I-RIM

PhD Course in

ROBOTICS AND INTELLIGENT MACHINES

Curriculum: Healthcare and Wellness of Persons

Research Themes

The main goal of the curriculum "Robotics and Intelligent Machines for Healthcare and Wellness of Persons" is to contribute to improving people's wellness and quality of life, as well as to prevent the risk of injuries and occupational diseases.

Projects within the curriculum will focus on the development and experimental validation of methods, conventional, biomimetic, and bio-inspired models, components, subsystems, systems, and intelligent strategies for information analysis and telemedicine in the following areas:

- Medical robotics with imaging support
- Rehabilitation robotics
- Assistive robotics and functional replacement
- Robotics for health and safety in the workplace
- Innovative medical devices
- Human-robot interaction

The research theme offered by the University of Genoa, the Italian Institute of Technology (IIT), the University of Palermo, and the University of Napoli Federico II will be awarded to the top applicants selected for this theme.

Ideal candidates are students with a Master's degree (or equivalent/higher qualification) in a STEM (Science, Technology, Engineering, and Mathematics) field, ideally with a background in Robotics.

Students will conduct their research project at the hosting institution (as described in the research project sheet). Interested applicants are encouraged to contact the tutors and/or the Unit's Principal Investigators for clarifications prior to submitting their application.

International applications are welcome, and applicants will receive logistical support for visa issues, relocation, and other related matters.

1. Companions with Purpose: Emotionally Intelligent Robots for Long-Term Alzheimer's Care - University of Genoa

Curriculum:

Healthcare and wellness of persons

Hosting Institution

University of Genoa (Università degli Studi di Genova)

Department:

DIBRIS, Department of Informatics, Bioengineering, Robotics and Systems Engineering (https://dibris.unige.it/)

Tutor(s):

Prof. Carmine Tommaso Recchiuto

Description:

May an opportunely programmed social robot be able to assist individuals with dementia and ease the burden of their caregivers, by a) showing emotional intelligence, b) providing practical help with Activities of Daily Life, and c) being extremely reliable so as to be used for long-term interaction?

The question, up to now only partially answered by related scientific literature [1, 2], comes with different technical issues to be addressed. Indeed, emotional intelligence, even when coupled with cutting-edge techniques in computer vision and language processing, is still a big challenge in social robotics, in particular, if the robot should behave autonomously and with adaptive capabilities. On the other hand, assistive robots able to practically help persons suffering from Alzheimer's to perform ADLs have received only limited attention, due to similar technical challenges and real-life complexity. Finally, long-term interaction requires autonomous robots that are able to deal with unexpected situations, are controlled by reliable software.

This PhD program project aims at tackling all or some of these aspects by developing a new generation of assistive robots able to provide emotional engagement with persons affected by Alzheimer's, by adapting to the user's identity and emotional state, expressing proper emotions in response to that state, while also helping the user to perform simple activities. In particular, the work performed during the PhD will allow for defining guidelines for social assistive robots interacting with people suffering from Alzheimer's and designing software architecture and modules able to interact with the user in the proper way, also adapting to the user's specific needs.

The project will be based on existing work in social robotics, psychology (e.g, affect theory, appraisal theory, existing cognitive architecture for robotics), but the student will also benefit from the experience acquired by the RICE lab in the CARESSES project [3] and its future evolutions, where cultural- and diversity-aware social robots have been developed for elderly care assistance and long-term interaction. Experimental tests with real end-users are also foreseen for the last phase of the project.

The project will be performed at the D IBRIS department in the “RICE Lab,” a fully equipped facility for software development with different humanoid robots for socially assistive applications (Pepper, Nao, Navel, Buddy)

Requirements:

Applicants are expected to have good programming skills (C++, Java, or Python) and a profound interest in cutting-edge research in autonomous robotics and socially assistive robotics. Previous experience with Artificial Intelligence techniques and Human-Robot Interaction strategies will be considered.

