

# SICELUKWANDA ZWANE

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🏠 London, United Kingdom

Final-year PhD candidate in robotics with experience in solving constrained manipulation and safe robot navigation problems with machine learning.

## EDUCATION

<b>PhD Robotics and Artificial Intelligence</b> , <i>University College London</i> Research Topic: Safety-aware Learning in Real-world Robotics with Gaussian Processes	2020 - Present
<b>MSc Computer Science</b> , <i>Wits University</i> Research Topic: Using Mixture Density Networks to Model Continuous Action Priors	2017 - 2019
<b>BSc (Hons) Computer Science (With Distinction)</b> , <i>Wits University</i> Project: Developing a Mobile Telepresence Robot	2013 - 2016

## WORK EXPERIENCE

<b>Research Intern - Mobile Robotics</b> , <i>AIST – Tokyo, Japan</i> • Applying Bayesian optimization to motion planning problems in mobile robots in crowded spaces (shopping malls).	Jan 2024 - Mar 2024
<b>CTO and Co-founder</b> , <i>Amathambo AI – London, UK</i> • Leading the development of an AI software tool for generating medical staff rosters, which won the Mandela-Rhodes Aänit Prize (valued at \$38 000 USD) in 2023. • Product management and full-stack development for company website and other software offerings.	2023 - Present
<b>Data Scientist</b> , <i>Explore AI, South Africa</i> • Developed a data-science training course which compressed machine learning into 6 months. • Led a team that developed a Twitter sentiment analysis tool and accompanying dashboard for a big South African bank.	2019 - 2020
<b>Research Intern - Field Robotics</b> , <i>CSIR – Pretoria, South Africa</i> • Developed and maintained software for control and perception of a mobile manipulator robot.	2017 - 2019

## Select PUBLICATIONS

### 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.

### Safe Trajectory Sampling in Model-based Reinforcement Learning, CASE 2023

Zwane S, Hadjivelichkov D, Luo Y, Bekiroglu Y, Kanoulas D, and Deisenroth MP

Introduced a novel method for learning a constraint-aware Gaussian process dynamics model and deployed the resulting safe policy on a physical robot arm.

### One-Shot Transfer of Affordance Regions? AffCorrs!, CoRL 2022

Hadjivelichkov D, Zwane S, Agapito L, Deisenroth MP, and Kanoulas D

Unsupervised method for one-shot transfer of robot affordance regions to novel scenes without fine-tuning, with semantic one-to-many part correspondence. Evaluated on a real robot arm with an RGB-D camera.

## SKILLS

Robotics:	Motion Planning, Model Predictive Control, Robot Vision, Grasping
Simulation:	Mujoco (and dm-control), Pybullet, Nvidia Isaac Sim
Machine Learning:	Generative modelling, Imitation Learning, Bayesian optimization, Reinforcement learning
Cluster & Compute:	High Performance Computing, GCP, Weights and Biases, Containerization (Singularity)
Software:	Python, C/C++, PyTorch, Mujoco, Tensorflow, ROS, Moveit!, Jax (basic)
Languages:	Zulu (Native), English (Full proficiency), Japanese (basic)

## HONORS AND AWARDS

<b>DeepMind Scholarship for PhD in Foundational AI</b> Awarded £125 000 full funding towards the pursuit of PhD in Robotics and AI	University College London 2020
<b>Most Innovative Honours Research Project</b> Built a semi-autonomous mobile telepresence robot with face-tracking and autonomous navigation.	School of Computer Science, Wits University 2016

## COMMUNITY OUTREACH

Reviewer for ICRA, IROS, ICLR.

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 Acraa, Ghana 2023.