Taras Fliorko

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Final-year Robotics student at SETU, focused on underactuated robotics, dynamics and control. Experience in mathematical modelling, nonlinear simulation and mechanical design through reaction-wheel cube research, rover development and drone navigation.

Education

South East Technological University (SETU), Carlow, Ireland 2023 – May 2027

BEng (Hons) in Robotics and Automated Systems

Lviv Polytechnic National University, Ukraine September 2021 – May 2023

Computer Science and Internet of Things

Research Interests

Underactuated robotics; dynamics and control; mathematical modelling and numerical simulation; physics.

Research Experience

Gimbaled Reaction Wheel Cube Present

Final-year project | SETU

- Developing a reaction cube that replaces 3 orthogonal flywheels with 1 gimbaled reaction wheel to investigate controlled tipping and balance
- Built a Python nonlinear model and evaluated 19,088 simulated cases across 157 flywheel geometries to assess the proposed motion and control
- Developed a weighted optimisation algorithm to rank alternatives and select the best tested design

European Rover Challenge - Robotic Arm Manipulator September 2024 – October 2025

University research project | SETU

Supervisor: Andrew Keppel

- Designed components for a lightweight 6-axis rover arm in SolidWorks and Fusion 360, using stress simulation to balance rigidity and mass with a factor of safety of 5
- Developed and simulated Python control logic for the manipulator and contributed to mechanical assembly to support arm integration

Projects

Drone Navigation without GNSS October 2026

Team project | EUDIS Defence Hackathon Ireland

- Co-developed and simulated a stereo-vision algorithm for GNSS-denied drone navigation, combining optical flow, least squares estimation and Kalman filtering
- Validated navigation on real data at approximately 2% final position drift and contributed to physical drone integration; the team reached the hackathon finals

Smartbreadboard Programmable PCB January – August 2026

Individual research project

- Designed a programmable breadboard to address manual rewiring during prototyping, with circuit connections selected and changed through software
- Integrated 2 MT8816 switch matrices with an I2C GPIO expander on a custom KiCad PCB and developed Arduino firmware to control circuit connections
- Produced a design with 256 programmable crosspoints and tested addressing and control signals using logic analyser captures and schematic checks

Ball Levitation System September – December 2025

University group project | SETU

- Integrated Arduino proximity sensing with a Siemens PLC over Modbus TCP as part of a team developing a closed-loop fan levitation system
- Tuned PID control and filtered sensor measurements to maintain ball height within ±3 mm of the target with a settling time of 10 seconds
- Designed and 3D-printed airflow components and sensor mounts to support team assembly and testing of the levitation system

Professional Experience

Carlow Toolmaking Services | Engineering Intern January – May 2026

- Produced and updated tool CAD in SolidEdge within a toolmaking team, maintaining drawing versions and manufacturing documentation for machining
- Applied guidance from toolmaking and machining specialists while supporting wire EDM setup and CNC milling as part of the workshop team

Insoftex | Software Development February – August 2024

- Developed a solar monitoring website with a software team, using Svelte and JavaScript to collect and visualise energy output and system performance
- Retrieved location and address information from satellite feeds for the monitoring project

Technical Skills

Programming and analysis: Python, C/C++, MATLAB, Simulink, JavaScript/TypeScript.

Control and embedded systems: Siemens TIA Portal, S7-1500 PLC, PID, Arduino, Modbus TCP, I2C.

Design and Electronics: SolidWorks, Fusion 360, Solid Edge, 3D printing, KiCad, Proteus, logic analyser.

Leadership and Activities

Chess Club Co-founder and Chairperson September 2024 – present

South East Technological University

- Co-founded and chaired a chess club with 25+ active members and built a team
- Organised weekly chess sessions, tournaments and events for the university club

Co-founded the university Astronomy Club