When applying for the Ph.D. scholarship, the student will be encouraged to propose solutions to address one or more of the aspects described in the proposal.

References:

1. Góngora Alonso, Susel, et al. "Social robots for people with aging and dementia: a systematic review of literature." Telemedicine and e-Health 25.7 (2019): 533-540.
2. Ghafurian, Moojan, Jesse Hoey, and Kerstin Dautenhahn. "Social robots for the care of persons with dementia: a systematic review." ACM Transactions on Human-Robot Interaction (THRI) 10.4 (2021): 1-31.
3. Carmine T. Recchiuto, and Antonio Sgorbissa. "A feasibility study of culture-aware cloud services for conversational robots." IEEE Robotics and Automation Letters 5.4 (2020): 6559-6566.

Number of positions available:

1

Main Research Site

RICE lab (https://rice.dibris.unige.it/), DIBRIS Department, University of Genoa, Via all’Opera Pia 13, 16145, Genova, Italy.

Contacts:

Email: carmine.recchiuto@dibris.unige.it

Funding Scheme: This doctorate grant is co-funded by University of Genova and by the DIBRIS Department, ARIA project, Proposal number: 24AARG-NTF-1200708.

Scholarship Amount:

- Fascia 4: 19,500 €/year

2. Preoperative Surgery with patient-specific 3D models – University of Genoa

Curriculum: Healthcare and wellness of persons	
Hosting Institution University of Genoa (Università degli Studi di Genova)	
Department: DIBRIS, Department of Informatics, Bioengineering, Robotics and Systems Engineering (https://dibris.unige.it/)	
Tutor(s): Prof. Serena Ricci, Prof. Maura Casadio	

Description:

Preoperative planning is a crucial phase allowing surgeons to anticipate potential complications or difficulties that may arise during the procedure [1]. Traditionally, preoperative planning is primarily conducted by looking at clinical images within a two-dimensional framework, where understanding the complex relationship between anatomical and pathological structures can be challenging. The use of 3D patient-specific models of organs can enhance anatomical visualization, either through digital models such as Virtual Reality (VR) or Augmented Reality (AR) or through physical 3D-printed organ replicas [2]. Numerous studies have highlighted the importance of incorporating 3D models in pre-operative planning processes. However, there is a lack of definitive guidance in the literature regarding the optimal visualization modality for various surgeries, and the effectiveness of VR and 3D printing for preoperative planning, seems to be based on the specific clinical needs [3].

The goal of this project is to **investigate the most effective visualization modality for preoperative planning in different clinical cases** and to design and develop effective tools to improve preoperative planning.

The project can be divided into two specific objectives (SO):

SO1: To compare the effectiveness of different visualization modalities (e.g., VR/AR screen based virtual representation, 3D printing, silicon casting). This SO includes the segmentation of patient-specific CT/MRI images, registration, 3D modelling, design and development of software-based applications and testing of the developed solutions to highlight the features that a model should have to support teams during preoperative planning.

SO2: According to the results of SO1, this objective aims to implement visualization tools to be tested during clinical practice. This SO includes the investigation of semi-automatic approaches for imaging segmentation, the development of modular system that can be adapted to real surgical cases and the testing phase.

Requirements:

We are seeking applicants with a master's degree in Bioengineering. Candidates should possess programming skills, basic knowledge of clinical imaging techniques and analysis methods, an enthusiastic attitude towards experimental work, problem solving skills, and a strong motivation to work in collaboration with clinicians.

References:

[1] A. Tejo-Otero, I. Buj-Corral, and F. Fenollosa-Artés, "3D printing in medicine for preoperative surgical planning: a review," *Ann. Biomed. Eng.*, vol. 48, no. 2, pp. 536–555, 2020.

[2] D. P. Romero Lara, C. J. Latorre-Rojas, M. Latorre Quintana, M. L. Velasco Morales, L. S. Pardo Nino, and M. L. Arango, "Use of virtual reality and three-dimensional printing in the surgical planning of slide tracheoplasty," *World J. Pediatr. Congenit. Hear. Surg.*, vol. 14, no. 4, pp. 503–508, 2023.

