

# Madiyar Mukanov

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in muqantegi

*MSc Robotics graduate passionate about intelligent perception,  
real-time control and human-centric robots*

## Robotics Experience

- Apr 2026– **Robotics Engineer**, *EnterAR LLC*, Almaty (Hybrid)  
Present
- Developing multi-robot systems with ROS 2, including fleet management and distributed coordination.
  - Working on BIM and digital twins, mapping, and collision avoidance for autonomous robot navigation.
  - Built backend services and action interfaces using FastAPI for robot control and monitoring.
- Jul 2025– **Robotics Engineer**, *CodiPlay*, Abu Dhabi
- Apr 2026
- Developed and maintained Python-based robotics modules, focusing on control logic and sensor interaction.
  - Implemented and tested hardware-software integration for embedded/robotics devices.
  - Performed debugging, testing, and optimization of Python code; improved stability and reduced runtime errors through structured test scenarios.
  - Participated in IT infrastructure discussions to support deployments, data storage, and internal tooling.
  - Worked cross-functionally in a startup/R&D environment, handling diverse tasks where engineering support was needed.
- Sep 2023– **Research Engineer, Robotics & Mechatronics Lab**, *Satbayev University*, Almaty
- Jul 2025
- Designed thermal-vision module (Pi Camera 2 + MLX90640 overlay) achieving  $\pm 1^\circ\text{C}$  accuracy; integrated face-tracking.
  - Built a computer vision pipeline in Python using OpenCV for face detection/recognition, and integrated it into the system's processing and monitoring logic.
  - Worked with CNN models, adapting vision models for image detection and analysis; performed testing, debugging, and optimization to improve reliability and performance.
  - Designed the software system architecture for data flow and storage; automated data collection, storage, and synchronization using SQLite (server-side style data logging).
  - ROS/ROS2 fundamentals and practiced building robotics nodes and message-based communication in a Linux environment to support scalable robotics software development.
  - Published a Springer conference paper (Scopus-indexed) on AI/robotics applications "An Intelligent System for Automated Monitoring and Control of Patient Conditions"
- Mar 2025 **Research Intern**, *Shanghai Jiao Tong University*, Shanghai
- Completed an internship at Shanghai Jiao Tong University, focusing on 3D printing technologies and industrial workflows.
  - Studied industrial and research-grade 3D printers (hardware components, motion systems, materials, calibration, quality control).
  - Explored China's additive manufacturing ecosystem: manufacturing scale, supply chains, R&D practices, and rapid prototyping/production cycles.
  - Reviewed medical 3D printing use cases (patient-specific models, surgical planning, custom implants/prosthetics) and the typical end-to-end workflow from imaging data to printed parts.
  - Documented observations and key takeaways, presenting findings to the team with practical recommendations for applying best practices in engineering and product development.
- Dec 2020– **Backend Developer (Contributor)**, *Kazakhstan Pavilion, EXPO Dubai 2021*, Dubai
- Jan 2021
- Assisted the backend team with day-to-day technical tasks: basic feature support, bug fixing, and system checks.
  - Worked with API/data flow troubleshooting and helped validate correct data exchange between components.
  - Participated in testing and quick fixes in a fast-paced event environment.

Summer 2019 **Intern (Sakura Science)**, *Kyoto Institute of Technology*, Kyoto

- Built a prototype bicycle speedometer: sensor-based speed detection, signal processing, and real-time display logic.
- Performed calibration and testing to improve measurement stability and accuracy.
- Documented the design and implementation steps for reproducibility.

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## Education

2023–2025 **M.Sc. Robotics**, *Satbayev University*, Almaty

**Thesis:** Intelligent System for Automated Patient Monitoring via Thermal Imaging

Key coursework: Advanced Robotics Control, Machine Vision, Embedded Real-Time Systems

2017–2022 **B.Sc. Nuclear Physics**, *Al-Farabi Kazakh National University*, Almaty

**Thesis:** Static correlation properties of thermonuclear plasma (HNC method)

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## Technical Skills

Multi-Robot	Master/Agents architecture, distributed coordination (collision avoidance, zone permissions), namespace mapping, fleet management
Robotics / ROS	ROS 2 (Humble), ROS 1, Nav2, BehaviorTree.CPP, TF2, launch files, rclpy/rclcpp, custom srv/action interfaces
Simulation & Middleware	Stage, Cyclone DDS, Groot 2
Perception / CV	OpenCV, PyTorch, TensorFlow Lite, cycleGAN
Programming	C++, Python, C#, MATLAB, Git
Backend / API	FastAPI, REST, ROS 2 Action Servers, SQLite
Embedded / HW	Raspberry Pi, ESP32-CAM, I <sup>2</sup> C/SPI/UART
DevOps / Tools	Linux, Docker, docker compose, colcon, GitLab, GitHub

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## Publications

- 2025 Mukanov, M., et al. (2025). *An intelligent system for automated monitoring and control of patient conditions*. In *Proceedings of the International Conference on AI and Robotics*. Springer. [https://doi.org/10.1007/978-3-032-05545-3\\_32](https://doi.org/10.1007/978-3-032-05545-3_32)
- 2023 Mukanov, M., et al. (2023). *Psychological profile of graduate students of technical specialities*. *Bulletin of Psychology*, Abai Kazakh National Pedagogical University. <https://doi.org/10.51889/2959-5967.2024.79.2.010>

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## Selected Projects

- 2024 **Thermal-Vision Telehealth Camera** – full-stack Python/Linux app with Matplotlib UI and DB logging.
- 2021 **Plasma Simulation Toolkit** – investigated radial distribution function (RDF) and static structure factor (SSF) for the BIM (Binary Ionic Mixture) model using the HNC (Hypernetted Chain) approximation; presented at Farabi Alemi conference.
- 2019 **Autonomous Bicycle Speedometer** – 1<sup>st</sup> place, International Competition in Electronics.

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## Additional Research

2019–2021 **Undergraduate Research Assistant**, *Al-Farabi KazNU & Kazakh-British Technical University*, Almaty

Surface modification via PECVD and plasma etching; maintained vacuum lab equipment.

## Awards & Leadership

2019 *Award for Excellence in Electronics*, Kyoto (1<sup>st</sup> place)  
3<sup>rd</sup> place, Student Business Incubator Pitch, Almaty

2017–2022 Full Academic Scholarship, Al-Farabi KazNU

## Languages

Kazakh (native) • Russian (native) • English (IELTS 7.0) • Arabic (beginner)