



Dr. Hannan Ejaz Keen

Expert in Perception, Artificial Intelligence, and Robotics

About Me

Dedicated educator and researcher with a PhD in Computer Science (Autonomous Mobile Robotics) and 9+ years of transnational teaching and research experience. Proven track record of securing international research funding (€1M+), publishing in top-tier robotics conferences (ICRA, IROS), and leading interdisciplinary projects. Passionate about fostering innovation, mentoring students, and bridging academia with industry.

Professional Experience

Senior Researcher

(Mar 2024 – Till Date)

Research and Innovation at Xitaso GmbH

- Leading German ministry-funded research projects:
 - VALISENS** – A smart city project; developed multi-sensor multi object detection and tracking pipeline for autonomous vehicles. - [Link](#)
 - ENGEL** – A safe flight navigation project; Developing a self-adaptive multi-modal perception system for safe helicopter landing. - [Link](#)
- Managing team of 10 researchers in the **Autonomous Systems** division.
- Writing research publications, proposals and organizing resource allocation, cross-departmental collaboration, and long-term roadmaps.
- Recent Achievement:** Best Student Paper award in *VEHITS 2025*.

Research Associate

(Sep 2019 – Feb 2024)

Robotics Research Lab at RPTU Kaiserslautern Landau

- Developed multi-modal perception system for autonomous off-road vehicles using computer vision and deep learning techniques.
- Developed HMI for driverless campus bus using novel perception system to detect and avoid vulnerable road users (VRUs).
- Taught Autonomous Mobile Robotics & Computer Vision courses.
- Supervised 5 Master's theses and 4 Bachelor's projects.
- Published peer-reviewed papers in ICRA, IROS, and top-tier robotics conferences.
- Led grant proposals securing €1M+ in research funding for AI-driven robotics projects
- Contributed to multiple advanced research projects:
 - Nalamki** - Conducted multispectral and heat signature analysis using multispectral imagery using image processing techniques.
 - Ponton Boot– POBO** - Developed perception architecture for surface water vehicles using machine vision and deep learning techniques.
 - JD Mapping** - Delivered elevation mapping pipeline using multi-modal sensory data captured via aerial drones and field tractors.
 - Autonomous Campus Bus** – Developed multi-modal fusion techniques for offroad vehicle to safely navigate by avoiding VRUs.

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Nationality

German

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Google Scholar

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Research Interests

Artificial Intelligence
Deep Learning
Reinforcement Learning
Generative AI
Computer Vision
Perception
Sensor Fusion
Mapping
Autonomous Vehicles
Robotics

HARDWARE EXPERTISE

Drones

Mikrokopter's Octocopter
DJI Mavic Air
GD's Basilisk
In-house built Astrider
TUK Campus Bus

Sensors

Ouster LiDAR
Velodyn LiDAR
Nerian Stereo Camera
ZED Stereo Camera
Tritech's Mikron Sonar
Tritech's Gemini 720ik
Trimble GNSS
Starfire GNSS
Parrot Sequoia Multispectral
Camera
Flir Vuo Pro Thermal Camera
RadarTeam's Cobra Wireless
Ground Penetrating Radar

SOFTWARE EXPERTISE

Languages

C/C++
Python
Bash

Frameworks/Software

OpenCV
Tensorflow, Pytorch
FINROC
ROS/ROS2
MATLAB
Pix4DMapper/Pix4DField
Docker
Gitlab/Github
Confluence, Jira
Sharepoint/MS Office
DrawIO
Overleaf/Latex

Lecturer/Associate Lecturer

(Feb 2014 – Jan 2018)

Computer Science Department at University of Central Punjab Lahore

- Taught 6+ core courses: Introduction to Computing, Programming Fundamentals, Object Oriented Programming, Data Structures, Operating Systems.
- Mentored 10+ student projects.
- Consistently rated 4.5+/5 in student evaluations for teaching effectiveness.
- Contributed to curriculum development and course updates.

Educational Background

(Feb 2018 – July 2024)

Doctor of Philosophy (Ph.D.) in Computer Science

Robotic Research Lab – RPTU Kaiserslautern Landau

Dissertation: Traversability Mapping in flooded environment using unmanned surface vehicle.