[3] J. Awori, S. D. Friedman, C. Howard, R. Kronmal, and S. Buddhe, "Comparative effectiveness of virtual reality (VR) vs 3D printed models of congenital heart disease in resident and nurse practitioner educational experience," *3D Print. Med.*, vol. 9, no. 1, pp. 1–8, 2023.

Number of positions available:

1

Main Research Site

Simulation and Advanced Education Center – SimAv (https://simav.unige.it/en), University of Genoa, Via Antonio Pastore 3 16132 Genova, Italy.

NeuroLab, DIBRIS Department, University of Genoa, Via all'Opera Pia 13, 16145, Genova, Italy.

Contacts:

Email: serena.ricci@unige.it; maura.casadio@unige.it

Funding Scheme: This doctorate grant is funded by the University of Genoa.

Scholarship Amount:

- Fascia 2: 17,500 €/year

3. Soft Robotics for Human Rehabilitation – Italian Institute of Technology (IIT)

Curriculum:

Healthcare and wellness of persons

Hosting Institution:

Italian Institute of Technology (Istituto Italiano di Tecnologia)

Department:

Soft Robotics for Human Collaboration and Rehabilitation (https://softbots.iit.it/)

Tutor(s):

Prof. Antonio Bicchi, Dr. Manuel G. Catalano, Dr. Giorgio Grioli

Description:

This PhD project focuses on soft robotics and human-machine interaction for neurorehabilitation. The goal is to develop wearable technologies based on supernumerary robotic devices, such as the SoftHand-X, to support motor recovery of the hand in sub-acute stroke patients. The candidate will investigate novel control interfaces based on residual signals, including joint motion and surface electromyography (sEMG), to enhance personalization and therapeutic effectiveness. The work will involve mechatronic design, control strategies, clinical testing, and functional assessment. Strong collaboration with clinical and industrial partners is expected to validate the proposed solutions in real-world scenarios. The project is embedded in ongoing international collaborations and will offer opportunities for scientific exchange and mobility.

Requirements:

The successful candidate must have an MSc degree with a strong background in Robotics, end/or Control.

The successful candidate should have:

- Good skills on C++ and Python
- Experience with ROS
- Excellent skills in control
- Good communication skills and ability/willingness to integrate within a multidisciplinary international research group
- Good knowledge of written and spoken English.

References:

1. Trompetto, C., Catalano, M.G., Farina, A. and A. Bicchi. A soft supernumerary hand for rehabilitation in sub-acute stroke: a pilot study. Sci Rep 12, 21504 (2022). https://doi.org/10.1038/s41598-022-25029-0
2. Godfrey SB, Zhao KD, Theuer A, Catalano MG, Bianchi M, Breighner R, Bhaskaran D, Lennon R, Grioli G, Santello M, Andrews K, Bicchi A. (2018). *The SoftHand Pro: Functional*

evaluation of a novel, flexible, and robust myoelectric prosthesis. PLoS ONE, 13(10): e0205653.

Number of positions available:

1

Main Research Site

Center for Robotics and Intelligent Systems (CRIS), Istituto Italiano di Tecnologia, via San Quirico 19D, 16163, Genova, Italy.

Contacts:

Email: Antonio.bicchi@iit.it

Funding Scheme: This grant is funded by the Italian Institute of Technology (IIT).

