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# Jainik Mehta

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🇮🇳 Citizenship: Indian

🎂 Date of birth: 06/07/2001

📺 [youtube.com/@\\_JAINIK](https://www.youtube.com/@_JAINIK)

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## About Me

A full-stack Robotacist and a Mechanical Engineer with 2 years of experience in CAD modeling and 3-D printing, CNC machining, linear and non-linear control systems, electric and pneumatic actuators, machine learning, digital and analog electronics, engineering simulation, signal and image processing. My research interests encompass defense robotics, bio-inspired robots, human-robot interaction, computer vision-based navigation, aquatic robots, aerial robots, and soft robot control.

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## Education

### Technion - Israel Institute of Technology

Aug 2019 - Aug 2023

BSc. Mechanical Engineering (Minor in Robotics)

Haifa, Israel

- GPA: 83.8% - Graduated with one semester worth of extra credits. Total 176 out of 157.5 required for degree. Took several advance graduate level courses.
  - 7th semester GPA: 85% (*Dean's list*), 8th semester GPA: 87% (*Dean's list*)
  - Worked with multiple research groups/labs. Took 2 final year projects even though only one was required for the degree. Participated in several startups events/competitions both in Israel and abroad.
  - Relevant Courses: *Introduction to Robotics, Kinematics Dynamics and Control of Robots, Introduction to Control, Control Theory, Seminar in Robotics, Advance Control and Automation Lab, Cyber-physical Systems, Cognitive Robotics, Introduction to Mechatronics.*
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## Research Experience

### Computational Robotics Lab

May 2023 - Aug 2023

Research student, Advisor: [Prof. Sarah Keren]

Haifa, Israel

- Developed ROS packages enabling synchronized motion of UR5 and UR3 robots with 6 degrees of freedom. Recieved hands on training on robot maintenance and handling.
- Acquired proficiency in numerous Linux commands and successfully collaborated with fellow lab peers.
- Simulated the Helios2 3D camera and two distinct types of UR robot grippers within Gazebo.
- Implemented machine learning algorithms to optimize the probability of successfully gripping objects based on point clouds generated from the camera's output.

## Complex Flow Lab

Apr 2022 - May 2023

Research student, Advisor: [Prof. Ian Jacobi]

Haifa, Israel

- Designed and built computer controlled experimental apparatus for experiment named "Rayleigh-Taylor turbulent instability criterion induced via nanoparticles".
- Made a few millimeters thin slider with microns thick inner wall, using rubber moulding process.
- Constructed an exceptionally precise gearbox assembly using SLS 3D printer to rotate nylon fabric at an accurate velocity over that slider, using a servo motor.
- Controlled servo motor via an Arduino board, which had a serial interface with a computer application designed with MATLAB App Designer.

## Mechatronics and Robotics Lab

Oct 2022 - Jul 2023

Research student, Advisors: [Mr Kfir Cohen, Mr Alon Ben Moshe]

Haifa, Israel

- Collaborated with a colleague to design and construct a tank-shaped remotely operated robot to address the gender determination challenge in alligators, which relies on precise temperature control during egg hatching.
- Innovated a specialized gripper mechanism attached to 4-DOF (degrees of freedom) arm mounted on the tank base in order to safely and securely grip the eggs.
- Designed custom parts in CREO that were subjected to stress analysis using SolidWorks and ANSYS. Utilized 3D printing and machined aluminum for manufacturing major components.
- Controlled robot's movement remotely, by implementing a ROS node on an onboard Raspberry Pi, which in turn managed the onboard electronics.
- Processed all levels of change orders through the PLM system. Responsible for product TDP and ensuring functional dimensioning schemes, appropriate GD&T, appropriate QAP identification, and ASME Y14.5 compliance.

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## Professional Experience

### Technion Rocketry Club

Feb 2022 - Jul 2023

Structural Engineer

Haifa, Israel

- Designed and constructed the rocket's fuselage, performed flow analysis using Ansys, and conducted thorough structural simulations in SolidWorks. Collaborated closely with fellow engineers to seamlessly integrate various components within the rocket's overall design.
- Gained valuable hands-on experience in refractory metal processing techniques, nylon MJF 3D printing, carbon and glass fiber molding, and precision laser cutting.

### INTSITE Robotics

July 2021 - Mar 2022

Robotics Engineer Intern

Hybrid - Tel Aviv, Israel

- Implemented SRN-PointNet++ and 3dContextNet Pointwise Multilayer Perceptron Algorithm in python for detecting tanks and human soldiers based on LiDAR sensor data with 92% accuracy.
- Managed Intellectual Property through patent searches, patent applications, and trade studies.
- Worked with ground control software's like QGC and Mission Planner. Additionally worked with UAV control software suits like ArduPilot and PX4 autopilot.
- Integrated a range of custom-made UAV electronics with proper mechanical safety, including LiDAR sensors for precise terrain mapping, high-efficiency brushless motors, advanced GPS modules and long range communication systems to ensure seamless data transfer.

## Motorika - Robotic Rehabilitation Solutions

Aug 2020 - Mar 2021

Robotics Design Engineer Intern

Hybrid - Caesarea

- Contributed to the design and development of a robotic exoskeleton arm for upper limb rehabilitation, including material selection for components, and creation of 2D technical drawings to ensure precise fabrication.
- Assessed various electric and pneumatic actuators, while precisely calculating the necessary force requirements for specific joints. Developed electrical schematics and utilized sophisticated instrumentation, including multi-channel oscilloscopes, to rigorously test and validate the performance of these circuits.
- Designed and executed tests/experiments to evaluate the mechanical stability and structural integrity of the robotic arm.
- Collaborated with interdisciplinary teams to integrate various sensors, such as accelerometers and gyroscopes, into the robotic arm, enhancing its motion tracking and control capabilities.

