Dr Satheeshkumar Veeramani

Research Associate – Robotics & Automation
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LINKS	Personal Webpage, GitHub, Google Scholar, LinkedIn
PROFILE	An aspiring researcher interested in exploring the potential of Robotics in Self-driving Labs. Research Interests: *Self-driving Labs, Mobile Robots in Material Discovery workflows, and Robotics & Embodied-AI for lab automation.* KUKA Robotics UK trained & certified developer. 11 years of research and technical experience in Robotics and Autonomous Systems. I currently hold UK Settlement/ILR status.

EMPLOYMENT HISTORY

Feb. 2023 - Present	**Research Associate - Robotics, Cooper Group, Materials Innovation Factory, University of Liverpool, United Kingdom.** *Objective:* Devise robust strategies for integrating mobile robots with chemistry laboratory hardware and instrumentation. *Other Responsibilities: Robot workflow Integration, Robot training to new users, Co-supervise students.*
Dec. 2021 – Jan 2023	**Research Associate - Robotics, Centre for IROHMS, Cardiff University, United Kingdom.** *Objective: To develop new techniques, algorithm and software to enable mobile robots to perform tasks of autonomous workflow.* *Other Responsibilities: Lab Management, Robot training to new users, Co-supervise students.*
Jan. 2018 – Nov. 2021	**Research Fellow – Robotics at Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram, India** *Objective:* Full-time research on AI based Control and Operation of Agents in a Multi-Agent Fixturing System with Swarm Control. *Funded by:* PMAR robotics research lab, University of Genova, Italy *Other responsibilities*: Half-time teaching – Robot kinematics & dynamics, AI, Design Optimisation. *Funded by:* Ministry of Education, Govt. of India
May 2016 – Dec. 2017	**Assistant Professor at Department of Mechatronics, Bannari amman Institute of Technology, India**
Jun. 2014 – May 2016	**Assistant Professor at Department of Mechatronics, Sri Krishna College of Engineering and Technology, India**

EDUCATION

Jan. 2018 – Sept. 2021	**PhD**, **Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram, India** *Thesis title:* Constrained locomotion and coordinated multi-robot path planning of SwarmItFIX intelligent fixtures. *Fellowship:* HTRA, Ministry of Education, Govt. of India *Responsibilities:* Half-time teaching - Design and analysis of mechanisms, Kinematics and dynamics, Mechatronics System Design
Jul. 2012 – May 2014	**M.Tech. – Robotics, SRM Institute of Science & Technology (Deemed University), India** *Thesis title*: Design and development of alive human detection robot for search and rescue missions using image acquisition and processing
Aug. 2008 – Apr. 2012	**B.E. – Mechatronics, Anna University, India**

OTHER QUALIFICATIONS

Sep. 2024 – Jan. 2025	**AFHEA** – The Academy, University of Liverpool, United Kingdom.
September 2023	**LBR iiwa Commissioning and Programming,** KUKA Robotics UK Limited, Birmingham, United Kingdom

KEY RESEARCH PUBLICATIONS

ACCEPTED PAPERS **(ICRA 2025)**	Hatem Fakhruldeen*, **Satheeshkumar Veeramani*,** Cooper A et. al **et al.,** Multimodal Behaviour Trees for Robotic Task Automation in Life Science laboratories, ***ICRA 2025*** ***(* First author Equal Contribution)*** Zhengxue Zhou, **Satheeshkumar Veeramani,** Cooper A et. al **et al.,** GenCo: A Dual LVLM Generate-Correct Framework for Adaptive Peg-in-Hole Robotics, ***ICRA 2025*** Munguia F, Lousi Longley, **Veeramani S,** Cooper A et. al. An Open-source Robotic Capping Machine Suitable for Confined Spaces, ***TAROS 2025***
PAPERS SUBMITTED / UNDER CONSIDERATION	Brass E, ***Veeramani S***, Cooper A, et. al. *A mobile robot process chemist.* ***Science | AAAS Paper*** ***Veeramani S***, Zhou Z, Fakruldeen H, Cooper A et. al. *PREVENT: Proactive Risk Evaluation and Vigilant Execution of Navigation and Manipulation Tasks for Mobile Robotic Chemists.* ***(IEEE RAL)*** Zhou Z, ***Veeramani S,*** Cooper A et. al LIRA: Localization, Inspection, and Reasoning Module for Autonomous Workflows in Self-Driving Labs. (Submitted to ***nature portfolio Self-driving labs and automation software for chemistry and materials science***) https://doi.org/10.21203/rs.3.rs-6148048/v1 Kourosh Darvish et. al. MATTERIX: Towards a Digital Twin for Robotics-Assisted Chemistry Lab Automation. (Submitted to ***nature computational intelligence***) Munguia F, **Veeramani S,** Cooper A et. al. Chemist Eye: A VLM-Powered System for Robot Decision-Making Driven by Personal Protective Equipment Monitoring and Accident Detection in Self-Driving Labs
SCI indexed articles	***Veeramani Satheeshkumar***, Sreekumar Muthuswamy, Keerthi Sagar, and Matteo Zoppi, Artificial intelligence planners for multi-head agent path planning of SwarmItFIX agents. *Journal of Intelligent Manufacturing (2020).* **(SCI, Q1, IF 6.49)** https://doi.org/10.1007/s10845-019-01479-8 ***Veeramani S***, Muthuswamy S, Hybrid type multi-robot path planning of a serial manipulator and SwarmItFIX robots in sheet metal milling process. *Complex and intelligent Systems (2021)* **(SCI, Q1, IF 6.7)** https://doi.org/10.1007/s40747-021-00499-3 ***Veeramani S***, Muthuswamy S, Reinforcement learning based path planning of multiple agents of SwarmItFIX robot for fixturing operation in sheet metal milling process. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture (2022)* **(SCI, Q1, IF 2.6)** https://doi.org/10.1177%2F09544054221080031 F. Munguia-Galeano, ***S. Veeramani***, J. D. Hernández, Q. Wen and Z. Ji, "Affordance-Based Human–Robot Interaction with Reinforcement Learning," in *IEEE Access, (2023)*, **(SCI, Q1, IF 3.9)** https://doi.org/10.1109/ACCESS.2023.3262450
Book chapters and Conference presentations	***Veeramani S***, Muthuswamy S, Sagar, K, and Zoppi, M, Multi-head agent Path Planning of SwarmItFIX Agents: A Markov Decision Process Approach, *In: Uhl T. (eds) Advances in Mechanism and Machine Science, Springer,* 2019. **(Scopus)** https://doi.org/10.1007/978-3-030-20131-9_221 ***Veeramani S*** and Muthuswamy S, Reinforcement Learning based Path Planning of the Mobile Agents with Constrained Locomotion for the Material Handling Applications*, IEEE 4th Conference on Information & Communication Technology (CICT), 2020*. **(Scopus)** https://doi.org/10.1109/CICT51604.2020.9311923 ***Veeramani S***, Muthuswamy S and Setchi R, Coordination and path planning of a heterogeneous multi-robot system for sheet metal drilling, *26th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems*, *Procedia Computer science*, 2022, Verona, Italy. **(Scopus)** https://doi.org/10.1016/j.procs.2022.09.292