Scholarship Amount:

- Fascia 4: 19,500 €/year

4. Social robot assistant for intelligent health care – University of Palermo

Curriculum: Healthcare and wellness of persons	
Hosting Institution: University of Palermo (Università degli Studi di Palermo)	
Department: Department of Engineering Dipartimento di Scienze Umanistiche	
Tutor(s): Prof. Arianna Pipitone, Prof. Adriano Fagiolini, Prof. Antonio Chella, Prof. Valeria Seidita	

Description:

Context. Improving citizen's health, care and lifestyle is one of the main goals of our society. The last years of the 21st century have seen an increase in average age and chronic diseases. Today's society in Europe is made of more over-60s than under-5, and according to WHO estimates, the World population is growing at an accelerating rate. Most people will reach and exceed the age of 60 by 2050. A serious consequence is less time and resources available to cope with the effects of population growth from the perspective of health services. Indeed, the main health problems are age-related and chronic diseases (from declining cognitive and motor skills to diabetes, cancer, and Alzheimer's). Economic pressure on national health systems is increasing. They are overburdened due to lack of staff, budget constraints imposed by public health, emergency, or exceptional events.

Another problem is the lack of doctors and nurses, the staff dropouts due to burnout and work-related stress or, even more challenging, the presence of changing contexts i.e., cases where patients with the same disease but placed in different family or social contexts have different characteristics and needs. Probably no single medical protocol can be applied in these cases, but doctors must be able to decide on a case-by-case basis.

Within this context, three main factors can be identified that explain the crisis in the health care sector: the gradual decrease in the number of physicians, the aging population, and the increased demand for care for chronic diseases. Providing adequate treatment and care to the population may become almost impossible, generating tragic consequences and domino effects on the economy and society. Investing in prevention is a strategy that could bring excellent results in the long term, but in the short and medium terms one solution is to invest in how to provide services to patients in a way that improves affordability and efficiency of care. An efficient health care system depends on accessibility, quality, availability of professionals and services. In today's scenarios, doctors can no longer rely solely on themselves to provide patients with quality diagnosis and care and in an acceptable time frame. It is necessary for the health care system to be supported and complemented by intelligent and (semi-) autonomous systems to support both the doctors and the patients. As EU documents show the urgent need for intelligent systems for healthcare should not be

underestimated. Investigating the importance of AI and Robotics in health care is the current challenge for scientists and doctors.

Activities. The new digital technologies covered in this research will play a major role in the transformation of health and care systems. Robotics and Artificial intelligence can potentially transform health and care facilities in all their functions, from the clinical aspects (screening and prevention, diagnosis, treatment, surgical support) to the organizational and the logistical ones. The results of this research project will contribute in the future to transforming traditional healthcare systems into a data-driven, experience-driven, patient-centered model that is more collaborative, distributed, and personalized and that can be cross-cutting across the various domains of healthcare.

The proposed Ph.D. project aims at investigating and analyzing how an intelligent system can help a doctor, or nurse, make decisions, even in dynamic contexts and support a patient during his or her care journey. The doctoral research activity will be carried out mainly in the Robotics Laboratory of the Department of Engineering. The idea is to create an intelligent system that can continuously interact with users (doctors, nurses, patients) and an often-changing environment. An intelligent system that can self-adapt to changing situations and decide the best action to take even in the complete or partial absence of input data from doctors or patients. All these aspects include the design of systems that can plan and adapt at runtime and at the same time provide the right level of reliability, acceptability, and transparency (closely related to the concepts of Trustworthiness and Human in the loop that underlie the well-known Explainable AI).

Two main activities will be pursued over the three-year PhD program:

1) Intelligent and Adaptive Support for Healthcare Professionals. This activity aims to create intelligent support to respond in a timely and efficient manner to the changing and sudden needs of patients and the environment. Support is also configured in the management of human-computer interaction. During this activity, techniques for creating autonomous, adaptive, and self-conscious systems will be explored from both a design and implementation perspective. The solution adopted to achieve this goal will lead to reduced costs and, most importantly, increased efficiency in cases of overloaded healthcare facilities.

