

Vishnuvardhan Shakthibala

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Education

Politecnico Di Milano

Milano, Italy

MSc in Space engineering

Sept 2018 - Jul 2021

- Average grade : 99/110 | Thesis grade: 6/7
- **Thesis title:** Autonomous motion planning spacecraft guidance for inspection mission
- Adopted the FMT* motion planning algorithm to find guidance law.
- Modeled the Spacecraft Inspection problem to be able to apply FMT* algorithm.
- **Main courses:** Orbital mechanics, Space mission design and analysis, Attitude dynamics and control, System Identification and Estimation, and Modeling and simulation of Aerospace systems

Alliance University, India

Bengaluru, India

Bachelor of Technology in Aerospace engineering

Aug, 2013 - Aug, 2017

- Cumulative GPA: 3.7/4.0
- Bachelor's thesis: Spacecraft trajectory optimization using Evolutionary Algorithm

CONFERENCES AND CONTRIBUTIONS

IAC 2024

Milan

Guidance and Control of CubeSat using Aerodynamic Forces for Space Debris Characterization

- Currently working independently towards manuscript submission.

IAC 2021 (Contributed)

Dubai

PHASE-A DESIGN OF ICE CREAM: A COST-EFFECTIVE MARS SAMPLE RETURN MISSION

- Team Advisor for the team that presented the project as a conference paper at IAC 2021, Dubai.

IAC 2021 (Contributed)

Dubai

ARGO: a planetary defense mission to test gravity traction techniques

- Part of the project that produced this paper. My role was to provide auxiliary support to all the subsystem, derive requirements from payloads, and develop a preliminary design of the On-board data handling architecture.

Work Experience

Simulation and Virtual Reality lab at University of Trento

Trento, Italy

Post graduate research assistant under [Prof. Mauro Da Lio](#)

Mar, 2023 - Present

- Supporting the development of the Green Co-Driver by integrating green driving functionality developed by University of Padova into an self-driving agent developed by University of Trento.
- Contributing to the integration of the Green Co-Driver agent into both static and dynamic driving simulators at UniTN and POLIMI.
- Utilized Carmaker software for rapid prototyping within the static driving simulator environment.
- Lead the transition of the project from Carmaker to Carla, ensuring broader applicability and independence with Open source platform.
- Engaged in dissemination and communication activities to promote the project's findings.
- **Skills:** Carmaker, C++/C, Python, Matlab, Carla, Rapid prototyping, ZMQ protocol.

Spacecraft dynamics control and system engineering group

Italy

Group leader (Volunteer Part-time)

Dec, 2023 - Present

- Co-Founder and group leader of an independent research group focused on Space systems.
- Driving and guiding the development of AOCS open-source simulator.
- Involved in research problems related to Cubesat formation flying, with a goal to develop robust GNC by leverage natural dynamics while respecting the constraints.

Brain technologies

Pordenone, Italy

System Validation Engineer at **Electrolux**

Jun, 2023 - Feb, 2024

- Functional validation (UI Firmware, CCF, Mainboard) of complete integrated prototypes
- Create a test plan which defines the kind of validation and verification that needs to be carried out
- Managing and solving issues with other departments.

Brain technologies

Trento, Italy

Software Developer for ADAS systems at **Stellantis - CRF**

Sep, 2022 - May, 2023

- Developing software in C++ on RTMaps for Software in loop testing aimed at Rapid prototyping.
- Successfully implemented the interfaces, enabling seamless integration of third-party devices – Radar, Camera from tier 2 providers into prototyping process.
- Automating and analyzing strategies to accelerate the migration of models from Simulink to RTMaps.
- Conducted bench tests to validate algorithms for real-time data processing using CAN data.
- Collaborated with the development team to fine-tune components/interfaces to reduce processing overload and increase the usability.
- Building interactive HMI using python to visualize ADAS/ADX features.
- Interacted with Dspace products – AUTERA AutoBox, Microautobox. CAN Message data logging and reading.
- **Skills:** RTMAPS, C++/C, Python, Matlab, Simulink, CAN protocol.

Polispace, Politecnico di Milano.

