Sicelukwanda Zwane

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Education

PhD Robotics and Artificial Intelligence, *University College London* 2020 - 2025
Research Topic: Safety-aware Learning in Real-world Robotics with Gaussian Processes

MSc Computer Science, *Wits University* 2017 - 2019
Research Topic: Using Mixture Density Networks to Model Continuous Action Priors

BSc (Hons) Computer Science (*With Distinction*), *Wits University* 2013 - 2016
Project: Developing a Mobile Telepresence Robot

Work Experience

Robotics Software Engineer - AI/ML, *Kinisi – Bristol, UK* Apr 2025 - Present

- Developing and implementing AI models for perception, planning, and control on physical autonomous mobile humanoid robots.

Research Intern - Mobile Robotics, *AIST – Tokyo, Japan* Jan 2024 - Mar 2024

- Applying Bayesian optimization to motion planning problems in mobile robots in crowded spaces.

CTO and Co-founder, *Amathambo AI – London, UK* 2023 - Present

- Leading the development of an AI software tool for generating medical staff rosters.
- Product management and full-stack development for company website and other software offerings.

Data Scientist, *Explore AI, South Africa* 2019 - 2020

- Developed a data-science training course which compressed machine learning into 6 months.
- Led a team that developed a text Tweet sentiment analysis tool and accompanying dashboard for a big South African bank.

Research Intern - Field Robotics, *CSIR – Pretoria, South Africa* 2017 - 2019

- Developed and maintained software for control and perception of a mobile manipulator robot.

Publications

Semantic Cross-Pose Correspondence from a Single Example, ICRA 2025
Hadjivelichkov D, **Zwane S**, Deisenroth MP, Agapito L, Kanoulas D
The paper presents a method for predicting a semantically corresponding pose of a pair of unseen objects, given one or a few example poses showing the interaction of a similar object-pair.

Learning Dynamic Tasks on a Large-scale Soft Robot in a Handful of Trials, IROS 2024
Zwane S, Cheney D, Johnson CC, Luo Y, Bekiroğlu Y, Killpack MD, Deisenroth MP
Developed a data-efficient learning-based controller for a large-scale soft robot using Bayesian optimization. Evaluated on hammering and throwing tasks in simulation (Mujoco) as well as on a physical soft robot.

A Unifying Framework For Variational Gaussian Process Motion Planning, AISTATS 2024
Cosier L, Iordan R, **Zwane S**, Franzese G, Wilson JT, Deisenroth MP, Terenin A, Bekiroğlu Y
Introduced a framework for motion planning based on variational Gaussian Processes, which unifies various probabilistic-inference-based motion planning algorithms. Pybullet and real-robot evaluation.

Safe Trajectory Sampling in Model-based Reinforcement Learning, CASE 2023
Zwane S, Hadjivelichkov D, Luo Y, Bekiroğlu Y, Kanoulas D, and Deisenroth MP
Learned a constraint-aware Gaussian process dynamics model, trained a safe policy on trajectories sampled from it, and deployed the resulting safe policy on a physical robot arm. Pybullet and real-robot evaluation.

One-Shot Transfer of Affordance Regions? AffCorrs!, CoRL 2022
Hadjivelichkov D, **Zwane S**, Agapito L, Deisenroth MP, and Kanoulas D
One-shot transfer of robot affordance regions in a Vision Transformer (ViT) to novel scenes without fine-tuning. Capable of semantic one-to-many part correspondence. Isaac Sim and real-robot evaluation.

Honors and Awards

DeepMind Scholarship for PhD in Foundational AI University College London
Awarded £125 000 full funding towards the pursuit of PhD in Robotics and AI 2020

Most Innovative Honours Research Project School of Computer Science, Wits University
Built a semi-autonomous mobile telepresence robot with face-tracking and autonomous navigation. 2016

Community and Outreach

Non-profit work for the Deep Learning Indaba - organizing annual machine learning workshops for African ML researchers. Organiser for the first African Robot Learning workshop in Ghana (2023) and Senegal (2024).