As part of this activity, particular attention will be devoted to the use of soft robotic systems for physical human-robot interaction in medical scenarios. Due to their intrinsic compliance, soft robots are well-suited for safe and adaptable interaction with fragile or elderly patients. The doctoral research will explore methods for the estimation and control of mechanical impedance, integrating feedforward action strategies to ensure responsive, stable, and personalized assistance during therapeutic or rehabilitative tasks. These developments will support the creation of intelligent robotic systems capable of adapting to the patient's physical and physiological characteristics in real time.

2) Advanced patient monitoring. The objective of this activity is the analysis and implementation of techniques suitable for patient monitoring and support. To do this, robots and IoT devices can be used to constantly monitor the patient in care facilities, or at the same time a set of patients. For example, at the entrance of triage, to capture in real time all useful data to be sent to the intelligent system. By useful data, we mean data that can be used to formulate a diagnosis or treatment hypothesis. Another key element of patient monitoring is the support of all activities during the stay in the healthcare facility. The outcome will be the improvement of the patient's quality of life, in fact, the system will adapt to the patient's needs, for example, it will make suggestions on how to take medication or complete a therapy. At any time, the monitoring system will alert the doctor or nurses of any abnormality in the patient's status or behavior.

Expected results. The proposed PhD program promotes the design and development of tools for ameliorating, modernizing the current public health with a specific goal to overcome the effects of the current crisis and its social consequences and to prepare for a green, digital, and resilient recovery of the economy. The doctoral track aims at fostering the creation of new knowledge and new technologies for the improvement of patient diagnosis, treatment and quality of life can find its natural verticalization in combating the health, social and economic challenges.

The results and impact of the PhD project will be directly measured through KPI indicators such as scientific excellence and industrial impact. Regarding scientific excellence, the publications produced in the three years of the doctoral program will be considered, in relation to the internal regulations of the doctoral host university and the regulations of the doctoral program itself. Bibliometric indicators will be mainly used, and reference will be made to the SCOPUS and/or WOS databases.

On the other hand, as far as industrial impact is concerned, the spin-off in terms of the production of software prototypes, within the company that will host the doctoral student, for the realization of the intelligent system to support doctors and patients will be considered.

Requirements:

Applicants are expected to have a general background in robotics, artificial intelligence, expert systems, control theory.

References:

1. Lanza, F., Seidita, V. and Chella, A., 2020. Agents and robots for collaborating and supporting physicians in healthcare scenarios. Journal of biomedical informatics, 108, p.103483
2. Sorbello, R., Tramonte, S., Giardina, M.E., La Bella, V., Spataro, R., Allison, B., Guger, C. and Chella, A., 2017. A human–humanoid interaction through the use of BCI for locked-in ALS patients using neuro-biological feedback fusion. IEEE Transactions on Neural Systems and Rehabilitation Engineering, 26(2), pp.487-497
3. Seidita, V., Lanza, F., Pipitone, A. and Chella, A., 2021. Robots as intelligent assistants to face COVID-19 pandemic. Briefings in Bioinformatics, 22(2), pp.823-831
4. Spataro, R., Sorbello, R., Tramonte, S., Tumminello, G., Giardina, M., Chella, A. and La Bella, V., 2015. Reaching and grasping a glass of water by locked-in ALS patients through a BCI-controlled humanoid robot. Journal of the Neurological Sciences, 357, pp.e48-e49
5. Dindo, H., Presti, L.L., La Cascia, M., Chella, A. and Dedić, R., 2017. Hankelet-based action classification for motor intention recognition. Robotics and Autonomous Systems, 94, pp.120-133
6. M. Trumić, K. Jovanović, and A. Fagiolini, "Decoupled nonlinear adaptive control of position and stiffness for pneumatic soft robots," International Journal of Robotics Research, vol. 40, no. 1, pp. 277–295, 2021

Number of positions available:

1

Main Research Site

RoboticsLab (http://diid.unipa.it/roboticslab/), MIRPALab (https://www.mirpalab.it/), Viale

delle Scienze, University of Palermo, Palermo, Italy.
Contacts: Email: arianna.pipitone@unipa.it, adriano.fagiolini@unipa.it, antonio.chella@unipa.it, valeria.seidita@unipa.it
Funding Scheme: This grant is funded by the University of Palermo.
Scholarship Amount: • Fascia 1: 16,500 €/year

