University of Pavia, Italy

Italian Space Research showcase – Italian Space Agency – June 2020

Fabio Dell'Acqua - Department of Electrical, Computer, Biomedical Engineering

UNIVERSITÀ
DI PAVIA

University of Pavia

- Public university, founded in year **1361**

- Among its rectors we may recall **Alessandro Volta**, the **inventor of the electric battery**, and **Camillo Golgi**, the earliest Italian **Nobel** laureate, for his studies on the histology of the human nerve system

- The town of Pavia forms a local «**knowledge network**» covering various scientific and also practical aspects:
    - Institute for Advances Studies (IUSS)
    - Polyclinic **hospital** «S. Matteo»
    - Research **foundations** (CNAO, Maugeri, Mondino, EUCENTRE, …)
    - Research **institutes** (IGM, INFM, CHT, …)
    - **Residential system**, including historical «colleges of merit» founded in the XVI century
    - Network of **museums** and **libraries**
    - **Technological incubator**

University of Pavia and Space

❑ Full member of the **Regional Aerospace Cluster**

❑ The Department of Electrical, Biomedical, Computer Engineering is a member of the **Copernicus Academy**

❑ Various courses explicitly address the joint **ESA-EU Copernicus** initiative

❑ The graduate course in Electronic Engineering features a "**Space Communication and Sensing**" track

❑ The University of Pavia will coordinate the didactic activities of the Italian semester of the **joint ASI-CONAE** Master on **Earth Observation for Emergency Management**
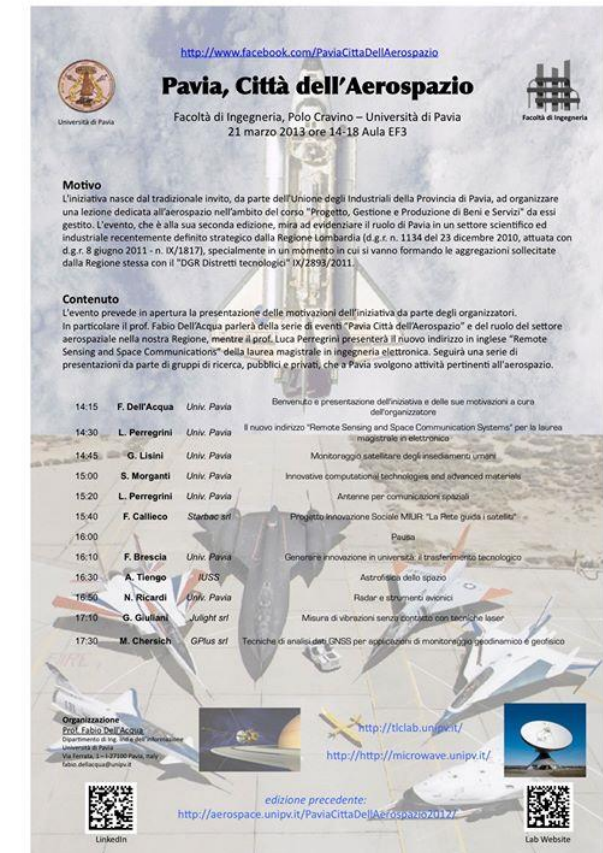
On 9th Nov. 2017, during celebrations for the 50° anniversary of the founding of the Faculty of Engineering, the astronaut Samantha Cristoforetti receives her **honoris causa degree** in Biomedical Engineering by the Rector prof. Fabio Rugge

University of Pavia and Space Research

As highlighted by the periodic initiative «Pavia, the Aerospace City», several research lines relate with space, including:

❑ Satellite systems and **Earth observation** from space

❑ **Antennas** for space communications

❑ High-frequency **electronics** for space environment

❑ **Materials**: 3D printing, shape memory alloys

❑ Energy harvesting, on-board **wireless sensor networks**;

❑ Hi-performance computation and **deep learning**

❑ **Space medicine** and effects of micro-gravity on the human body

Earth observation

❑ Algorithms and methods for **large-scale analysis of satellite Earth Observation data**, including Machine Learning approaches. Focus on urban areas and on agricultural applications.