ROBOTS – HANDS-ON EXPERIENCE	Care-O-bot4 (humanoid)		ABBIRB120, 1410	ABB Yumi
	Franka Emica Panda, UR5		Kuka KMR, YouBot, iiwa	MCI Delta Robot
OTHER KEY EQUIPMENTS	Vicon motion tracking system	Tobii glasses, Touch haptic device	Tactile and FT sensors	RealSense depth camera

SOFTWARE SKILLS - ROBOTICS	ROS, & ROS2 Python, Java, C++, MATLAB CoppeliaSim, Webots & IsaacSim GitHub, Conda & Robostack	Linux system (Ubuntu) Kuka Sunrise 1.16, Robot Studio (RAPID) SolidWorks, Fusion 360 & Inventor PLC Programming

ROBOTICS COURSES COMPLETED	
Dec. 2022	**Ros2 for Beginners,** Udemy **(Online)**
July 2021	**Fundamentals of Cobotics,** IIT Delhi (**Online)**
Sep. 2020	**Deep Learning with MATLAB**, MathWorks **(Online)**
Sep. 2020	**Machine Learning with MATLAB**, MathWorks (**Online)**
Sep 2019	**Fundamentals of Reinforcement learning**, University of Alberta (**Online)**
Jul. 2015	**AUTONAVx: Autonomous Navigation for Flying Robots**, Technische Universität München
KEY INVITED LECTURES	Handled a technical session on **Hardware Integration and *Simulation* using ROS** in the two-week Hybrid FDP on "AI & ROS for Robotics: Theory and Practice" organised by IIITDM. **June 2024** Handled a technical session on ***Tools for Hardware Integration and AI Implementation in Robotics*** in the ATAL two-week Hybrid FDP on" COLLABORATIVE ROBOTS AND DRONES" organised by Amrita Vishwa Vidyapeetham, Chennai. **Dec. 2022** Handled a technical session on ***Industrial Automation & PLC*** in the one-week online STC on "Integration of Robots, IoT Devices and Computer Vision in Smart Manufacturing: Fundamentals" organised by IIITDM Kancheepuram. **Feb. 2022** **Handled practice sessions** on ***Robotics Systems Toolbox*** (Trajectory planning), Coppelia sim in various workshops and STTPs during my PhD.
ROBOTICS EVENTS - ORGANIZED	**Facilitator,** "**Robot Chemist Demonstration at British Science Festival,** Liverpool, UK. **Sept. 2025** **Organising team member** "IROHMS – Future Leaders Academy", a research colloquium on AI, Robotics and Human-Machine systems**,** Cardiff University, UK. **June 2022** **Student organizer** for the international conference on Robotics and Smart Manufacturing (RoSMa 2018) held at IIITDM Kancheepuram **Student coordinator** for the PhD colloquium, international conference on Advances in Robotics (AIR 2019) held at IIT Madras **Student organizer** for the International Student Robot Competition (ISRC 2018) held at IIITDM Kancheepuram
LANGUAGE SKILLS	**Tamil** Native Speaker **English** Very good command **Kannada** To articulate **Hindi** Basic Understanding
HOBBIES	Coding, Reading fiction books, Jogging,
INTERNSHIPS	
Jan. 2012 – Mar. 2012	**Internship, Steel Authority of India Ltd. (Govt. of India)** Title: Design and adaption of exit crop shear in slitting line.
Apr. 2011 – May 2011	**Summer internship, Integral Coach Factory. (Govt. of India)** Investigated various manufacturing processes (Raw material to Job) involved in building various Indian train coaches
REFERENCE	**Prof. Andy Cooper, Professor,** Academic Director of the Materials Innovation Factory and Director of Leverhulme Research Centre for Functional Materials Design, The University of Liverpool, United Kingdom. aicgroup@liverpool.ac.uk **Dr Hatem Fakhruldeen**, Theme lead – Robotics, Cooper Group, The University of Liverpool, United Kingdom. H.Fakhruldeen@liverpool.ac.uk. **Dr. Gabriella Pizzuto,** Lecturer in Robotics and Chemistry Automation, Department of Computer Science, University of Liverpool, United Kingdom Gabriella.Pizzuto@liverpool.ac.uk