



# Sidhant Kumar

## EDUCATION AND TRAINING

---

[ 11/2023 – Current ]

### PhD Student in Aeronautical and Space Engineering

*Sapienza University of Rome*

[ 2020 – 16/10/2023 ]

### Master Science Degree in Space and Astronautical Engineering

*Sapienza University of Rome*

**Final grade:** 110 cum Laude

**Thesis:** In Orbit Testing of Attitude Determination and Control System of WildTrackCube-SIMBA CubeSat

[ 2017 – 2020 ]

### Bachelor Degree in Aerospace Engineering

*Sapienza University of Rome*

**Final grade:** 110 cum laude

**Thesis:** Indirect Optimization of a Finite Time Impulsive Rendezvous Manoeuvre

[ 2011 – 2017 ]

### Scientific High School Diploma

*Liceo Scientifico Marcello Malpighi*

**Final grade:** 100

## PROJECTS

---

[ 09/2021 – Current ]

### S5Lab Activities

The main activities conducted as part of the research group of the Sapienza Space Systems and Space Surveillance Laboratory (S5Lab) are:

- CubeSat monitoring and operations ( WildTrackCube-SIMBA, Ledsat, Greencube)
- Participation at observation campaign, with particular focus on Ledsat

[ 10/2023 – Current ]

### RETINA Mission | REXUS Programme

The RETINA mission aims to demonstrate the functionality of innovative technologies using a sub-orbital launch. The mission comprises four different experiments: a low-cost real time navigation unit, an AI module for attitude estimation, an innovative thermal cooling system for space applications in a microgravity environment and a flexible time triggered ethernet (FTTE) for real-time communication.

#### Role and Activities:

- Attitude Payload Engineer
- Participation to Selection Workshop at ESTEC (7-11 November 2022)

[ 07/2022 – Current ]

### NIBBIO | Research Project

NIBBIO is a research project supported by the Italian Space Agency (Agenzia Spaziale Italiana - ASI) for the development of hybrid navigation systems.

#### Role and Activities:

- Student coordinator

- IMU sensor test and integration
- Attitude estimation through Kalman filter

[ 09/2021 – Current ] **GREENCUBE 3U CubeSat | Research Project**

Greencube is a 3U CubeSat developed by Sapienza University of Rome (S5Lab research group) and the Italian Space Agency (ASI), with the participation of the ENEA (Alternative Energy National Agency) and the University of Naples Federico II. Its objective is the autonomous cultivation of microgreens in orbit. The CubeSat was launched on 13/07/2022 with the VEGA-C maiden flight.

**Role and Activities:**

- CubeSat assembly and integration
- Environmental test campaign for qualification and acceptance to launch
- Technical report writing

[ 07/2022 – 12/2022 ] **LEDSAT 2 | Student Project**

LEDSAT 2 is a 3U CubeSat for the extension of LED based technology for ground-based satellite tracking and Space Traffic Management.

**Role and Activities:**

- Student System Engineer
- Participation to 'Fly Your Satellite!' 4th edition Selection Workshop
- Participation to 'Fly Your Satellite Design Booster' program
- Participation to training week at ESTEC (7-11 November 2022) and Selection Workshop (6-7 December 2022)

[ 09/09/2020 – 25/07/2021 ] **LOOPS-M (IGLUNA 2021) | Student Project**

LOOPS-M is a project developed for the IGLUNA 2021 program and its objective is the development of a Lunar Operative Outpost for the Production and Storage of Microgreens and interactive Virtual Reality simulation of a Lunar greenhouse.

**Role and Activities:**

- Design, development and integration of micrometeorite shield based on the model of Stuffed Whipple Shield
- ANSYS hypervelocity impact simulation
- Student technical documentation writing

**LANGUAGE SKILLS**

---

**Mother tongue(s):** Italian

**Other language(s):**

**English**

**LISTENING C1 READING C1 WRITING C1**

**SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1**

**Hindi**

**LISTENING B1**

**SPOKEN INTERACTION B1**

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## HONOURS AND AWARDS

[ 10/2020 ]

**Path of Excellence Bachelor's Degree in Aerospace Engineering - Sapienza University of Rome**

## DIGITAL SKILLS

Microsoft Office (Word, Excel, Powerpoint) | CATIA V5 (CAD) | Matlab | C programming | ANSYS | Global Mission Analysis Tool (GMAT) | FreeFlyer | Git (Github / Gitlab) | Visual Studio Code, Visual Studio | Arduino

## TECHNICAL SKILLS

**Good knowledge of orbital dynamics**

**Good knowledge of space systems and space mission life-cycle**

**Good knowledge of CubeSat Design Specification**

**Hands-On experience in Cubesat assembly and environmental testing**

## CONFERENCES AND SEMINARS

[ 18/09/2022 – 22/09/2022 ] **73rd International Astronautical Congress** Paris, France

[ 24/10/2021 – 28/10/2021 ] **72nd International Astronautical Congress** Dubai, United Arab Emirates

## PUBLICATIONS

[ 2021 ]

**LOOPS-M Project: Structural and Bioregenerative Systems for a sustainable lunar greenhouse**

**Reference:** Paper Code: IAC-21,A3,IP,38,x66536

[ 2021 ]

**The GreenCube CubeSat mission: Development and Qualification of an autonomous Microgreens Cultivation System and demonstration of CubeSat propulsion in MEO**

**Reference:** Paper Code: IAC-21,B4,9-GTS.5,5,x66431

[ 2022 ]

**[Shared CubeSat Bus Approach for the design and development of the Sapienza S5Lab nano-satellites](#)**

[ 2022 ]

**[Designing greenhouse subsystems for a lunar mission: the LOOPS - M Project](#)**

[ 2022 ]

**Autonomous cultivation system for nano platforms: the GreenCube mission**

**Reference:** Paper Code: IAC-22,B4,6B,4,x73614

[ 2022 ]

**Microgreens growth tests and space qualification for the GreenCube CubeSat cultivation laboratory**

**Reference:** Paper Code: IAC-22,B4,9-GTS.5,7,x73619

[ 2022 ]

**First in-orbit operations for the WildTrackCube-SIMBA and LEDSAT 1U CubeSats**

**Reference:** Paper Code: IAC-22,B4,3,12,x73652

[ 2022 ]

**Early identification and attitude reconstruction of LED-equipped satellites for Space Traffic Management and improved trackability**

**Reference:** Paper Code: IAC-22,A6,4,7,x73755

**Internet-of-Things sensor applications on the Sapienza S5Lab CubeSats: from wildlife monitoring to inter-satellite link research**

**Reference:** Paper Code: IAC-23,B4,6B,10,x79893

**Advances in spaceborne LED payloads attitude determination and autonomous units design for Space Traffic Management**

**Reference:** Paper Code: IAC-23,A6,4,1,x79847

**Lessons learned from the GreenCube 3U CubeSat operations in Medium Earth Orbit**

**Reference:** Paper Code: IAC-23,B4,3,2,x79650