❑ Contact: prof. Paolo Gamba, prof. Fabio Dell'Acqua, prof. Francesco Zucca

2014-04-06   2016-04-18   2017-02-12   2017-03-03
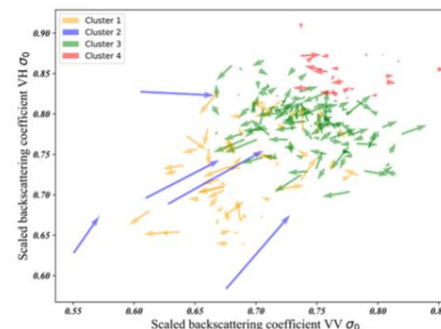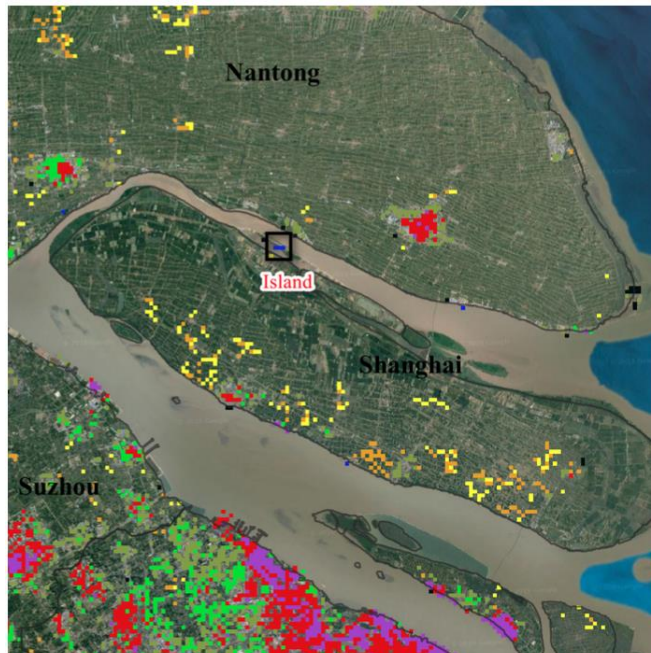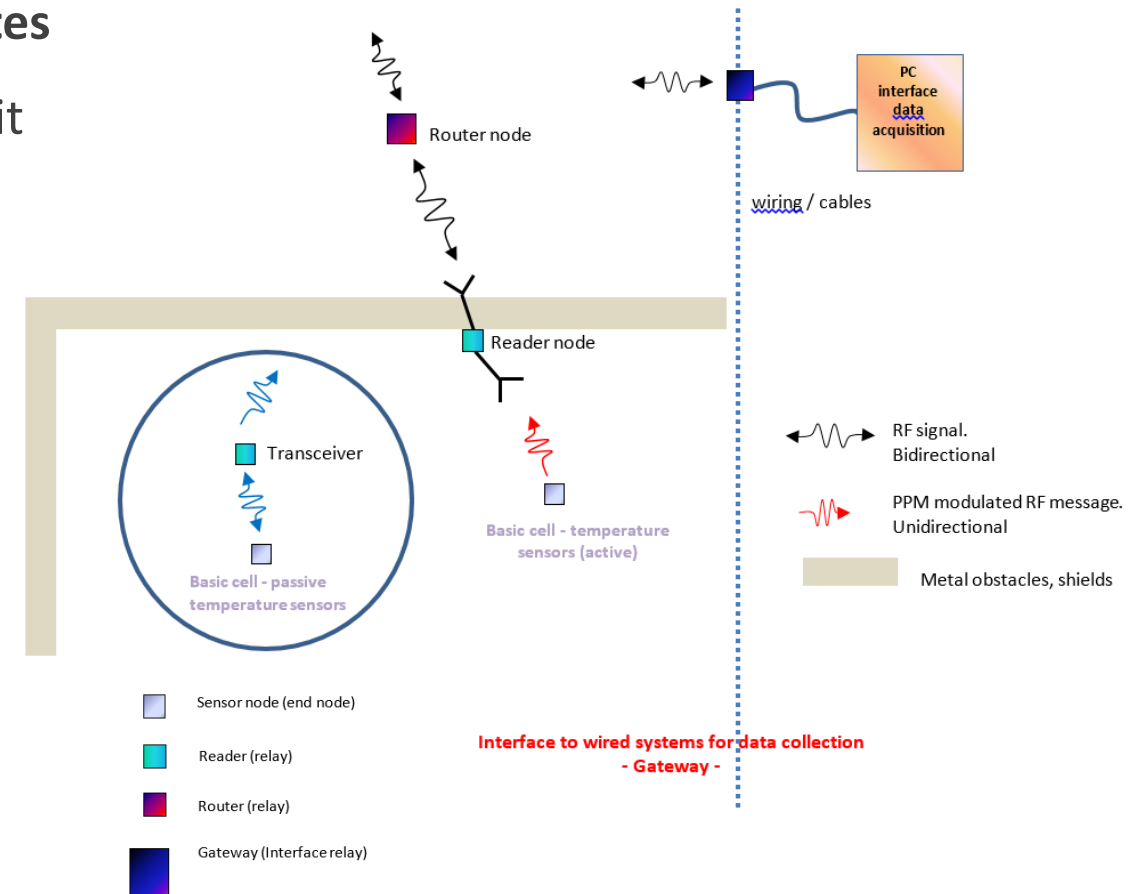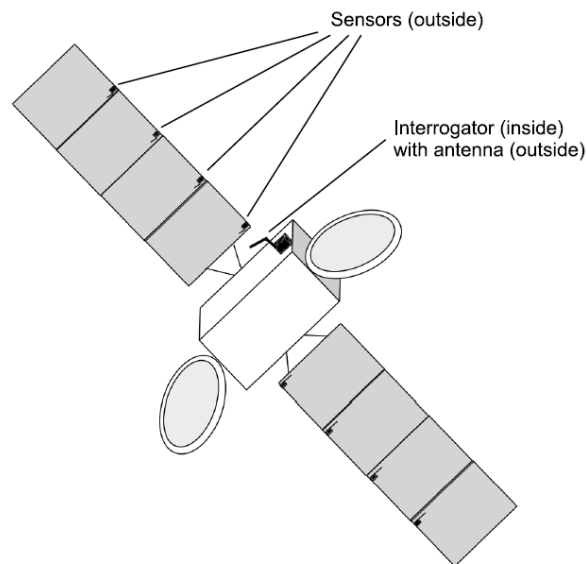