5. Personalized and proactive behaviors for socially aware robots – University of Naples Federico II

Curriculum:

Healthcare and wellness of persons

Hosting Institution

University of Naples Federico II (Università degli Studi di Napoli Federico II)

Department:

Centro Interdipartimentale ICAROS

Department of Electrical Engineering and Information Technologies

Tutor(s):

Prof. Silvia Rossi

Description:

Socially assistive robotics (SARs), aiming to improve the standard of living in modern society through social interactions, find applications in various fields such as hospitals [1], or support for the elderly [2]. In these application contexts, social robots are designed to interact with people naturally and personally through verbal, nonverbal, or affective modalities. This project aims to investigate how a robotic system can engage a user in context-aware interactions by leveraging multimodality. To do so, we aim to investigate how a robotic system can understand and appropriately interpret human multimodal cues or predict the intentions, situational and social context, and future actions of other actors. Through this, robots can provide personalised assistance through monitoring, coaching, encouragement, and motivation towards specific therapeutic goals. The project intends to investigate how the use of LLM and multimodal LLM can leverage natural mechanisms for both understanding users' intentions, beliefs and situational context as well as to produce effective content-dependent and personalized dialogues.

Moreover, most current robotic systems tend to react to human inputs or after an event has occurred, whereas few ones take the initiative proactively [3]. This project is aiming to investigate how robots could be endowed with adaptive and proactive behaviour in order to predict the users' needs to support them in assistive tasks. To achieve this goal both the proper perceptual capabilities to infer beliefs, emotions and desires of a user and decision-making ones are necessary components. In particular, the ability to have a Theory of Mind (ToM) representing and reasoning on the users' mental state as they evolve over time and personalize the robot's behaviour based on inferred beliefs and intentions will be considered.

Requirements:

Applicants are expected to have a master's degree or equivalent in Computer Science, AI, or robotics. Previous experience in machine learning, robot programming, and/or human-robot research is preferential.

References:

[1] Rossi, S., Larafa, M., Ruocco, M.: Emotional and behavioural distraction by a social robot for children anxiety reduction during vaccination. International Journal of Social Robotics 12, 765–777 (2020)

[2] Di Napoli, C., Ercolano, G. & Rossi, S. Personalized home-care support for the elderly: a field experience with a social robot at home. User Model User-Adap Inter 33, 405–440 (2023).

[3] Ilenia Cucciniello, Antonio Andriella, and Silvia Rossi. 2023. Towards a Computational Approach for Proactive Robot Behaviour in Assistive Tasks. In Companion of the 2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI '23). Association for Computing Machinery, New York, NY, USA, 521–525.

Number of positions available:

1

Main Research Site

PRISCA Lab, Università degli Studi di Napoli Federico II, Piazzale Tecchio, 80215 Napoli, Italy. (https://www.prisca.unina.it/)

Contacts:

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Funding Scheme: This doctorate grant is funded by University of Naples Federico II.

Scholarship Amount:

- Fascia 1: 16,500 €/year

6. Upper limb soft wearable robotics – Università Campus Bio-Medico di Roma

Curriculum:

Healthcare and wellness of persons

Hosting Institution:

Università Campus Bio-Medico di Roma

Department:

Departmental Faculty of Engineering – Research Unit of Advanced Robotics and Human-Centered Technologies

Tutor(s):

Nevio Luigi Tagliamonte and Loredana Zollo

Description:

Wearable robotic technologies are emerging as a powerful tool to support motor rehabilitation and functional assistance in individuals with upper limb impairments. Their potential to restore motor functions is transforming both clinical and everyday settings. The development of wearable robots for the upper limb is particularly challenging due to the complexity of human arm motion, which includes multiple degrees of freedom and intricate joint kinematics across the shoulder, elbow, and wrist.

