep learning with radar data to improve performance and robustness in autonomous vehicle applications.

Nuro

Mountain View, USA

MACHINE LEARNING

Jun. 2018 – Sep. 2018

- Research, development and systems integration to improve ML models.

Oxbotica

Oxford, UK

CONSULTING RESEARCH ENGINEER

Jan. 2017 – Mar. 2017, Oct. 2018 – Present

- Developed system to provide real-time obstacle detection and path estimation with monocular cameras.
- Implemented automatic labelling pipelines for generation of visual semantics ground truth.

UK Space Agency

Oxford, UK and Utah, USA

PLATFORM ENGINEER

Oct. 2016 – Nov. 2016

- Robotic platform support for the Mars Utah Rover Field Investigation (MURFI) UK Space Agency Mission in Utah, USA.
- Developed autonomy software to enable remote operation of the rover from the UK.
- Jointly responsible for software and hardware diagnostics on the space rover platform.

Electronic Systems Group, BAE Systems Detica

Gloucester, UK

TECHNICAL PLACEMENT

Jun. 2012 – Aug. 2012

- Summer vacation placement, creating and testing network infrastructure hardware and firmware designs.

Awards

- 2014 **Bennett Prize**, Engineering Project Prize at Keble College, University of Oxford *Oxford, UK*
- 2011 - 2015 **College Scholar**, Academic Performance at Keble College, University of Oxford *Oxford, UK*
- 2010 **A Level Electronics Award**, Highest A Level Electronics Result in the UK *Exeter, UK*

Skills

Programming Python, C++, MATLAB

Libraries Tensorflow, PyTorch, OpenCV, Numpy, Boost, Qt, Eigen, Protobuf, CMake, Bazel, Kubernetes

Languages English (native), Dutch (basic)

Referees

The people listed below are willing to be contacted and/or send a written recommendation. Please get in touch to arrange for references to be sent or to provide contact information.

Professor Ingmar Posner

DPHIL SUPERVISOR, ASSOCIATE PROFESSOR IN INFORMATION ENGINEERING, UNIVERSITY OF OXFORD · FOUNDER, OXBOTICA

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Dr Will Maddern

HEAD OF MAPPING AND LOCALISATION, NURO

FORMER: DPHIL ADVISOR AND SENIOR RESEARCHER, UNIVERSITY OF OXFORD

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