Change indicators

radar backscatter → # of buildings

Night time lights → economic activities

On-board Wireless Sensor Networks

❑ Wireless networks of local sensors **onboard satellites**

❑ Contact: prof. Pietro Savazzi, pietro.savazzi@unipv.it

HPC for hyperspectral data processing

❑ **Specialised systems and strategies** for near-real time hyperspectral data processing

❑ Contact: prof. Francesco Leporati, francesco.leporati@unipv.it
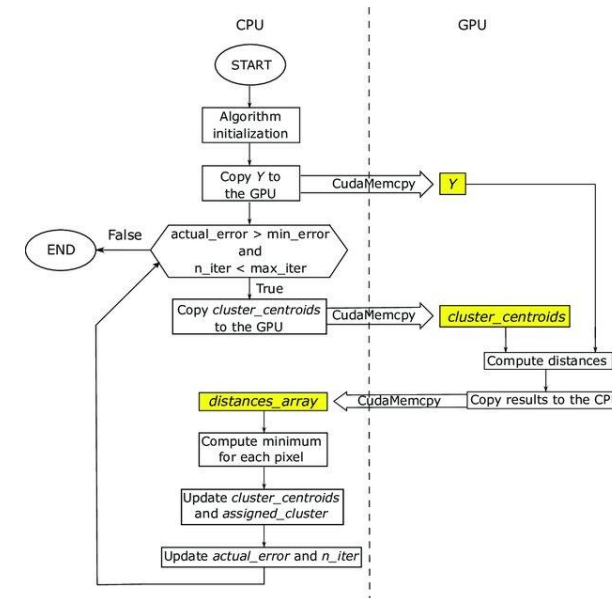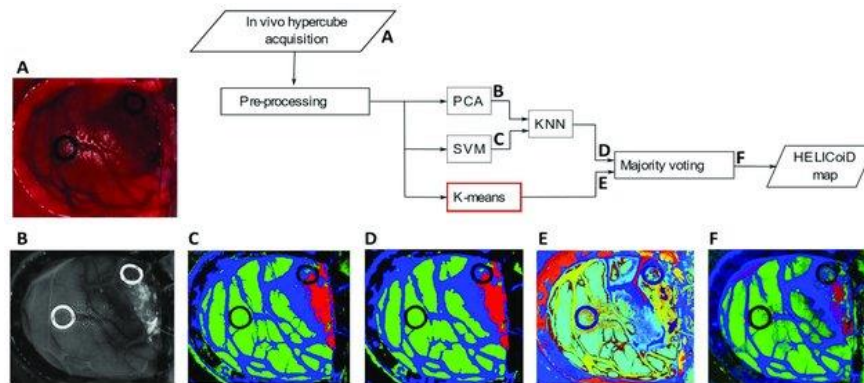
Antennas