Milan, Italy

Junior Project Manager (Volunteer)

Nov, 2020 - May, 2021

- Supervised a team of 10 undergrads to work on end-to-end spacecraft subsystem design from high-level requirements.
- Conducted regular teaching activities to equip the team with necessary knowledge and skills in Mission design
- **Skills:** System engineering, Project management.

Society for Space education research and education

Bengaluru, India

Teaching Mentor (Volunteer)

Aug, 2020 - Mar, 2021

- Motivated and mentored interns to work on interesting space technology-related problems.
- Assessed and evaluated the quality of the internship projects.
- **Skills:** Teaching, Performance evaluation.

Skills

Programming Matlab, Python, C++, C, Shell scripting

Software Simulink, Real-time multisensor application (RTMAPS)

Miscellaneous Linux-Ubuntu, \LaTeX (Overleaf), Microsoft Office, Git, GNU build tools.

Soft Skills Team work, Time management, problem-solving, leadership, adaptability, communication.

University Projects

Drag Free trajectory control (DFTC)

Milan, Italy

Politecnico Di Milan

Nov 2020 - Dec 2020

- Modelled the multi-disciplinary domain of the Uni-directional DFTC system.
- Numerically analyzing the system dynamics and selecting suitable integrator.
- Simulated and analyzed the model for nominal and off-nominal conditions in MATLAB.
- Parametric study is carried out to study the sensitivity of the system performance with variations in parameters.
- Simulated and analyzed the model for nominal and off-nominal conditions in MATLAB.
- **Skills:** Modeling and Simulation of dynamic systems, Classical control theory.

ARGO - Phase A space mission design and analysis

Milan, Italy

Politecnico Di Milan

Feb, 2020 - Jun, 2020

- Designed the complex space mission using concurrent system engineering principles.
- Handled collection and dispersion of state-of-the-art data to multi-domain subsystems.
- Responsible for the preliminary design of the OBDH subsystem.
- **Skills:** Skills acquired: System Identification, State estimation, Monte Carlo Simulation, Control theory.

Preliminary orbital trajectory design and perturbation analysis

Milan, Italy

Politecnico Di Milan

Nov 2018 - Jan 2019

- **Preliminary Trajectory Design:** Mission was to find the optimal trajectory between Mars and Mercury by leveraging the fly-by maneuver around the earth. Various trajectories are evaluated by pruning the solutions from feasible porkchop plots (built using Ephemeris) combined with the optimal fly-by maneuver.
- **Perturbation Analysis:** Analyzed the evolution of the prescribed orbit with effects of perturbations such as 3-body and J2 perturbation.
- Obtained perturbed orbit was then compared with the real data from the existing orbit of comparable characteristics.
- **Skills:** Orbital/Space mechanics, Evolutionary algorithms (Genetic algorithm).

UAV system Identification and State estimation

Milan, Italy

Politecnico Di Milan

Jun 2020 - Aug 2020

- Frequency domain Grey box model identification of Linear lateral dynamics of UAV by using Experimental Data (with the aid of the Greyest function of Matlab).
- Data filtering was carried out by eliminating the noises and identifying the major frequency content of the dynamics.
- Prior to parameter estimation, the initial condition required for the Output error method was obtained by using both the Genetic Algorithm and Monte - Carlo Analysis.
- Designed Kalman filter (as a sensor fusion technique) to estimate the lateral velocity (one of the state variable) using inertial measurements.
- **Skills:** Orbital/Space mechanics, Evolutionary algorithms (Genetic algorithm).

Achievements & Scholarship

Handled the team as a project manager for AIAA UG Space mission design competition, AIAA

2021, US

University Financial Aid - DIRITTO ALLO STUDIO UNIVERSITARIO scholarship recipient, POLIMI

2018-2021, Italy

Top three finalists out of 76 , Design for additive Challenge (Competition by Additive Industries)

2017, Netherlands

Best New Entry team award , 33rd American Helicopter Society undergraduate student design competition

2016, US

Interests

Documentary, Films, Cricket, Snow-Boarding

Languages

English - IELTS - C1, 2017	Professional proficiency
Kannada	Native proficiency
Tamil	Bilingual proficiency
Italian	Beginner