Description: The critical challenge in a post-flood environment is the destruction of the environment and the unavailability of an updated map for rescue operations. In my Ph.D. research, I have developed a surface water robotic platform that detects surface water and underwater obstacles that can be dangerous for robot navigation and generates a traversability map. The essential requirements of such a system are reconfigurability, robustness, reusability, and precision. I have several peer-reviewed publications in this research area.

MS in Electrical Engineering

(Sep 2014 – June 2016)

Lahore University of Management Sciences

Dissertation: Conflict Avoidance among multiple Unmanned Aircrafts using Reinforcement Learning.

Relevant Courses: Robot Motion Planning, Stochastic Processes, Mobile Robotics

BSc. in Electrical Engineering

(Sep 2009 – Oct 2013)

University of Engineering and Technology Lahore

Research Grants

1. **BMWK:** Valisens (€550k, 2023-2025), ENGEL (€600k, 2024-2028), NaLamKI (€420k, 2021-2024), Ponton Boot (€300k, 2019-2021)
2. **DAAD Grants:** FYEOAR (€50k, 2019-20), AMS-HyRes (€50k, 2020-21), CoPest (€50k, 2022-23), Abiotic Stress (€50k, 2024-25)

Trainings

1. "Understanding the Ground Penetrating Radar" from RadarTeam Sweden AB, 2022.
2. "Drone Flight Training and License", 2020.
3. "Data Protection – Basic Knowledge (Level 1)", 2024
4. "Data Protection – Data Processing (Level 1)", 2024
5. "How to Recognize Phishing?", 2024
6. "Information Security", 2024
7. "Basics Secure Software Development", 2024

SOFT SKILLS

Problem Solving
Focused
Consistent
Team Player
Research
Adaptability
Time Management

LANGUAGES

Urdu (Native)
Punjabi (Mother tongue)
English (C1 Level)
German (B1 Level)

Publications

- Wan, L., **Keen, H.E.**, Vinel, A., "The Components of Collaborative Joint Perception and Prediction – A Conceptual Framework," 11th International Conference on Vehicle Technology and Intelligent Transport System VEHITS 2025, **Best Student Paper**.
- Wan, L., Zao, J., Wiedholz, A., Bied, M., Martinez de Lucena, M., Jagtap, A. D., Festag, A., Fröhlich, A. A., **Keen, H. E.**, Vinel, A., "A Systematic Literature Review on Vehicular Collaborative Perception - A Computer Vision Perspective," IEEE Transactions on Intelligent Transportation Systems, Submitted Publication 12.2024.
- Mirlach, J., Wan, L., Wiedholz, A., **Keen, H.E.** and Eich, A., 2025. R-LiViT: A LiDAR-Visual-Thermal Dataset Enabling Vulnerable Road User Focused Roadside Perception. arXiv preprint arXiv:2503.17122 (Submitted to ICCV 2025).
- **Keen, H. E.**, Berns, K., "Traversability mapping for safe navigation in flooded environment," IEEE/RSJ International Conference on Robotics and Automation (ICRA), London, England, 2023, Accepted Poster.
- **Keen, H. E.**, Berns, K., "Probabilistic Fusion of Surface and Underwater Maps in a Shallow Water Environment," Advances in Service and Industrial Robotics. RAAD 2023. Mechanisms and Machine Science, vol 135. Springer, Cham.
- **Keen, H. E.**, Berns, K., "Denoising and Segmentation of SONAR Images for Rescue Operations. International Symposium on Robotics," ISR Europe 2023. Stuttgart.
- Meckel, D., **Keen, H. E.**, Heupel, C., Berns, K., "Transferring off-road control concepts to watercraft used in flooded areas," Commercial Vehicle Technology 2022. ICVTS 2022. Proceedings. Springer Vieweg, Wiesbaden.
- **Keen, H. E.**, Jan, Q. H., and Berns, K., "Drive on Pedestrian Walk. TUK Campus Dataset," 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, 2021, pp. 3822-3828.
- Zaheer, M.H., Mehdi, S.A., **Keen, H.E.**, Berns, K., "Detection of Fungus in Gladiolus Fields Using a Quadcopter," Advances in Service and Industrial Robotics. RAAD 2021. Mechanisms and Machine Science, vol 102. Springer, Cham.
- **Keen, H.E.**, Berns, K., "Generation of Elevation Maps for Planning and Navigation of Vehicles in Rough Natural Terrain," Advances in Service and Industrial Robotics. RAAD 2019. Advances in Intelligent Systems and Computing, vol 980. Springer, Cham.

References

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