❑ Analysis, design and simulation of **space communication antennas**

❑ Contact: Prof. Luca Perregrini, luca.perregrini@unipv.it
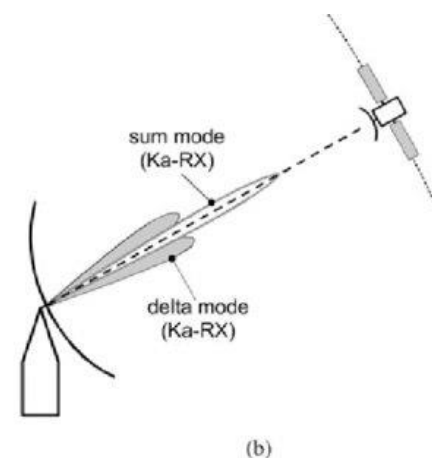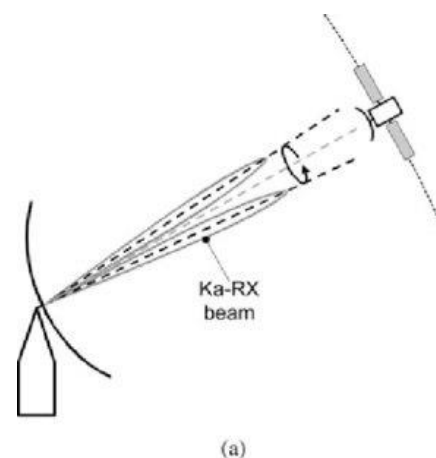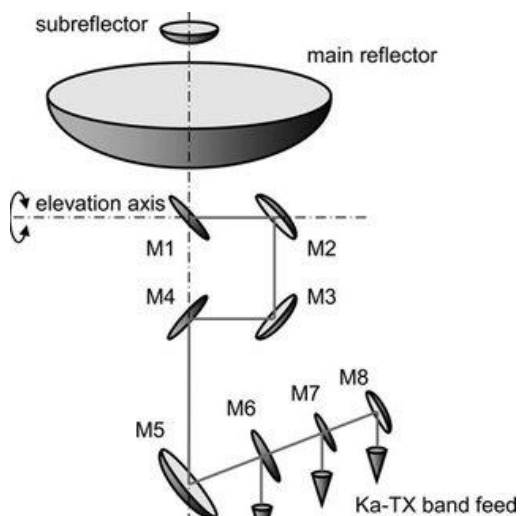
Electronics

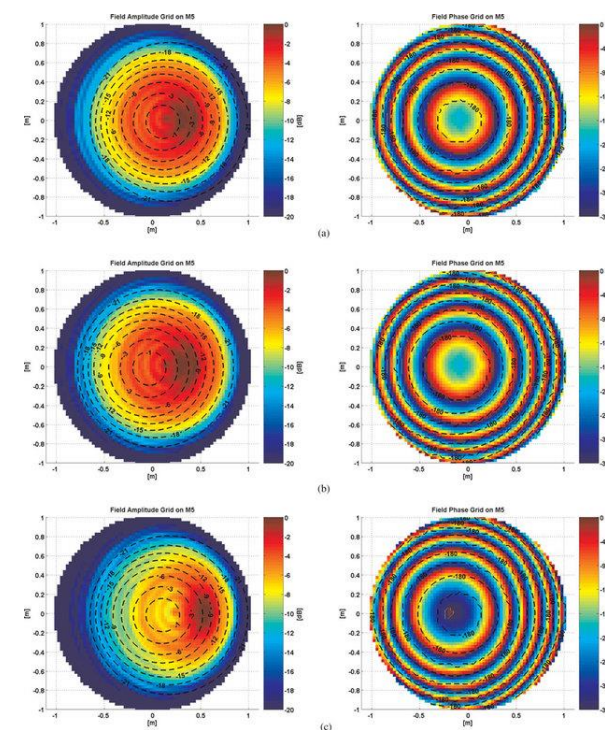❑ **Mixed Signal ASICs** for Space Applications (in Cooperation with Polytechnic of Milan)