## Marble Robotics (CAT Robotics)

Feb 2020 - May 2020

Robotics Software Engineer Intern

Work from home

- Assisted in Test Driven Development of highly scalable cloud based navigation and planning software for food delivery robots.
- Leveraged git version control and collaborated closely with a cross-functional team of software developers, roboticists, and engineers.
- Implemented robust real time MQTT network protocols within the cloud-based software infrastructure, facilitating seamless communication and data exchange between food delivery robots and central control systems.
- Fortified data integration and communication security by proficiently implementing industry standard security measures, including AES, secure socket layers (SSL/TLS) and MFA protocols.

## Technion International office

Jan 2020 - Feb 2021

Student Ambassador

Haifa, Israel

- Developed promotional materials like brochures and videos to communicate benefits of Technion International's undergraduate program to a broader audience.
- Met and talked with prospective students at student fairs. Organized and managed Technion international student events.
- Provided personalized guidance to incoming international students, aiding in their transition to a new academic and cultural environment of Israel.

## Elvister.com

Sep 2017 - Jul 2019

Founder, CEO

Nagpur, India

- Used CSS and HTML to design and develop a website that presents the latest scientific research in a simplified and interactive manner to high school students. Built server backend using PHP.
- Read and summarized several latest research papers. Collaborated with teachers and classmates throughout the project. Gained thorough understanding of scientific writing.

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## Software Skills

**Expert:** SolidWorks, Creo, Arduino, MATLAB, Mathematica, Excel

**Proficient:** ROS(1&2), Fusion 360, AutoCAD

**Intermediate:** DaVinci Resolve, AutoCAD Electrical, Ansys, ArduPilot, PX4 autopilot, Blender

# Programming Language Skills

**Expert:** C++, C, Python

**Proficient:** CSS, LaTeX, HTML

**Intermediate:** PHP, JavaScript, Dart, SQL

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## Language Skills

**Expert:** English, Hindi, Gujarati

**Proficient:** Marathi

**Intermediate:** Hebrew

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## Achievements / Extra - Curricular

- **Gold Medal in BME Hackathon, Technion:** Designed a smart mosquito trap in Fusion 360 which used yeast cell to generate CO<sub>2</sub> from organic waste. Pitch the idea under 5 mins.
  - **Volunteering, Melech Club, Technion:** Club collects old computers from people across Haifa, upgrade and repair them, and donate them back to those in need. My responsibility included upgrading HDD to SSD, adding new RAM modules and reinstalling operating system via central server.
  - **Technion Merit based scholarship:** Tuition scholarship for scoring 95% in CBSE class 12 exam.
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## Projects

### Reusable car cover for paint jobs

Mar 2023 - Jun 2023

*EuroTeQ - Joint university course*

TU'e, Netherlands

- Designed a unique and environmentally conscious reusable car cover with canvas and 3M coating to significantly reduce plastic waste in car painting processes.
- Pitched the idea in front of the Dutch Ambassador and the CEO of ABS Autoherstel at CTU, Prague, Czech Republic.

### App to detect diabetic retinopathy

Nov 2022 - Jan 2023

*Machine learning in Healthcare course*

Technion, Israel

- Built an android app using Flutter framework and Dart language that incorporated CNN based ML model coded in Python to detect diabetic retinopathy with 95% accuracy. The app took an image of the eye via a smartphone camera for analysis.

### Nuclear Thermal Rocket Simulator

Jul 2022 - Feb 2023

*Digitalization of Thermal energy Technologies course*

DTU, Denmark

- Modeled and simulated a NTP rocket engine using fundamental equations and used MATLAB app designer for designing user interface. Verified transient simulation using BoilFAST software.
- Acquired comprehensive insights regarding diverse rocket parameters, including the hydrogen boil-off rate, maximum thrust generation, and specific impulse of the rocket.

## Automatic potato peeling machine

Product design course

Mar 2021 - Jun 2021

Technion, Israel

- Used CREO design and simulate an innovative and fully automatic potato peeling machine tailored for small to large-scale restaurants, capable of peeling potatoes in as little as 10 seconds, providing significant time savings for busy food service operations while incorporating a user-friendly interface for ease of use and maintenance.
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## Research Papers and Poster Presentations




- Presented paper on "Shard Systems: Scalable, Robust and Persistent Multi-Agent Path Finding with Performance Guarantees" to class of 50 students in the faculty of Computer Science.
  - Co-authored and presented paper titled "Security and Safety for Cyber-Physical Systems: Inverted Pendulum" to class of 30 students in the faculty of Mechanical Engineering, Technion.
  - Co-authored and presented paper titled "Age estimation using 12 lead ECG with Domain adaptation and Deep learning" to class of 40 students in the faculty of Biomedical engineering, Technion.
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## Other Personal Projects/Hobbies


- Started You-Tube channel for explaining university level courses.
  - Made 2-D sprite-based video game using WIN-32 API and C language.
  - Started a social media startup, where student's within university can connect and help each other for in app rewards. Currently app is in Alpha testing (more details on my website).
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## References




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