

SEDI GENERICHE SCUOLA INGEGNERIA

DESCRIZIONE TIROCINI

(per ulteriori informazioni contattare l'Ufficio Relazioni Internazionali della Scuola international@ingegneria.unifi.it)

1. **UNIVERSITY OF MALAGA - Spagna** (2 laureati della Magistrale - durata 6 mesi)
 - a. 1.-Solar cooking. We investigate the behaviour of new models of solar cookers. The work is both theoretical and experimental. Write to: Antonio Carrillo or Xabier Apaolaza (ancarrillo@uma.es; apaolaza@uma.es)
 - b. Thermal modelling and optimization of solar protections. We have an office with a solar protection electronically controlled and we want to optimize the position of the store during the day to minimize energy consumption but maintaining thermal comfort. Write to: Francisco Fernández (franciscofh@uma.es).
 - c. Modelling of new refrigeration cycles to reduce ODP and GWP (reduction of refrigerant charge, use of new refrigerants, etc.) and to improve EER. Write to: Bernardo Peris (perisbernardo@uma.es)

2. **FACULTY OF BIOSCIENCE - UNIVERSITY OF GENT - Belgio** (2 studenti della Triennale o Magistrale – durata 6 mesi) Research at BIOMATH see the link <https://biomath.ugent.be/education/thesistopics>

3. **INSA ROUEN NORMADIE – Francia** (3 studenti magistrale – durata 6 mesi): Activities related to Energy (Fluid Mechanics, heat and mass transfert, combustion, renewable energy)

4. **SAARLAND UNIVERSITY, DEPARTMENT OF SYSTEMS ENGINEERING - Germania** (3 studenti della triennale o magistrale – durata 6 mesi):
 - a. Development and characterization of novel robotic and mechatronic systems based on smart material transducers
 - b. Development of mathematical models and simulation tools for smart material robots and actuators
 - c. Development and implementation of advanced motion control algorithms and systems for smart material-based robots and actuators

5. **VON KARMAN INSTITUTE FOR FLUID DYNAMICS – Belgio** (3 studenti della triennale o magistrale, 3 studenti laureati triennale o magistrale, 3 dottorandi, 3 PhD – durata 6 mesi): Research in Fluid Dynamic in aerospace, Aeronautic, Turbomachinery, Propulsion Environmental and Industrial Flow.

6. **IETR – Francia** (2 studenti della magistrale, 1 laureato della magistrale, 1 dottorando):
 - 1) Sub-THz radial line slot antenna on polymer substrate

Abstract: Polymer substrates are known for their low dielectric constant and low losses at high frequencies (>200 GHz). Nevertheless, their low glass transition temperature (T_g) prevents the use of high-temperature process such as laser drilling and metallizing the substrate will damage the polymer.

This stage will deal with the design of a low-profile LWA system on a low-loss polymer substrate: Cyclic Olefin Copolymer (COC). A high-gain polymer-based antenna will be designed, fabricated and tested. The proposed antenna system will consist of two building blocks, namely: a cylindrical wave launcher and a radial line slot array (RLSA). An important part of the project will consist in adapting our the RLSA design to the polymer characteristics.

2) Mode matching for the synthesis Bessel-Gauss THz beams

Abstract: We will study the capability of Bessel beams to establish robust wireless links in the near field with error-free, high data-rate transmission at J-band. The self-healing feature of Bessel beams will be exploited to create a resilient link to opaque metallic obstructions. Such capability will be first validated experimentally by placing a circular metallic obstacle within the non-diffractive region of the Bessel beam. To that end, the near field radiated by a broadband launcher consisting of a photonic transmitter and a spline-profile horn will be measured with and without obstacles, and the corresponding profiles compared.

References: <https://ieeexplore.ieee.org/document/9309030>,
<https://ieeexplore.ieee.org/document/9425504>

3) Ultra low profile transmitarrays

Abstract: Transmitarray antennas are very attractive for beam steering and beam scanning applications, e.g. at K/Ka bands for satellite communications and at millimeter-waves for beyond-5G point-to-point & point-to-multipoint services. They typically consist of a focal array (made of horn antennas or microstrip antennas, etc.) and a multi-layer radiating panel made of phase correcting unit-cells. The accurate control of the phase distribution across the radiating panel allows to steer the antenna beam. The focal distance F separating the focal array and the radiating panel is about $0.5xD$ to $0.8xD$, where D is the size of the radiating panel. Therefore, transmitarrays with highly-directive beams have a large size (or in other words a large value for D), there a large total thickness F . One of the most important challenges is to explore new solutions to reduce the total thickness F of ultra-directive transmitarrays to generate low-profil reconfigurable smart skins. This constitutes the main objective of the proposed project.

7. **DB SAS – France** (2 studenti magistrali – 6 mesi)

A French company, historically known as a leader in ultrasound non-destructive testing, is now expanding its activity into the field of medical ultrasound imaging and ultrasound therapy. Our fully customizable systems, tailored to meet specific needs, enable us to support all areas of medical research and innovation, including brain therapy, 3D imaging, ultrafast imaging, and more. Our solutions are used by research laboratories and innovative start-ups.

As part of accelerating our growth in these fields, we are looking for specialized engineers, particularly in electronics, mechanics, software, and ultrasound physics.

8. **IMST – Germany** (1 studente magistrale 6 mesi – 1 laureato magistrale 6 mesi)
Student will be hosed in the antenna group and will be involved in development of innovative RF systems. Antenna design and measurement could be possible tasks. Students could also improve soft skills as working with others, effective communication and self-management.
9. **ISISPACE – (The Netherlands)** – (1 studente laureato magistrale 6 mesi)
RF systems engineering for small missions, including RF/Antenna simulations, Link budgeting, etc.
- Antenna Design and prototyping, including testing
 - EMC/EMI test strategies development and execution on small satellite platforms
 - Design and prototyping of modular radio front end building blocks
- We are looking for a hands-on, pragmatic person, that is comfortable with working in an international, fast-paced environment
10. **ESTP Grand Ecole d’Ingenieurs de la construction - (France)** (2 studenti magistrale – 1 Dottorando – 1 Dottorato 6 mesi)
Research internship in the field of civil engineering, construction, architecture, the built environment. The internship may be included in one of the following research group that constitute ESTP Research:
- ✓ Material for sustainable construction
 - ✓ Multi-physics and multi-scale studies of building systems (geotechnics and hydraulics)
 - ✓ Digital systems and geomatics
 - ✓ Electrical systems and energy transition for construction
 - ✓ Architecture & management of the building project
 - ✓ Smart construction
 - ✓ Smart city
 - ✓ Smart Building