❑ Contact: prof. Piero Malcovati, piero.malcovati@unipv.it
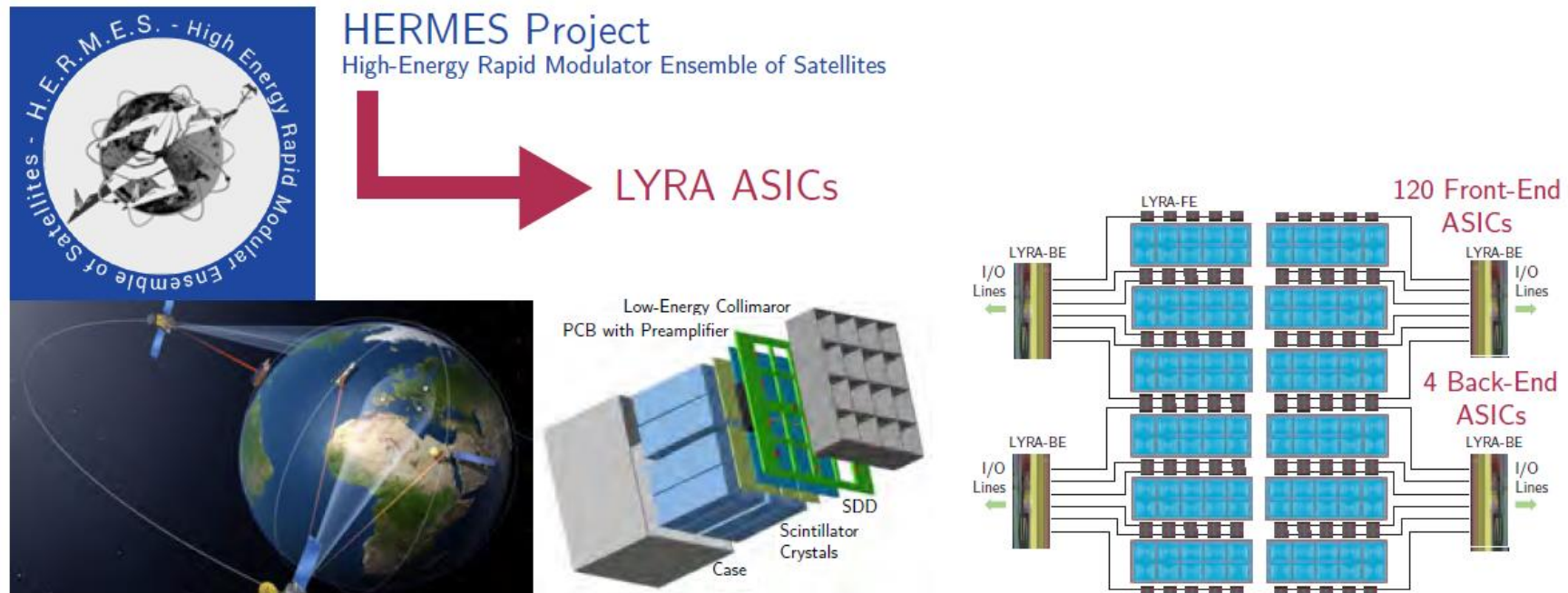
Materials