Wearable robots often rely on rigid structures, which provide robust mechanical transmission of forces and accurate motion control. While effective in many scenarios, rigid systems may be bulky, uncomfortable, and poorly adaptable to the natural human motion. These drawbacks can limit user acceptance, especially in long-term use or applications requiring high dexterity. In contrast, soft wearable robots have gained increasing attention in recent years for their ability to conform to the human body, enabling safer and more comfortable motion [1]. Soft wearable robots, which leverages compliant materials, and often cable-driven or fluidic actuators, may face limitations in terms of load capacity, structural stability, and accurate control.

One promising direction to overcome the mentioned drawbacks consists in exploring novel approaches that combine rigid and soft elements in a structurally integrated manner [2].

For example, smart shell-based solutions can be engineered to exhibit programmable global shaping starting from local cells deformations. These solutions enable robotic structures that are simultaneously supportive and adaptable, creating wearable devices that conform to the body while guiding or assisting complex movements in a more controlled way [3].

Within this research theme the PhD candidate will work on the mechanical and mechatronic design and prototyping of a new generation of rehabilitation/assistive soft wearable robotic devices for the upper limb. The research will emphasize structural innovation to address the mechanical, anatomical, and functional demands of upper limb movement. Rather than choosing between rigid and soft paradigms, the goal is to engineer soft-rigid structure and geometric continuum that ensures comfort, safety, and biomechanical alignment.

More specific activities will include (but are not limited to):

- Design and modeling of wearable structures that can follow natural upper limb joint trajectories, ensuring anatomical and kinematic compatibility.
- Identification of deformable elements and shell-based components (e.g. with cellular or architected geometries) to achieve controlled deformation with localized compliance.
- Structural and material optimization to tailor the mechanical response of the device to desired motion patterns.
- Development and prototyping of selected solutions by using both additive manufacturing and traditional fabrication techniques.
- Experimental validation through bench tests and human-centered assessment.

The candidate will have the opportunity to work in a dynamic research environment, offering access to advanced prototyping facilities and close collaboration with other researchers in robotics, biomechanics and bioengineering.

Requirements:

The ideal candidate would have a MS degree in Mechanical Engineering (preferred), Biomedical Engineering, Mechatronics Engineering, Aerospace Engineering, or related fields. Applicants are expected to have (or willing to get) advanced knowledge of CAD/FEM software for mechanical design, additive manufacturing technologies, design optimization processes, and Matlab programming. An appreciated plus is a previous experience in robotics for bioengineering, compliant mechanisms and soft robotics, smart materials, wearable robotics, optimization algorithms for mechanical design.

References:

[1] Bardi, E. et al., 2022. Upper limb soft robotic wearable devices: a systematic review. Journal of NeuroEngineering and Rehabilitation.

[2] Ou, J., Ma, Z., Peters, J., Dai, S., Vlavianos, N., & Ishii, H. (2018). KinetiX-designing auxetic-inspired deformable material structures. Computer & Graphics, 75, 72-81.

[3] Kulkarni, S. R. et al. ''Modelling and optimisation of a mechanism-based metamaterial for a wrist flexion-extension assistive device'' IEEE ICRA 2021.

Number of positions available: 1

Main Research Site

CREO Lab, Università Campus Bio-Medico di Roma – Via Álvaro del Portillo 21, 00128 Roma (RM) (https://www.unicampus.it/en/ricerca-ucbm/unita-di-ricerca/unita-di-ricerca-ingegneria/robotica-avanzata-tecnologie-centrate-sulla-persona-creo-lab/)

Contacts:

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Funding Scheme: This doctorate grant is partially funded by INAIL within the project BioARMnext (Esoscheletro portatile per la riabilitazione e l'assistenza del paziente plesso-leso: follow-up), CUP: E57G23000260005.

Scholarship Amount:

- Fascia 2: 17,500 €/year