UNIVERSITA' DEGLI STUDI DI GENOVA

AREA RICERCA, TRASFERIMENTO TECNOLOGICO E TERZA MISSIONE
SERVIZIO RICERCA
SETTORE RICERCA NAZIONALE

IL RETTORE

- Visto il Decreto Rettorale n. 560 del 06/02/2025, con il quale è stato indetto il concorso per titoli e colloquio, per il conferimento di 1 borsa di ricerca post laurea, di tipo starting della durata di 9 mesi, dell'importo di € 11.250,00 euro (undicimiladuecentocinquanta/00), eventualmente rinnovabile, per lo svolgimento di una ricerca sul tema "Analisi dei correlati neurali associati all'apprendimento di abilità manuali in chirurgia laparoscopica robot assistita", presso il DIBRIS dell'Università degli Studi di Genova;

- Visto il Decreto Rettorale n. 1055 del 07/03/2025 con il quale è stata costituita la Commissione giudicatrice per il conferimento della suddetta borsa di ricerca;

- Visto il verbale della Commissione giudicatrice del concorso in parola, riunitasi in data 12/03/2025;

- Constatata la regolarità della procedura seguita;

DECRETA

Art. 1

Sono approvati gli atti del concorso di cui in premessa e la seguente graduatoria di merito:

1. Dott.ssa Camilla Minghetti punti 77/100

Sotto condizione dell'accertamento dei requisiti di cui al bando, è dichiarata vincitrice del concorso in parola la Dott.ssa Camilla Minghetti.

Genova,

IL RETTORE
(firmato digitalmente)

Responsabile del procedimento: Paola Pelle
Area Ricerca, Trasferimento Tecnologico e Terza Missione
Servizio Ricerca
Settore Ricerca Nazionale

Camilla Minghetti

ABOUT ME

A graduate student in Biomedical Engineering and currently a master's student in Bioengineering, specializing in Rehabilitation Engineering and Interaction Technologies. I will graduate in Bioengineering in March 2025. I have a passion for innovation in medicine and technology, with the goal of contributing to the development of solutions that improve the quality of life and the effectiveness of treatments. I am motivated to grow professionally in a challenging, research and innovation-oriented environment.

EDUCATION AND TRAINING

Master's Degree in Bioengineering - Rehabilitation Engineering and Interaction Technologies

University of Genoa - Genoa, Italy

| Final grade: Master's Degree scheduled for the March 2025 session. | Level in EQF: EQF level 7 | Thesis: Depth-Sensing from Monocular Cameras in Minimally Invasive Robotic Surgery. Thesis conducted at MITIC Lab (Department of Excellence in Surgical Sciences, University of Turin) under the supervision of Prof. Maura Casadio, Prof. Giulio Dagnino, Prof. Alberto Arezzo.

Robot-Assisted Minimally Invasive Surgery, Depth-Sensing, Medical Robotics, Rehabilitation Engineering, Colonoscopy, Depth Estimation, Foundation Models.

[09/2018 – 02/2023]

Bachelor's Degree in Biomedical Engineering

University of Genoa - Genoa, Italy

| Final grade: 88/110 | Level in EQF: EQF level 6 | Thesis: The role of the cerebellum in temporal prediction: a transcranial direct current stimulation (tDCS) study. Thesis conducted at the Neurological Clinic of the San Martino Hospital (Genoa) under the supervision of Prof. Laura Avanzino.

[03/07/2018]

Upper Secondary Education Diploma – Scientific High School

Liceo Scientifico Orazio Grassi - Savona, Italy

| Final grade: 82/100 | Level in EQF: EQF level 4

DIGITAL SKILLS

My Digital Skills

Python (use of AI models for image processing) | Python Language | Matlab/Simulik | Unity Real- Time Development Platform | Microsoft Office (Outlook, Excel, Word, PowerPoint)

CONFERENCES AND SEMINARS

Hamlyn Symposium on Medical Robotics 2025 - “Back to the Future: Telesurgery in 2025”

Imperial College London

Submission of the abstract titled "Depth Estimation in Colonoscopy using Foundation Models"

Authors: C. Minghetti, M. Pescio, F. Marzola, F. Barontini, F. Corso, P. Leoncini, F. Secundo, G. Distefano, F. Farnesi, C.A. Ammirati, G. Losecco, A. Arezzo, G. Dagnino

Colorectal cancer is a leading cause of death worldwide, and early detection through colonoscopy is essential. However, 2D visualization can limit diagnostic accuracy due to suboptimal angles and anatomical obstructions. Depth estimation enables 3D reconstruction of the intestinal environment, improving lesion detection, but obtaining accurate ground truth data is challenging. This study

explores two foundation models for depth estimation, highlighting their potential to enhance diagnostic accuracy despite limited ground truth data.