❑ 3D printing, including **metal 3D printing** – modelling and simulation

❑ Contact: prof. Ferdinando Auricchio, ferdinando.auricchio@unipv.it
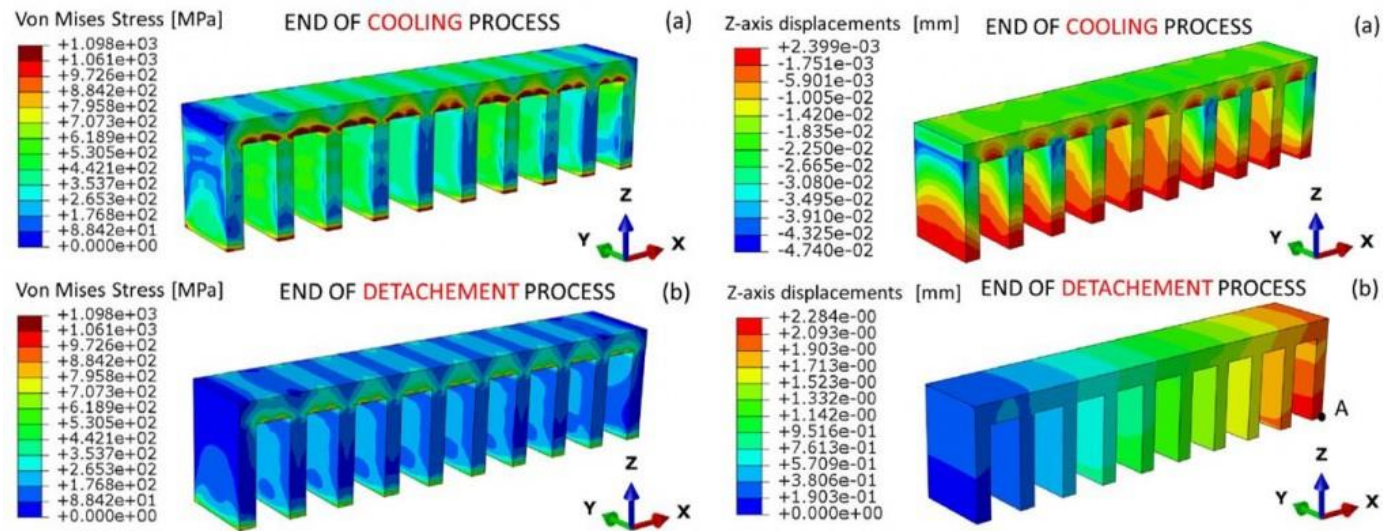
Human spaceflight

❑ Treatment of **microgravity-induced osteoporosis**

❑ Prof. Livia Visai, livia.visai@unipv.it

Thank you!

FABIO.DELLACQUA@UNIPV.IT

[HTTP://TLCRS.UNIPV.IT/](http://tlcrs.unipv.it/)

University of Pavia

- Among its rectors we may recall **Alessandro Volta**, the inventor of the electric battery, and **Camillo Golgi**, Nobel laureate for his studies on the histology of the human nerve system
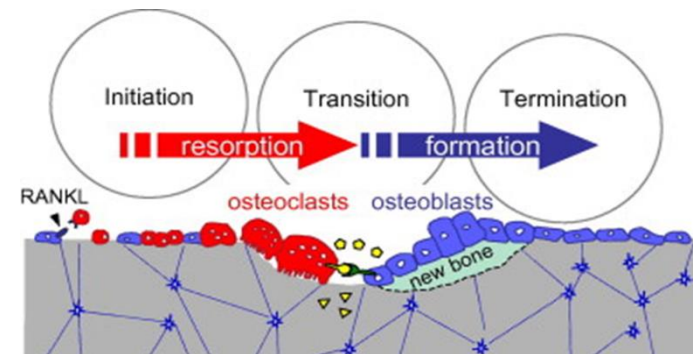
- Its teaching body included famous Italian historical figures such as the mathematicians **Eugenio Beltrami**, **Felice Casorati** and **Luigi Berzolari**, the poets **Vincenzo Monti** e **Ugo Foscolo,** the medical doctor **Carlo Forlanini**

- It is part of the «Coimbra group» and features **a high degree of internationalization** (1° CENSIS rank in 2017) thanks also to specific programmes like the «Boston project»

- **Earliest university in Italy** to activate courses taught in English

- Currently offering 84 degree courses, 22 PhD courses, 29 specialized courses, and counting about 25,000 students

Faculty of Engineering

Founded in 1967, it now counts:

- 3 departments:
  - Electrical, Computer and Biomedical Engineering
  - Civil and Architectural Engineering
  - Mathematics

- 4 undergraduate courses

- 4 graduate courses in Italian

- 4 graduate courses in English,

- more than 3,000 students, increasing trend

On 9th Nov. 2017, on the occasion of the celebration of the 50° anniversary of the founding of the Faculty, the astronaut Samantha Cristoforetti receives her honoris causa degree in Biomedical Engineering by the Rector prof. Fabio Rugge