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING B2 READING B2 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

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

PROJECTS

[01/09/2024 – Current]

Master's Thesis - Depth-Sensing from Monocular Cameras in Minimally Invasive Robotic Surgery

The thesis research focuses on depth-sensing from monocular cameras in robot-assisted minimally invasive surgery, specifically for endoscopic procedures like colonoscopy. Early detection of colorectal cancer through colonoscopy is crucial, but two-dimensional visualization can limit diagnostic accuracy. Depth estimation is needed to create a 3D view of the intestinal environment, improving diagnostic precision. However, obtaining accurate ground truth data in clinical settings is challenging due to image complexity and patient variability. Foundation models, pre-trained on large datasets, may offer a promising solution in this context.

[01/05/2022 – 01/09/2022]

Bachelor's Thesis - The role of the cerebellum in temporal prediction: a transcranial direct current stimulation (tDCS) study

Study of transcranial direct current stimulation (tDCS): practical set-up, placement of anode and cathode electrodes on the scalp, setting of stimulation parameters and control of electrical conduction using electrodes and conductive gel.

Progress in the field of neuroscience has emphasized the importance of the cerebellum in integrating temporal information in order to achieve efficient predictions. In this sense, the aim of this project was to investigate the causal involvement of the cerebellum in temporal prediction based on single intervals or rhythmic contexts.

[17/04/2024]

Tracking of Movements with Markerless Approach

The project focuses on tracking movements with a markerless approach in physiological and Poland syndrome subjects, with the aim of analyzing kinematics. In particular, the aim is to understand whether and how subjects with this pathology develop compensatory strategies to overcome the lack of or incomplete development of the great pectoral muscle or other chest muscles. The work involved the calibration of cameras, the labelling of repere points and the segmentation of upper limb movements. DeepLabCut, based on convolutional neural networks, was used for the labelling, while the segmentation of movements was performed by peak velocity detection.

[22/03/2023 – 21/05/2023]

Bioengineering of Human Movement - Lab Activities

Motion capture using IMU sensors

The project involves recording a specific movement using IMU sensors and analyzing the data to reconstruct full-body kinematics. The experimental protocol includes selecting a movement, defining a body model with relevant segments, and determining sensor placement. After running the experiment and collecting data, the analysis focuses on estimating movement parameters such as joint angles and segment trajectories. The goal is to characterize body motion using IMU data.

Postural adjustment during seating using a force platform

The project focuses on recording postural adjustments during seating using a 3-component force platform with four load cells. The experiment involves selecting a movement, defining an experimental protocol, and calibrating the device by applying known weights at specific locations. After running the experiment and collecting data, the analysis reconstructs force, center of pressure (COP), and torques using a calibration matrix. The goal is to understand postural control by examining force distribution and pressure shifts on the seat surface.

Sensorimotor adaptation

The project involves the recording of hand trajectories during a sensorimotor adaptation experiment in which a robotic manipulator introduces visual perturbations (rotations). The experiment comprises a baseline phase, a training phase with the perturbation active and a post-effect phase without perturbation, with ‘catch trials’ in which the perturbation is suddenly turned off. The data analysis focuses on the lateral deviation of the trajectory from the target direction, evaluating the directional errors in the different phases.

[20/02/2023] Analysis of Biomedical Data and Signals - Myoelectric Control of Isometric Force

In an experiment, the activity of N muscles of the upper limb is recorded while a subject applies forces at fixed handle in different directions: the aim was to use muscle activity (EMG signals) to estimate the force exerted by the hand on the handle in real time. In this project, a method involving low-pass filtering, rectification and integration of the EMG signals was used, followed by analysis using PCA to explore the data. Next, polynomial regression models were applied to estimate the hand force from the EMG signals, comparing the performance of different polynomial orders and using cross-validation to determine the optimal order. Finally, the spatial distribution of muscle activity was analyzed to identify which muscles are activated in the different directions of movement.

COMMUNICATION AND INTERPERSONAL SKILLS

Teamwork and collaboration skills, Time management, Problem-solving, Presentation skills. Teamwork and collaboration skills have been developed through active participation in group projects and collaborative work during university courses. Strong time management abilities have been demonstrated by successfully handling multiple tasks, meeting deadlines, and balancing academic assignments, research projects, and presentations. Problem-solving skills have been enhanced through the application of analytical thinking to address academic challenges, approaching problems in a methodical and effective way. Additionally, presentation skills have been improved through presenting work and projects during university courses and while preparing and presenting thesis research during meetings.

DRIVING LICENCE

Motorbikes: AM

Cars: B